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## MEMORANDUM OF INTEREST

Conference on Issue Voting,  
Cognitive Processes, and Rational Choice

The Laboratory for Behavioral Research, with which I am associated, has for several years been engaged in basic research on two of the subjects addressed in the "Stimulus Memorandum for the Conference on Issue Voting, Cognitive Processes, and Rational Choice." The first concerns scaling intensity of responses to survey questions, and the second determining the meaning to respondents of concepts embedded in questionnaire items. I shall treat these subjects separately.

I. Scaling the Intensity of Response to Survey Questions

The measurement technique most commonly used by social scientists for determining the direction and intensity of judgments is category scaling, a procedure whereby a respondent is asked to rate an item or express a judgment by selecting one of a fixed number of categories. Category scaling, which has a history that extends back to at least 150 B.C. (when Hipparchus used a six-point category scale to judge the luminance of stellar objects), may employ a variety of formats. Often we ask a respondent to select one of the category options associated with the garden variety of Likert scale. Or we may ask a person to designate the strength of his feelings by selecting an appropriate position on a feeling thermometer, or by positioning himself on a seven- or nine-point bipolar adjectival scale of the kind associated with Osgood's Semantic Differential. Despite its long history and widespread contemporary use, category scaling as a procedure for measuring the intensity of social opinion has serious weaknesses.

One weakness of category scaling is that information is often lost through the resolution of the categories. Even when a respondent can clearly distinguish between two items, or make finer judgments than the available categories permit, this limited resolution forces him to settle for the options presented to him. Second, by offering a fixed number of categories, however few or numerous, the investigator is biasing response by artificially constraining or expanding its true range--and is thereby making it impossible to describe the intensity of opinion accurately. Third, category scales represent at best an ordinal level of measurement, which limits the statistical procedures that can be properly used to analyze data based upon them. That many researchers are prepared arbitrarily to assign numbers to the categories and treat them as if they were interval does nothing to alleviate the basic problem that categorical scaling cannot satisfy interval assumptions.

The disadvantages of category scaling can be avoided by means of magnitude scaling procedures, which were originally developed by S. S. Stevens and his associates for the ratio scaling of such physical phenomena as the loudness of sound and the brightness of light. For one thing, psychophysical procedures (which remove investigator-imposed constraints on respondents) enable respondents to indicate, and investigators to record, judgments as precise as any respondent is able to make. Furthermore, the evidence is now commanding that respondents (or at least 95 percent of them) can make "ratio" judgments (technically log-interval because the zero point is arbitrary) when responding to the kinds of items that survey researchers seek to scale. As a result, any of the higher-order statistics that data analysts might wish to employ can be properly used with data generated through psychophysical scaling procedures.

Our Laboratory has adapted, and tested in the field, a simple paper and pencil technique that makes it possible to incorporate magnitude scaling procedures into conventional survey instruments. By means of a calibration exercise that takes about six minutes to administer, one can test each individual's ability to make proportional judgments and thus weed out the small percentage of the population who for physical or psychological reasons cannot carry out the basic magnitude estimation task. This calibration process also permits the investigator to correct for individual or group regression bias, thus insuring no undue measurement error from those sources. Moreover, the calibration procedure makes it possible to validate the procedures cross-modally. [Cross-modal validating procedures are conventionally used by psychophysicists to determine whether responses in two or more modalities--e.g., line produced and numbers generated--when plotted against each other result in a function that approximates the ratio of the characteristic exponents produced by responses to stimuli in those modalities. For example, since line and number stimuli both produce responses with a unity exponent, the ratio of the responses produced by these measures to any set of quantitative stimuli should approximate unity.] Once calibration has been completed, a respondent can use line and numeric estimation to evaluate precisely the intensity of scale items or express directly his strength of opinion to questionnaire items.

To compare psychophysical to category scaling of political opinion in a survey context, we incorporated many items used in SRC's election studies, word for word, option for option, into a pair of local surveys--together with procedures for eliciting magnitude estimation and line drawing responses to the same items. Predictably, the results differed substantially. Figure 1 gives some indication of how substantial those differences are. Since the responses to the issue items (e.g., busing, abortion, pollution, marijuana, and inflation) are depicted in semi-logarithmic coordinates, it is evident that a psychophysical response range that in extreme cases far exceeded 400:1 has been forced by category scaling into 7 pigeon holes. Psychophysical responses, it is well to note, also indicate that

- 1) the seven categories certainly do not constitute equal intervals;
- 2) the midpoint of the 7-category scale misclassifies the direction of the response of some people;
- 3) the range of response contained in the end categories, 1 and 7, is enormous.

The vast range of response in the endmost categories is particularly serious because many theories of behavior posit a relationship between the strength of opinion and the likelihood of a congruent behavior. With the wide range of opinion represented in those categories, however, an analyst cannot know which respondents in end categories are expressing extreme opinions.

## II. Determining the Meaning of Political Stimuli to Survey Respondents

Many verbal stimuli are complex in that they carry multiple connotations that affect how people extract, process, store in memory, and recall the information derived from such stimuli and, consequently, how people respond to questionnaire items. The failure to develop and employ demonstrably unambiguous verbal stimuli in political research, it follows, makes it virtually impossible to describe accurately opinion distributions, test hypotheses, or model political behavior. Recently our Laboratory carried out several studies that illustrate the problem as it pertains to stimuli involving SRC-type political issues.

In the first of these studies, a sample of 104 local respondents listed three associates to a number of political issues culled from Gallup and Harris polls. A typical stimulus, "Welfare Budget," elicited a variety of primary associates. For many respondents, "Welfare Budget" is associated with poor people, for others the unemployed, black people, or fraud. In a follow-up study designed to test the utility of a classical conditioning paradigm for the measurement of meaning, we were able to demonstrate a strong conditioning effect for a relationship between race and some political issues: Civil Rights, Welfare Budget, and Crime were strongly associated with black people, while other issues, such as Defense Budget, Women's Rights, and Watergate, showed a strong conditioned effect to whites.

Still more recently, in a replication and methodological extension of the conditioning study, 60 subjects participated in a four-part counterbalanced experimental design, which again measured the race-relatedness of political issues. Based on the analysis of data developed by means of psychophysical scaling procedures, reaction time, and galvanic skin conductance, we were able to show that some issues have racial connotations. For example, civil rights, welfare budget, crime, and to a lesser degree unemployment are strongly, though not exclusively black-related. On the other hand, abortion, jobs, and gun control are white-related for most respondents, but black-related for a minority.

The ability to demonstrate that certain political stimuli involve multiple connotations, however edifying, cannot by itself answer the basic question: what does a particular stimulus mean to a respondent? Unless we can know what specific meaning is salient to a respondent, we cannot interpret his expressions of support for/or opposition to an issue. Recent developments in experimental cognitive psychology, principally within the last decade, suggest a variety of measures, research strategies and procedures that can be adapted for identifying and removing the ambiguities from the kinds of stimuli used in survey research. Among those strategies and procedures are semantic categorization, semantic distance, property comparison analysis, sentence verification, and the manipulation and control of context through priming.

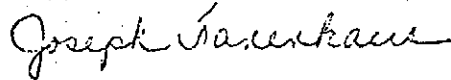
In a series of pilot studies we have sought to adapt these strategies and procedures developed by experimental cognitive psychologists to the analysis of political stimuli. Although our activity is still at an early stage, our work indicates that the problem of identifying and removing ambiguities from political stimuli is not intractable. Pilot studies already completed were directed to questions such as the following:

- 1) Do subjects have more difficulty in processing information about political concepts than about more concrete concepts conventionally used by experimental cognitive psychologists? Student subjects, at least do not.
- 2) Can subjects differentiate the performance of incumbent presidents from the authority role of the President of the United States? Student subjects can.
- 3) Is there a structural bias underlying our subjects' ability to differentiate incumbent presidents from the authority role? Scale results from proto-typicality ratings of individuals who have held the office of the president, and from prototypicality ratings of characteristics defining the role of the presidency suggest that there is a basis--characteristic features and their organization in semantic memory.
- 4) Do contextual variables operate to affect the interpretation of political phenomena as effectively as they operate to affect the interpretation of more concrete concepts? Subjects will change their interpretations of such phrases as "Government in Washington" as a function of context.

These findings--albeit preliminary--indicate that it is possible via such techniques as priming to rewrite questionnaire items such that each evokes a single, unambiguous meaning for each issue.

Although, as earlier indicated, we have done some research designed to determine whether conventional issue stimuli are ambiguous, and in what respects, we have not as yet made a direct attempt to create unambiguous issue stimuli. We expect to run pilot studies for that purpose within the next 6 to 10 weeks, and I should have something preliminary to report about them by the time the Conference meets.

Sincerely,

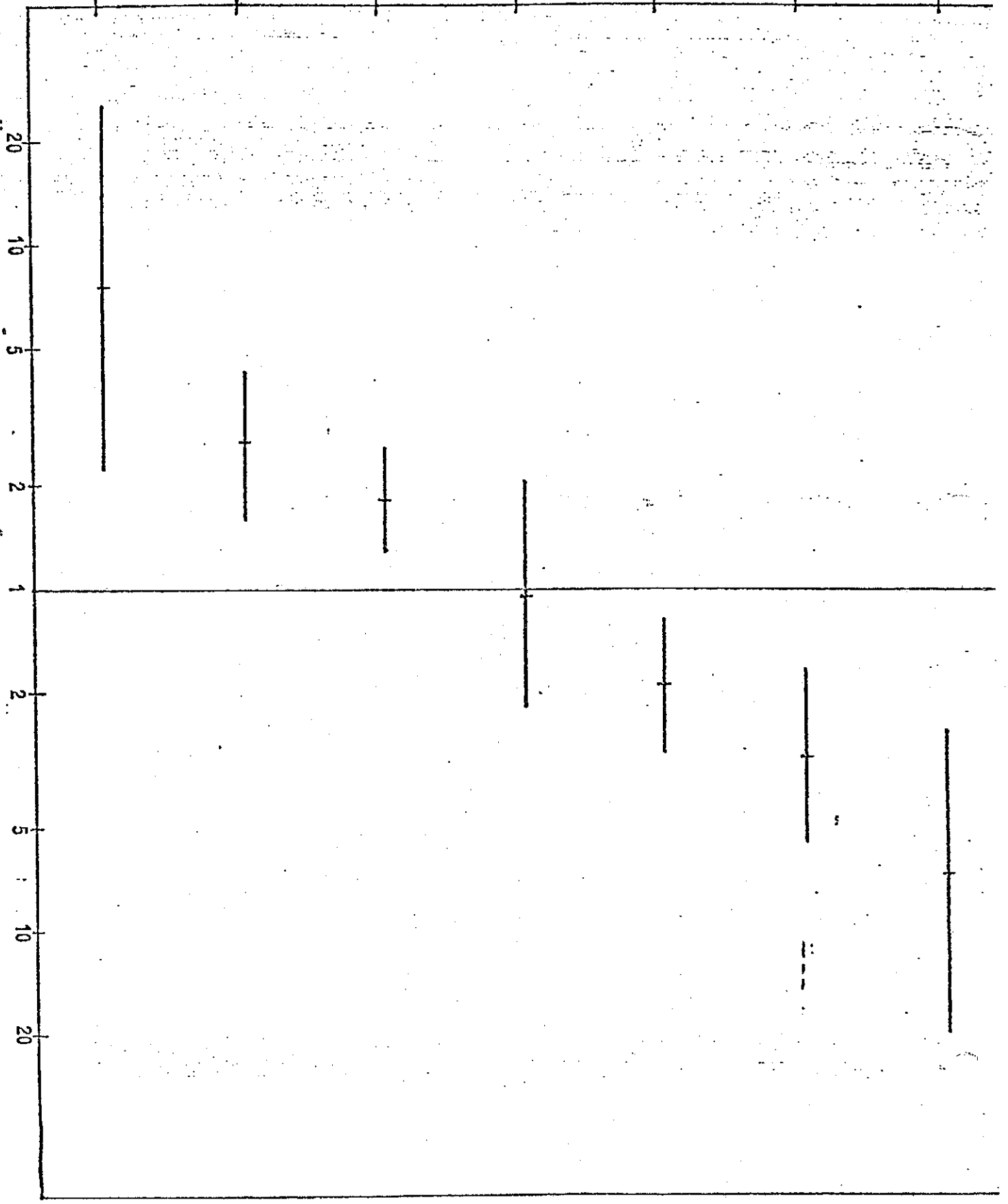


Joseph Tanenhaus  
Professor

JT:JP

CATEGORIES

(n = 327)  
7  
(n = 202)  
6  
(n = 138)  
5  
(n = 97)  
4  
(n = 103)  
3  
(n = 119)  
2  
(n = 209)  
1



PSYCHOPHYSICAL RESPONSES

The X-axis is ratio-ruled, and the Y-axis is arbitrarily spaced. Psychophysical responses are shown as a mean plus/minus one standard deviation.