Political Change Explained, Validity, and a Cognitive Perspective

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Abstract

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Global conditions affecting politics are changing as conditions including pervasive information technology (IT) and climatic change gain in importance. Techniques that can analyze how people's political cognitions are similarly changing need be developed in order to understand the implications of changing conditions affecting politics. This paper presents aggregate cognitive mapping as a technique that can evaluate how people's cognitive habits are changing with new global conditions. Cognitive studies are extensively defined in this paper with examples from fourteen different areas of political science that are shown to have used cognitive studies as a tool for analysis between 2002 and 2009. The extent cognitive studies have been used in political analysis recommends this technique as possible in studying political change.

Greater research validity is attained because the cognitive technique presented here is aligned with current social science movements. Aggregate cognitive mapping is accomplished by coding a sample's responses on an X and Y axis. Developments in qualitative methods that emphasize interpretative and action research comprise one contemporary social science movement with implications for research validity. The encouragement of greater use of IT to accomplish more sophisticated political analysis is discussed as the second social science movement affecting validity. Better artificial intelligence is imagined capable of accomplishing excellent results in political analysis. Concept sharing from IT to social science is improving communicating social science results. Aggregate cognitive mapping is a methodology that draws upon the contemporary strengths of both qualitative methods and IT analysis in political analysis. The seriousness of developments in both of these social science movements are supportive of aggregate cognitive mapping and can allow this method to attain acceptable validity in research results.

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Politicians claim to have unusual abilities to accomplish political change. Popular sentiment applauds rhetoric promising political change. The political scientist, though, is left to present whether change is authentic or rather based in people's imagination. Political movements in the past unable to substantially affect conditions, have traded upon promises that were empty and lacking in reality. Present political use of the word "change" claims instead to be providing a service to citizens helping them adjust to emerging conditions that are reshaping contemporary reality. Popular political support occurs as citizens need the redefinition of current problems that politicians provide. Emerging political realities better appreciate how the polity can develop and advance with confidence. Society can accomplish results that would be impossible without people accepting the rhetorical theme of political change.

This paper analyzes from a cognitive perspective how to determine if political change is
authentic. The hypothesis the paper develops is that some non-political conditions as exemplified by rapid technological change and global warming have reorganized how citizens think about political problems. In some cases, these emerging realities may require political reaction to enable an optimistic future. In other instances, citizens like to hear what they are experiencing vocalized. Political talks about change probably have the current strength they have because they resonate with psychological needs widely shared among citizens.

Popular cognitive developments about changing conditions demand politicians who satisfactorily explain these phenomena. The rapid rate of change in information technologies has produced substantial dislocation in how politics reason. IT has had more pervasive influence than any similar phenomena. The logical analytic techniques upon which IT is based have been pervasively infused into other areas of knowledge and society. After the substantial introduction of IT, people conceptualize politics differently. Citizens eagerly anticipate a politician who can reassure them that their changes in cognitive perspective from pervasive IT are authentic.

Global warming is analogous causing citizens to reorganize how they perceive political realities. Established formulas for organizing and perceiving climatic events are being revised. Equilibrium phenomena are now much better understood as dramatic weather confronts people with the significant difference even a few degrees can make in weather occurrences. Economic perspectives are similarly being tested, as weather occurrences increasingly prove costly. People like to hear politicians who can explain the climatic changes they perceive as affecting themselves. Hearing politicians discuss these changing realities perfunctorily gains citizen approval. Citizens like to know that their own explanations about global warming have political reality.

The methodological problems in studying political change are substantially validity problems. The empty phrases as answers for dire conditions from politicians in the past produces contemporary concern with whether claims of authentic change occurring within the polity can be shown to have validity. Methodology reasonably is directed toward discussing whether authentic cognitive realignments are occurring as politicians assist citizens accommodate emerging problems and develop more successful techniques for cognize political realities. Authentic change could be explained as more effective cognitive reality taking over from obsolete cognitive practices. The methodologist studying political change needs to authenticate that people's reasoning is advancing and becoming more sophisticated.

Methodologists could use qualitative data gathering techniques to establish changing cognitive abilities as the result of emerging conditions including pervasive IT and global warming. Interpretive skills could assist in cognitive mapping and allow better appreciation of the cognitive realities upon which political rhetoric impinges. Observing the cognitive schemata allows explanation for why change rhetoric is presently powerful. Deciding if change themes are a reflection of authentic progress or empty words is another possible research result.

When present political change rhetoric is analyzed from a cognitive perspective, results may
reassure that politicians are providing a service to the electorate. Unlike questionable politicians of the past who based their appeal on empty phrases addressed to dire conditions, present political appeals to change can likely be shown constructive. Cognitive mapping can establish that emerging conditions generate authentic needs for political explanations that are reinforcing. Unlike the past, present political themes about change are useful knowledge valuably assisting citizens adjust to emerging conditions. Politicians who use change rhetoric are encouraging individual's politics as they support what people already know about changing conditions.

**Cognitive Studies Appear Useful for Studying Political Change**

Recent interest in cognitive psychology as useful in political analysis deserves attention. Cognitive studies have for decades been useful to political theorists. Explaining how people think and solve problems has assisted political science analyze political behavior in many different contexts. The word "cognitive" is now experiencing substantial renewed interest and contemporary theorists are producing explanations for politics that rely upon the contributions of cognitive psychology. This paper begins by examining some techniques for discussing cognition that are useful in political analysis.

A possible reason cognitive studies have their present popularity is because of the diversity of ideas that can be called cognitive analysis. Richard Rorty's discussion of cognitive modes is a excellent place to begin explaining the usefulness of cognitive studies. Rorty writes about cognitive modes and explains a mode he calls "desire for solidarity" and another mode he identifies as "desire for objectivity." These two cognitive modes are different methods for knowing and understanding the reality that people confront. (Rorty, 1985, 3) The desire for objectivity is associated with analytic research results. The desire for solidarity with knowledge acquired through action research.

Qualitative methods in social science currently are making extensive use of Rorty's perspective about two cognitive modes. Orthodox qualitative methods, of course, intend to build knowledge by objectively explaining from data. Other contemporary popular qualitative methods techniques are more directed at acquiring knowledge through solidarity with experience. Ethnomethodologists "focus on how members actually 'do' social life." (Holstein and Gubrium, 2008, 177). Performance ethnography explains that "a performance of possibility is always a harbinger of and a confrontation with the truth. " (Madison, 2008, 245) The artfulness of qualitative methods explains building knowledge as accomplished by these two possible techniques.

A cognitive study explanation of the solidarity mode and the objectivity mode of knowing proves useful in discussing how methods techniques can create useful knowledge. While ordinarily one is aware of building knowledge with objective techniques, one cannot reasonably deny that experiential or active learning can be a powerful influence in better comprehending conditions. Popularly, cognitive studies assist methodologists discuss gains made from both techniques in knowledge building.
Dissatisfaction with developments in the social sciences produced the current emphasis on qualitative methods. Possibly knowledge building was failing to adequately occur with quantitative methods' objective techniques. Excessive obedience to exact research procedures slowed or prevented much being learned about social phenomena. This failure has lead to the proliferation of qualitative methods techniques that have diligently sought to build basic social science knowledge. Social science techniques that involved greater emphatic involvement with whatever was being studied began to rival traditional techniques.

Cognitive explanations for this happening emphasize that alternative modes of knowing are present in human abilities. Active, involved learning directly connected to the phenomena being studied successfully makes rational research activity. Alternative techniques made genuine increases in what was known about subject being researched. Political analysis became stronger as a result of cognitively effective techniques for social science research.

Cognitive methods are influential in advanced computer techniques that could prove valuable in political analysis. This perspective on building social science is somewhat different than qualitative methods yet as the research ideas presented here establish, the techniques intersect at several points. Those who like to imagine information technology making substantial changes in what is possible in political analysis have interest in cognitive psychology. Artificial intelligence (AI) is usually explained as a possible way IT could improve the sophistication of political analysis. All sorts of complex problems that involve assessing numerous variables in changing conditions appear amenable to IT analysis. Artificial intelligence possibly has the ability to reduce seemingly insurmountable problems in analysis to rational proportions. Knowledge of human cognitive processes can serve as the basis for sophisticated models of artificial intelligence.

Ordinarily, artificial intelligence is explained as having two important functions—representational knowledge and emergent knowledge. Representational knowledge refers to how IT organizes and presents information about pertinent subjects. To succeed in being useful AI must know what bits of information are useful in a given situation and present them to decision makers in a comprehensible manner. When AI has adequate strength in representational knowledge, this task is successfully accomplished. (Ein-Dor, 1999, 121).

Emergent knowledge refers to how AI can possibly seek out new developments in what is known and add new facts to the data system's database. When AI succeeds with emergent knowledge, changes occurring in the environment relevant to the problem being analyzed are recorded and usefully analyzed. The complex problems in political analysis could be resolved satisfactorily if excellent AI had the ability to locate facts and integrate them into the information system's database. (Ein-Dor, 1999, 121)

The imagination about how significant AI's contribution to political analysis could be is profound. Any analysis problem that involves many variables and changing conditions could
possibly be better accomplished with AI. As cognitive studies learn about human thought processes, IT acquires possible models for more sophisticated AI. Cognitive studies presently appear useful in the preliminary concept building that may one day produced the sophisticated AI capable of accomplishing political analysis. All the gains from more AI and IT analysis are not in the future, however. The conceptual strength of these fields is now adequate to allow concept transfer to political analysis. Concept transfer from IT strengthens the communication strength of research presentation as IT concepts are powerfully accepted.

Theory beyond Qualitative Methods and Artificial Intelligence

Cognitive studies currently are increasing in popularity because, as the proceeding paragraphs have explained, two important movements within social science are emphasizing cognitive explanations. The emphasis that qualitative methods place on cognitive rationalisms for knowledge building techniques improves the respected qualities of cognitive studies. Qualitative methodologists become involved with their research aware that knowledge building happens as cognitive change occurs as result of research activity. Developing social science is more involved with current social realities than simply building objective truths. Cognitive accomplishments are understood to contribute to knowledge building.

Increasingly, social science is questioning how more analytic functions could possibly be turned over to AI. The increasing sophistication that could occur from more extensive use of AI is tempting theory builders in many areas of social science to anticipate how AI could increase the complexity of their work. Cognitive studies are now followed with considerable interest because new developments in IT may allow including findings from cognitive research in intelligent computers. The possible gains in more sophisticated political analysis are readily recognized.

While qualitative methods and AI may be the most substantial influences encouraging more use of cognitive studies, the literature in political science has an abundance of other ideas for using cognitive studies. When one reviews various ideas for applying cognitive principles to political analysis, a more complete definition of cognitive studies is produced. One could explain cognitive research as pertaining to anything about how problems are analyzed. The thought processes that occur in reasoning with the various realities are the legitimate subjects of cognitive research. While this definition appears comprehensible, examples of theoretical ideas connecting political analysis and cognitive research are useful in further defining what "cognitive" refers to in ordinary social science usage. de Araujo Silva explains, "Cognition refers to the human mental processes of perception, reasoning and intuition that allow us to interact with ourselves and with our surrounding physical and social environments in intelligible ways. It applies to mental processes such as problem solving, memory, attention, emotion and behavior, among others." (de Araujo Silva p,. 2008, 13)

Cognitive techniques have been attractive to many political scientists attempting to analyze problems in their area of interest. Theory and research about inherent properties of human thought are potential explanation for numerous happenings in politics. Thanks to the efforts of a
Cognitive studies most frequently are used between 2002 and 2009 to attempt to explain international politics. Theorists who use cognitive concepts often discuss limitations in humans that restrict ability to successfully analyze international situations. Over 50 years ago, Herbert Simon introduced the concept of "bounded rationality." As Simon explained, "The capacity of the human mind for formulating and solving complex problems is very small compared with the
size of the problems whose solution is required for objective rational behavior in the real world or even for a reasonable approximation to such objective rationality.” (Simon, 1957, 198) Various international relations theorists have attempted to explain the implications of foibles of human consciousness for resolving international situations. The objective of these international politics studies is usually to suggest procedures for remediing inherent defects in consciousness. When ordinary failings of mental process are understood, possibilities occur for designing systems of rationalism that attains rational choice despite cognitive limitations.

Studies about electoral behavior are the political science area that second most frequently uses cognitive studies. According to Kim, Lodge, and Tabor, cognitive/affective mechanisms programmed into John Q. Public successfully produce a set of well-known empirical phenomena found in electoral research." (Kim, Lodge, and Tabor, 2004, 1) Levin explains that the "need for cognition" can be used to predict voter turnout (Levin, 2004, 1) These and other studies exemplify using cognitive studies to explain why people vote as they do. The cognitive explanation theorists produce attempts to explain the behavioral mechanisms that determine electoral choice.

As Table One presents, the third most often attempted use of cognitive studies is in discussions about attitudes, opinions, and thought mechanisms. Public opinion studies have the objective of explaining those beliefs held by mass publics. Commonly held attitudes can themselves be discussed as political phenomena. Many analysts observe a connection exists between attitudes and beliefs and political behavior. Cognitive studies are used to explain attitudes and opinion mechanisms for adjusting or making congruent beliefs.

Leon Festinger's book about cognitive dissonance from 1957 is a famous example. Cognitive dissonance explains that if person A has a positive attitude toward both persons B and C, then person A would have difficulty maintaining that the valances of the relationship between B and C was negative. Cognitive mechanisms would adjust beliefs so that the valance between B and C was perceived as, also, positive. (Festinger, 1957)

Cognitive dissonance is by present-day standards not a complex explanation of inherent human thought traits. de Araujo Silva explains thought process as having four levels—creative schema, conceptual schema, logical schema and physical schema. An individual summarizing personal perceptions of a given subject would exemplify the activity of the creative schema. The conceptual schema includes sketches, mental models and maps of concepts and their relationships. Taxonomies, typologies and classifications comprise the logical schema. The physical schema is analogous to an expert system found in IT where specific data is stored. (de Araujo Silva, 2008, p. 16) Contemporary explanations for human thought emphasize combining numerous variables such as these four levels or schemas of thought.

Studies that explain democratic governments are the fourth most frequent users of cognitive studies. Collective intelligence has been used to explain why democracy succeeds. This phenomenon is alternatively known as "distributed intelligence." Whether referred to as
collective or distribute intelligence, this cognitive phenomenon occurs when thought processes are stretched across different individuals, culturally organize settings, and possibly political institutions. (Landemore, 2008, 4-5)

Collective intelligence has also been explained as a statistical phenomenon called "the miracle of aggregation." Landemore explains, "a few informed people in a group are enough to guide the group to the right average answer, if uninformed people's answers are randomly distributed and thus cancel each other out." Here collective intelligence actually depends on extracting the information held by an informed elite from the mass of "noise" represented by other people's random opinions. (Landemore, 2008, 19-20) This paper later makes a reasonably similar use of aggregate cognitive analysis in explaining a methodology usable to evaluate how change conditions affects cognitions.

Morris explains another possibility for using cognitive studies to discuss the conditions that allow democracy to flourish. "The ways people comprehend, come to understandings with one another, and embody the relationship between knowledge and social action are authentic concerns of cognitive studies. (Morris, 2008) This perspective defines culture as the "the subject's imaginary relationship to the real" which is infused with historical relationships of class, power and domination. Cognitive structure is explained as having a political dimension since to some extent cognition is culturally determined. . (Morris, 2008, 10) Democratic freedom (political autonomy) exists when the laws that bind citizens are the product of their will in accordance with insights they have acquired intersubjectively.(Morris, 2008, 1)

Comparative politics is fifth in the use of cognitive studies. Comparisons among nations like to explain differences in political culture so as to allow comprehension of how political outcomes are shaped. The comparativist attempts to identify as many unique features of countries as possible. Cognitive analysis is theoretically useful in differentiating among various nations. Sheehy-Skeffington exemplifies current interest in this technique as she writes about comparative cognitive psychology. Her perspective is basically that cognitive mechanisms may be hard-wired evolutionarily, but that which mechanisms are activated and in which ways are determined by cultural context. (Sheehy-Skeffington, 2008, 4)

An example of a comparative politics study using cognitive studies as an analytic tool is Weyland discussion of Bolivia's pension reform. Weyland's analysis of the Bolivian case explains that policy-making in this country differs substantially from the rational comprehensive model. The dominant factor Weyland identifies in Bolivia is the use of "cognitive shortcuts that facilitate decision-making, but risk creating distortions and biases in judgment, especially the heuristics of availability, representativeness, and anchoring occur." Weyland concludes that political rationality in Bolivia exemplifies bounded rationality and that "cognitive-psychological findings" can offer a much “firmer more convincing micro-foundation for political science" to use in discussing Bolivian pension reform. (Weyland, 2004, 6-8)

Communication studies are sixth in number of research articles produced that rely on cognitive
analysis. Popescu discusses metarepresentation distinguishing between internal or mental representations of knowledge and public representations that "are meant to mean that something too to someone else." Public presentations are termed "metarepresentation." Virtually only humans use metarepresentations. Humans use metarepresentations continually and they essentially make "humans what we have become." (Popescu, 2008, 15-16)

Rosenberg discusses cognition and communication as having both subjective and inter-subjective dimensions. Communication, according to Rosenberg, can "take qualitatively different forms thereby producing (a) structurally different ways of coordinating the interaction between participants and (b) different possibilities for the kinds of meanings they can inter-subjectively construct. Three types of communications are imagined produced by these qualitative variances: "(1) concretely anchored, conventional discourse, (2) co-operative discourse and (3) collaborative, transformative discourse." These three styles of communication can be understood as analogous to familiar political discourse. The first type "is consistent with a conservative vision of citizen discourse, the second with a liberal democratic tradition and the third with a more critical, developmental democratic tradition." (Rosenberg, 2008, 1)

Nelson and writes about how the popular cinema can prefigure any phenomenal field. Nelson explains, "cognition depends on-more or less prior-recognition. To 'apprehend' something in the firm if mental grasp which is what the word means, we must discern something to grasp." Movies effectively "prefigure our political experience and responses." When people experience new situations, they cognitize less with "political facts" than with "audiovisual 'figures,' many from movies." (Nelson, 2002, 7)

Learning and socialization studies appear tied with decision making studies as the seventh most popular use of cognitive studies by political science. This author has written about group cognitizing about IT. This research discussed comparing the aggregate cognitizing habits of the IT sophisticated with students whose classes have informatics content. Education including informatics is hypothesized to increase the similarity in cognitizing habits between students and the IT sophisticated. This is deemed significance as students acquires more strength employing IT concepts in a wide range of analytic problems from informatics content. (Mitchell, 2008)

Rosenberg, Sellick, and Winterstein recently presented research that examined how different classroom techniques affected "the development of individual's political reasoning." Three classroom instruction conditions were used in their experiment -- "(a) a ordinary seminar, (b) a seminar which adopted a debate format placing students in opposing groups, and (c) a seminar which combined initial debate with a subsequent attempt to bridge differences by crafting some common ground of understanding and evaluation." A pretest and post test was devised that measured students' ability "to make sense of a political issue." (Rosenberg, Sellick, and Winterstein, 2009)

When cognitive studies are used in decision making analysis, these studies usually explain weaknesses that carry over from man's inherent mental processes to rational choice situations.
The cognitive psychologists Amos Tversky and Daniel Kahneman provide an explanation often used as an alternative to the rational actor or expected-utility theory of decision making. Tversky and Kahneman begin by identifying common heuristics used in making judgments under conditions of uncertainty that lead to efficient yet often biased outcomes. In general, their work demonstrates how individuals reduce complexity by relying on a limited number of heuristics which provide shortcuts to assessing the probability of an event or the value of a quantity in outcomes. (Fisher, 2008, 11-12)

Heuristics are used in human consciousness because people have a limited ability to reason with complicated probabilistic relationships. Richard Heuer explains, "Some people tend to employ simple rules of thumb that reduce the burden of processing such information." (Heuer, 1999, 122). Tversky & Kahneman report that studies over the past three decades have generated a wealth of empirical evidence supporting the explanatory power of heuristics. Yet, while these mental processes can be extremely useful and adaptive in many situations, "the use of the availability heuristic leads to systematic biases." (Tversky & Kahneman, 1982, 164)

Extension neglect is another example of a cognitive bias that necessitates caution in decision making. When evaluating a possible option or course of action, human have a tendency to place the same value on an action with little regard for the number of units (e.g., people, animals, lakes, etc.) it will affect, unless specifically drawn to focus on the numbers. (Woocher, 2008, 21) Humans appear to have the ability to comprehend small numbers but lack ability when large numbers are used. Daniel Kahneman discusses a series of experiments that tested how many subjects would be willing to pay to save a given number of birds from drowning in oil. Kahneman summarized, "It doesn't matter what the number of birds is. Two thousand birds, two hundred thousand, two million, they will pay exactly the same amount." (Kahneman, 2007)

Group behavior studies and general discussions of social science tied for ninth place in how frequently cognitive studies are used in different research articles. Margolis discusses group behavior in his analysis of the results of a group playing the "minimum game." In this game, there are 10 rounds of choice. In each choice situations, the higher the minimum choice in a group the better the payoff to anyone matching the minimum; however, anyone whose choice turns out to be higher than the minimum gets less. Explaining his research results, Margolis observes "a cognitive illusion that diverts many players from a rational response" occurs, which in turn forces even those not caught by the illusion to go along. (Margolis, 2007)

Social science issues that surround successful interpretivism have been discussed in another paper by this author. The cognitive skills required to succeed with interpretive techniques need be taught in order for this method to attain desired results. Qualitative methods cannot deny the connection between interpretivist skills and the political left. Qualitative methods is approximately a reaction to the perceived failures of traditional statistics based quantitative methods. Social action research reasoning additionally permeates contemporary qualitative methods. How to teach interpretivism's cognitive skills without compromising research results with a left bias remains a social science issue as the bureaucratic demand for qualitative research
increases. (Mitchell, 2007)

Eleventh place is a three-way tie between leadership studies, American government institutions, and political activism studies. Brown writes about cognitive complexity and political leadership. Complexity is discussed as the tendency individuals have to construe behavior in multidimensional ways. More cognitively complex individuals, have more "ability to psychologically order, integrate, and link different issues during decision making." (Brown, 2004, 7)

Lieberfeld analyzes Nelson Mandela's leadership style and concludes, "Cognitive complexity allows pride in his own group to coexist with empathic understanding of the adversary group." Mandela's high degree of cognitive complexity "enabled him to fulfill the different roles of nationalist leader/competitive negotiator and of mediator/integrator, and equipped him, more so than other revolutionaries, for the transition to post-liberation leader." A famous 1989 letter from Mandela to the government refused to retreat from core ANC demands and yet addressed "the minority's fears as well as the majority's aspirations." (Lieberfeld, 2002, 28)

Gronke and Wilson discuss U.S. Representatives and their constituents. Constituents, they find, have a tendency "to retain facts and messages that reinforce their existing opinions and to discard those that would force them to reevaluate." This is called the "resistance axiom" to cognitive dissonance theory. People tend to refuse information inconsistent with their beliefs in order to minimize cognitive dissonance. Constituents are more likely to remember a U.S. Representative's vote on a specific measure if they are supportive of the measure. In instances where constituents do not agree with the Representative, they more frequently forget his vote and imagine that the Representative agrees with them. (Gronke and Wilson, 2008)

The cognitive impact of violating folk social psychological assumptions is discussed by Sheehy-Skeffington, as being an influence that spurs political activism. "The folk theory of human nature" is explained by Sheehy-Skeffington as acquired by an individual early in life. The cognitive foundations of present day cultural and social phenomena may well be found in conflict with early ideas about human nature. Political activism could be explained to emerge from this incongruence between individual's folk theory of human nature acquired in childhood and their present day reality. (Sheehy-Skeffington, 2008, 28)

The fourteenth most common are research articles that attempt to explain the globalization phenomena using cognitive studies. Barkin presents the reality of globalization as influenced by conflicts between national norms and global norms. He interests in aggregate belief systems and how they respond to globalizing conditions. "Aggregate cognitive maps," "collective intelligence," and "distributed intelligence" are all terms that have been applied to phenomena similar to the phenomenon Barkin discusses as "normative dissonance." As Barkan explains "the concept of normative dissonance... aggregates from patterns of individual cognition." (Barkan, 2002, 12-13)
Barkin asks that globalization be understood as "the processes of interaction among norm sets, whether or not they are mutually compatible." While the possibility exists that two conflicting norms sets can exist within the same population-- one being basically nationalistic and the other being primarily global-- normative dissonance theorizes about attempts to resolve differences in beliefs by a mechanism analogous to cognitive dissonance. Barkin causes one to imagine that substantial shifts toward globalism occur as normative dissonance resolves norm set conflicts in favor of globalism. (Barkan, 2002, 18-19) Barkan's ideas about normative dissonance are somewhat similar to this paper's aggregate cognitive theme. Barkan emphasizes the usefulness of theorizing about aggregate opinion phenomenon.

One gains a substantially better definition of cognitive studies from reviewing the fourteen areas of political science that have used cognitive studies in recent years. From the various examples that have been used to explain each of these areas, one acquires a more precise understanding of the meaning of the term, "cognitive studies." The extensive definition of "cognitive" provided in this manner is useful in realizing the versatility and possibilities this field of study has for political analysis.

Bender has created a list of six properties that are always true with regard to cognitive analysis. These six attributes of cognitive studies are useful to review at this point in the discussion. 1.) Selective perception of information prevails. According to Bender, "Perception is influenced by schemas and other mental constructs. 2.) High order mental process, including conscious thinking and attention, is largely serial in nature. 3.) Human mental process when compared to computers is slow. 4.) Humans are not as adept at calculations as computers. 5.) Human memory is actively reconstructive and not photographic. 6) While long-term memory is not limited, short-term or working memory holds little information. (Schreiber, 2004, 9)

How to Use Cognitive Tools to Observe Change

As this paper has already explained, two movement oriented current developments in social science are encouraging greater use of cognitive studies. Qualitative methods increasingly place emphasis on knowledge building that reorders cognitive schemata. Qualitative methods is now more inclusive of techniques that are effective at causing researchers to internalize knowledge gains about a phenomena being studied. A recognized difference is emerging between results that reason analytically and those that effectively reorganize perceptions and understandings about a subject. Both the analytic results and the cognitive transformative results are recognized to have methodological significance.

The second movement oriented development in social science encourages using increasingly sophisticated IT in political analysis. Analytic problems that have complex variables and difficult change conditions are now being reasoned as possibly solvable with IT techniques. Developing AI techniques are believed possible of imitating cognitive habits in solving political analysis problems. Political theorists now accept analytic concepts from IT in their work. While the future may prove IT capable of sophisticated political analysis, presently borrowing concepts
from IT is popular. Cognitive studies are useful in projecting where AI likely will be in several years.

The future of cognitive studies in social science appears well established by the interests of qualitative methodologists and those interested in more sophisticated IT analysis of political problems. This paper agrees with the emphasis on cognitive studies being generated by both of these social sciences movements. Some of the social-cultural-environmental conditions that affect politics are thought to be profoundly changing. IT has produced a level of globalism that could not have been anticipated decades ago. Changing climactic conditions are similarly becoming question marks in every person's equations about the future. How these changing conditions affect calculations about politics can effectively be studied with cognitive techniques.

Cognitive studies as presented in this paper are extensively used in political science and are in demand by current movements within social science. The amount of current interest in cognitive studies suggests attempting to use cognitive techniques to observe how change conditions are affecting politics. The methodology this paper presents for observing political change is cognitive mapping. For observing the effect of changed conditions, aggregate cognitive mapping is the technique this paper would like to encourage. By devising a representation of how a group cognizes an issue, the political scientist makes a meaningful attempt to explain how changing conditions are affecting the target population being studied.

Cognitive mapping nicely combines movement factors from both the qualitative methodologists and IT analysis advocates. As a knowledge building exercise, cognitive mapping is an exciting foray into qualitative methods and IT concept analysis. From a contemporary methodology perspective, cognitive mapping offers excellent possibilities for the methodologists to comprehend the phenomena being studied and to communicate findings to an audience effectively.

Unlike principles of traditional quantitative analysis, present day qualitative techniques encourage the subjective strengths of the methodologist. Current qualitative methods place emphasis on the methodologist using his own strengths in interpreting data. Increasingly social science recognizes and utilizes the unique aptitudes the interpretivists have to produce substantially more knowledge building.

The other great idea moving the development of social science methods is imitating IT concepts in analysis. The prestigiousness of IT is so great that social scientists believe in the conceptual strength of this field. The unusual acceptability of IT concepts is possible because there is a belief that in the future IT may well provide the resources to effectively analyze complex political situations. IT concepts have been gaining in popularity and have acquired considerable communications strength in contemporary social science. Cognitive mapping is excellent methodology because this technique's imitation of IT has astounding communications strengths.

The aggregate cognitive mapping methodology has been used by this author to analyze data from
an e-survey conducted in January and February 2008. The survey was conducted for the purpose of learning those IT themes that are most associated with this field by highly educated people. The design of the e-survey was such that IT transformational issues were salient to all e-survey respondents. The questions that were used in the e-survey produced data that could be analyzed to explain the sample's aggregate cognitive perspective on subjects related to the global transformations resulting from substantial increases in IT usage. This methodological technique provides a reasonable snapshot of the sample's aggregate cognitive habits with regards to some transformational IT issues.

The questions on the e-survey that were amenable to this type of analysis were questions that asks the respondent to identify an opposite term to an IT transformation related terms presented to them. For example, the respondent might be asked to react to "free expression." The answer the e-survey recorded was an opposite word supplied by the respondent. These opposite word questions from the e-survey are thought to have provided an opportunity to study group habits for cognitizing IT transformational issues. The representations of the sample's aggregate cognitive maps for these questions proved very useful in helping the researcher visualize the phenomena being analyzed.

The coding decisions that produced aggregate cognitive maps of the sample exemplify how effective qualitative methods can be in social science research. The data presented in Tables Three and Four is organized along two axes, the X axis between personal restrictions and personal freedom and the Y axis between governmental and non-governmental values. Coding responses to the opposite concept questions involved placing the response word somewhere on the X and Y axes. If for example, the respondent reacted to "free expression" with the phrase "thought control," this response phrase had to be given a position on both X and Y axes. This coding choice was made by the coder for each different phrase used by respondents in answering the question. Clearly, some of the coding choices required the interpretivist skills of the coder. Possibly the coding of this data could be called action coding, as the coder's personal involvement with the sample is required for this interpretive technique to succeed.

The interpretivism qualitative methodologists use in working with data is a positive step that produces knowledge building. Coding these cognitively oriented responses proved invaluable in combining one's own aptitudes with data in order to produce more meaningful knowledge about the phenomena being studied. Working with this data in an interpretivist manner was doubly rewarding because the coding experience assisted the researcher reorganize his own thinking about the problem and because applying his aptitudes to the data credibly created useful knowledge. Both the experience and the results of interpretivist coding contributed meaningfully to knowledge building.

This coding scheme for opposite responses has conceptual strength as coding imitates IT concepts. Using an X and Y axis in the coding results in mathematical imagination. This is a situation where computer software could accomplish sophisticated analysis. An AI program could imaginably accomplish all the complexities of assigning response words X and Y.
coordinates. Were this possible with IT techniques, cognitive mapping might become common in describing and comparing various groups. The potential for IT analysis of social science problems using these cognitive concepts appears substantial.

Table Two
Educational Level of the E-Survey Sample

Table Two presents the educational background of the e-survey sample. This sample was comprised of people with academic backgrounds and the educational level of respondents was high. 105 Ph D's responded to the e-mail invitations to complete the online survey. 51 M A's completed the e-survey. The number of persons without graduate degrees completing the survey was insignificant.

A highly educated elite sample is useful in analyzing how more sophisticated persons cognitize IT. The number of Ph D's in the sample results in this research resembling ethnography. As the sample appears dominated by one educational stratum, the sample explains particularistic thinking habits of a distinct social group. Analysis of this stratified group is excellent because an example is being sought that emphasizes cognitive studies and aggregate analysis. From the extensive definition of cognitive provided from literature examples, one can discern that this procedure for evaluating how people accept IT transformation into their reasoning system is
similar to the cognitive studies found in the literature.

The stratified sample works well on the aggregation issue, as well. Other researchers cited in the literature review have attempted to analyze aggregate or distributed opinion phenomenon. The ethnographic objective of explaining group reaction to a transformational issue is purposive. Knowing similarity and dissimilarities of responses significantly improves one's perception of how educated people react to changes occurring because of IT. Other possible uses of a data presentation found in Tables Three and Four could be to compare cognitive practices of this educationally sophisticated sample with other groups such as students learners, working groups, or the general public. All sorts of hypotheses about cognitive differences among these groups could be supported with analysis of this sample and another sample drawn from a second group.

Table Three presents how the educated sample reacts with an opposite concept to the IT transformation related concept of "free expression." The cognitive map produced when the responses to the free expression question are coded exemplifies the usefulness of aggregate cognitizing in comprehending a phenomenon. Most responses to this question are coded to belong in the upper left-hand quadrant of the diagram. This signifies most responses are situated on their respective axes toward the governmental and personal restrictions end of the axis. A large number of respondents chose the word "censorship" as the opposing concept to "free expression."

When one imagines the cognitive processes taking place as people accept cultural transformation due to IT developments, one can better visualize what is happening with Table Three. The question of whether cognitive processes are shaped by group consensus is well presented in Table Three. At least in this educationally sophisticated sample, there appear to be mechanisms increasing agreement as to the opposite concept for free expression. The small number of sporadic answers distributed in the graph's other three quadrants presents how a few respondents cognitize the opposite word task differently than the majority.

Contrast the cognitive map for "free expression" with the results obtained when "opinion leaders" is used to elicit a response. Table Four presents the aggregate cognitive map that coding individual responses created for how respondents resolved “opinion leaders.” One noticeable difference between Table Three and Table Four is in how many sporadic responses are distributed throughout the four quadrants of this graph. When "opinion leaders" is used, the distribution of answers is more significant among all four quadrants of the graph. There is no exact consensus word opposing “opinion leaders.” There was a substantial number of different alternatives suggested by respondents answering this question. One might infer that the same mechanistic conditions favoring an agreement in answers does not exist for the "opinion leaders" concept. A possible cognitive explanation is that much less influential reasoning has occurred defining the concept “opinion leaders.” Respondents were more on their own in identifying an opposite phrase for “opinion leaders.”
Comparing Table Three and Table Four one does discern the differences between how the two concepts are cognitized. A possible inference is that one concept has undergone more societal definition than the other has and this explains the difference between Table Three and Table Four. Probably free expression results in a quicker definition of the opposite concept due to more societally discussion of this issue. The sporadic responses notable in Table Four possibly occur because respondents had less frequently been asked to defined the opposite of “opinion leader.”
Comparing how well educated people cognitize IT transformational issues with how students, working people, or the general public cognitize these issues could be a valuable research experience. Discernible differences might emerge in the cognitive maps developed from these different groups. A panel studies approach could be used. One group could have aggregate cognitive maps developed prior to an important experience such as a college level course in informatics. Developments in how the group cognitizes relevant concepts could be followed as
instructional events influence cognitizing habits. A second aggregate cognitive map created following the college course possibly would present changes in cognitizing.

**Social Science Using Cognitive Studies Has More Validity**

The proceeding discussion has developed a methodology for using cognitive studies as a tool for studying political change. Aggregate cognitive mapping allows the researcher using qualitative methods coding techniques to present a reasonable representation of cognitive processes occurring in a group. As changing environmental conditions such as a transformational IT and global warming create different influences on politics, cognitive mapping offers the researcher a technique for analyzing how cognitions are different as a result of these new conditions.

The same aggregate cognitive mapping technique could be used in more mundane situations including panel studies that evaluate everyday change conditions such as classroom learning. Results in the learning instance could prove that course content had a measurable effect upon improving the sophistication of student cognitive habits. Following the educational program with informatics, students might be found to more nearly emulate the cognitive habits of groups with substantial education.

As IT becomes more sophisticated the possibilities for implementing this research design become greater. Creating aggregate cognitive maps appears not difficult with the use of IT software. Some additional development in the AI field may be required, but the obstacles to designing an evaluative IT system do not appear substantial. The use of an X and Y axis in aggregate cognitive mapping reminds that the mathematical base of this idea could be machine accomplished. This technique is substantially amenable to mathematical analysis and there are considerable open ended possibilities for more advanced use of aggregate cognitive mapping in evaluation and social science research.

Possibly, the most encouraging anticipated strength of the aggregate cognitive mapping technique is the excellent validity anticipated for the findings. The distance between social science representation and reality is always of interest to social science researchers. An inevitable objective of social science research is to improve validity. Reducing the distance between representation and reality improves the quality of research. Greater validity is a much sought after objective in any research endeavor.

Throughout this paper, a theme has been developed that two movements in contemporary social science are supportive of more extensive use of cognitive studies. Qualitative methods are redefining social science research explaining action research cause cognitive realignment of the researcher's idea. The substantial emphasis that qualitative methods places on action research reminds of the importance of validity in social science research.

AI's future development could be based on machine analogies to human cognitive processes. The sophisticated AI capabilities that are now sought by social science researchers possibly will
be developed as IT imitates human cognition. Belief that cognitive studies offer AI a reasonable possibility of attaining more sophistication is substantial. The future appears sound for IT and concept sharing from this field to political analysis is popular. There is much movement ferment around combining concepts from the IT and social science fields.

The objective of attaining validity in studying political change can best be achieved by staying close to the two current movements in social science discussed here. The substantial contributions of the qualitative methodologists are all directed toward the objective of greater validity in research. Similarly, that IT analysis advocates are striving to produce greater validity by encouraging more sophisticated political analysis. Both social science movements recognize that validity is substantially important to attaining better research results. The conflicts that have shaped both social science movements have produced methodological developments always attentive to validity issues. The methodologically skillful idea in aggregate cognitive mapping is staying near the validity gains of these two social science movements.

The cognitive mapping technique this paper has advocated for studying political change anticipates achieving excellent results in validity. The seriousness of purpose that the qualitative methodologists are evidencing as they attempt to apply their aptitudes to interpretivist activities improves possibilities for successful cognitive mapping. Agreement exists that knowledge building occurs as interpretivists explain data with their special aptitudes and strengths. The coding steps in devising cognitive maps allow the interpretivist the opportunity to improve the validity of the results. Similarly, the conceptual richness of the IT analysis improves the communications reasoning of this date analysis. Validity must be attained with presentations that succeed in delivering the representation to the audience. Concepts from IT analysis communicate and significantly improve validity.

The two social science movements that this paper has discussed are both effectively working to improve research validity. The social science researcher who aligns himself with current social science movements reasonably produces research that can claim to achieve more validity. Aggregate cognitive mapping drawing as it does on both qualitative methods and IT analysis of politics can reasonably attain substantial validity in explaining the political implications of change conditions.


Amos Tversky and Daniel Kahneman. "Availability: A Heuristic for Judging Frequency and
