Some Problems in Testing Two Rational Models of Participation
Author(s): John H. Aldrich
Source: *American Journal of Political Science*, Vol. 20, No. 4 (Nov., 1976), pp. 713-733
Published by: Midwest Political Science Association
Stable URL: https://www.jstor.org/stable/2110568
Accessed: 01-11-2018 01:23 UTC

JOHN H. ALDRICH
Michigan State University

*Some Problems in Testing Two Rational Models of Participation**

Two rational choice models of participation conflict over whether there is an expected benefit or a pure benefit component to participation (as modeled by the calculus of voting and a minimax regret model respectively). Data from the 1952–1972 elections are used to examine this difference. Turnout data for any given election are inconclusive on this point, our results being more indeterminate than others (who usually de-emphasize expected benefits) suggest. Differences between elections clearly support an expected benefit model. We also apply our procedures to other forms of campaign participation. Such data lead to the opposite conclusion, supporting the minimax regret model. The analysis then raises several problems associated with testing formal models, such as measurement error, validity and reliability of measures, etc. It is shown that these problems can materially affect conclusions.

The view that man can be characterized as a politically rational actor has spawned an extensive body of theoretical literature, a much less bountiful but growing set of empirical results, and perhaps most of all, considerable controversy. These developments are fully mirrored in the attempt to formalize a rational citizen's decision to vote or abstain.

Initial formulations of the "rationality of turnout" led to the conclusion that either the decision to vote was irrational prima facie (Tullock, 1967, ch. 7) or that widespread turnout must be explained by extratheoretic and therefore nonrational criteria (Downs, 1957, pp. 260–276 and ch. 14).

Riker and Ordeshook's seminal work (1968, pp. 25–42) remained within an expected utility framework, but differed by the addition of a variable capturing direct benefits obtained from the act of voting, per se. Their "calculus of voting" specifies the following equation (1968, p. 25):

$$R = PB + D - C$$

The "PB" term represents the interaction of the (subjectively estimated) probability that the citizen's vote will affect the outcome with the differential benefits to be gained from the election of the preferred candidate. Thus,

*I would like to thank David Rohde, Morris Fiorina, and the anonymous referees for their insightful critiques. Data were made available through the Inter-University Consortium for Political Research. The author reserves responsibility for this analysis.

PB captures the "expected utility" of voting. "C" denotes the physical, decision, and other costs associated with voting, while "D" (for "citizen duty") stands for the benefits of simply casting a ballot. If R (or "reward") is positive, the citizen would be predicted to vote, while abstention is expected if R is not positive.

More recently, Ferejohn and Fiorina (1974, pp. 525–536) have posited an alternative rational choice model of turnout. Their model is based on a "minimax regret" decision rule (cf. Luce and Raiffa, 1957, pp. 280–282, 316), which, like the "calculus of voting," leads to turnout in less restrictive circumstances than the earlier formulations. There are two major differences between the calculus of voting and minimax regret models. Most importantly, Ferejohn and Fiorina reject the notion that P can meaningfully be calculated, obviating the empirical plausibility of an expected utility model. The second major difference concerns the "D" term. Critics such as Barry (1970, pp. 13–23) have argued that "economic models," such as the calculus of voting, "have nothing to say" about such a term which apparently separates the voting decision from a means-ends calculation. Ferejohn and Fiorina argue that while Barry's conclusion does not follow, a different type of theory–a theory of consumers' choice as opposed to investors' choice–is required. Their model is built on the proposition that turnout can be modeled as a pure investment or means-ends decision. Clearly, the calculus of voting is a mixture of both investment and consumption. It is, of course, possible to construct a parallel mixture under the minimax regret framework (i.e., the "D" term can be included). In what follows, we will admit of this possibility, doing so at the risk of doing an injustice to the Ferejohn-Fiorina formulation, but thereby focusing on what we see as the foremost distinction, the role of P.

The crucial distinction, then, between these models is in the nature of the decision rule, the alternative rules leading to differing consequences. Under the normalization used by Ferejohn and Fiorina (1975, pp. 921–922), the calculus of voting model implies that the citizen votes if:

$$P(B/2) + D > C$$

In contrast, the minimax regret model predicts turnout if:

$$B/4 + D > C$$

The inclusion of D, as above, or its exclusion as in Ferejohn and Fiorina, adds an independent constant which has the effect in either case of making turnout more probable. Clearly, the fundamental difference concerns the role

of P. It is at this point that these alternative conclusions should be empirically investigated. The remainder of this paper will reexamine and extend empirical tests of these models and consider some of the problems inherent in such tests.

Is There a "P" in Participation?

Riker and Ordeshook applied their formulation to data from the SRC's 1952–1960 presidential election surveys. Table 1 reproduces their basic test (1968, p. 38).[1] The entry in each cell is the proportion of respondents with the given configuration of P, B, and D values who reported having voted. The total N in each cell is also noted, and the cells are numbered from 1 through 12 in the 1952 table for easy reference.

Riker and Ordeshook conducted tests of statistical significance on proportionate differences between appropriate cells within each election year. They demonstrated that almost all their predicted differences were statistically significant and in the appropriate direction. Therefore, they concluded that P, B, and D affect turnout. While their findings have been generally accepted, critics (Barry, 1970; Ferejohn and Fiorina, 1974; Fiorina, 1974) have pointed out that the *substantively* most important changes are attributable to the D term, especially in moving from medium to low D values. Taking 1956 as an example, the marginal proportionate ranges in turnout for differing values of P and B are .748 to .689 and .796 to .629, respectively, while the comparable high through low D proportions are .847, .743, and .448, respectively. More importantly, this basic pattern holds in all three elections.

Riker and Ordeshook only examine differential turnout rates *within* one election year, while the cited critics pool the three elections into one aggregated table. Therefore, changes *between* election years are ignored, and differences between elections may be as important as those which are cross-sectional, within-election. The "P" variable provides a good example. In 1952, the actual vote spread between the two candidates was 10.8%; in 1956 the spread increased to 15.6%; while the Kennedy-Nixon vote difference was only 0.2%. These actual changes may well have been anticipated in the respondents' perceptions of likely outcomes. By working within any one election or aggregating over all three, the impact of P can only represent differences between individuals when confronted with the same reality or set of realities. By looking at differences across elections, we can obtain an

[1] The operationalization of the variables is discussed in Riker and Ordeshook (1968, pp. 25–42). A score of "high" P results from claiming to see the election as close or very close, and a "high" B occurs if the respondent cared or cared very much about the outcome. The "D" term is a trichotomization of the SRC's "citizen duty" scale.

TABLE 1

Riker and Ordeshook Test of the Calculus of Voting[a]

1952

D	High		Medium		Low	
B	High	Low	High	Low	High	Low
P High	(1) .892[b] 362	(2) .839 124	(3) .835 310	(4) .674 141	(5) .573 150	(6) .459 159
P Low	(7) .859 99	(8) .778 27	(9) .773 75	(10) .654 26	(11) .611 54	(12) .500 32

1956

D	High		Medium		Low	
B	High	Low	High	Low	High	Low
P High	.893 421	.808 198	.803 274	.650 137	.571 98	.410 156
P Low	.806 129	.778 63	.736 87	.733 30	.521 46	.263 38

1960

D	High		Medium		Low	
B	High	Low	High	Low	High	Low
P High	.940 335	.831 15	.899 198	.823 96	.743 70	.457 92
P Low	.902 41	.667 12	.788 33	.756 4	.727 11	.417 12

[a]Adapted from Riker and Ordeshook (1968, Table 3).

[b]Entry in each cell is proportion of respondents in cell having reported voting in that election.

Total N in cell at bottom right corner of cell.

Numbers in parentheses in 1952 table label cells for easy textual reference.

indication of at least aggregate responses to quite different probable outcomes.

There are two distinct possibilities for changes. First, the probability that a citizen with a given combination of P, B, and D values will turn out may change over time. The estimator of this probability is simply the proportion of citizens in the appropriate cell who reported voting. Secondly, the distribution of citizens' responses on the independent variables may change from election to election. Note that this frequency of response is independent of the probability of turnout.

Let us first examine changes in the probability of voting (i.e., the entries in Table 1). Changes between 1952 and 1956 are small and apparently random. A test of differences of proportions may be used to demonstrate this. The null model in this case is that the proportion in a given cell is the same in both elections. Of the twelve comparisons between 1952 and 1956, only one proved to be significantly different at the .05 level. This one is cell 12, or low values on all three variables. While significant and large, this difference affected few respondents and is not significant at the .01 level. The stability in proportionate turnout between 1952 and 1956 contrasts with the comparison of either Eisenhower campaign and the 1960 election. Not only are there large and significant changes (one in three comparisons being statistically significant), but the pattern of these changes is important. All eight significant changes involve high P cells (cells 1, 3, 4, and 5 in both the 1952–1960 and 1956–1960 comparisons), and in all cases proportionate turnout is larger in 1960. Moreover, all possible high B/high P combinations significantly increase in 1960, lending support to the notion that P and B exert a combined effect on turnout. Finally, note that these significant changes are uniformly distributed across D categories.

A similar pattern is found in examining differential response frequencies, at least to the P question. The frequency distribution of P was relatively constant in the 1950s, but increased sharply in 1960. In particular, about 80% of the sample felt the 1952 election was going to be close. This percentage dropped slightly to 76% in 1956, but increased dramatically in 1960 to over 89%. Once again it appears that "close" and "very close" responses assumed more realistic meaning in 1960. Moreover, the changes in the frequency distribution of P contrast with changes in B and D. B was quite stable over time, with 67% caring about the outcome in 1952, 63% in 1956, and 65% in 1960. The trend in marginal frequency responses to D was monotonically increasing with time, the larger change occurring in 1956. For example, those classified as high in citizen duty increased from 39% to 48% to 51% over time. The relatively large increase in high D responses in 1956

flows *against* the changes in turnout. The net differential contribution of D in 1956 would lead to a predicted *increase* in turnout, and therefore must be being offset, and somewhat more by decreased contributions of the P and B terms to actual turnout, to account for the 2% drop in voting in the sample.

We do not disagree with the contention that D, not the P or B variables, appears to discriminate voters from nonvoters most sharply *within* any given election. Comparisons across elections, however, suggest that changes in turnout rates depend more heavily on probabilistic and expectational considerations. This conclusion is supported both by changes in the distribution of response frequencies and by changes in proportionate turnout. These changes also appear consistent with reality. More citizens perceived 1960 as a close election and apparently acted on the belief, while fewer so perceived or acted in 1956, and in fact 1960 was close while 1956 was not. Barzel and Silberberg's study (1973, pp. 51–58) of aggregate turnout in gubernatorial elections over the 1962 through 1968 period found that expected benefits and their measure of P, in particular, were their most important variables. As we will show, our conclusions are maintained when we examine the relevant elections over this period (i.e., 1964 and 1972, leaving the three-candidate 1968 election aside). However, these data are more useful in demonstrating some important questions of validity and reliability of the measures used to date, so we will defer their examination.

Reexamining the Joint Effects of P and B

Ferejohn and Fiorina (1975) recently noted that the calculus of voting posits an interaction between P and B (which, we should point out, had not been directly tested heretofore) and that minimax regret does not. They specify a testable model, examine just the P and B dichotomies, and attempt to test between the two formulations. While the evidence is mixed, they conclude it weighs in favor of minimax regret.

Their data base consists of only registered voters. They argue (1975, p. 922) that particularly in the era of restrictive registration laws, failure to register should not be considered equivalent to abstention, and they do not examine registration as a potentially rational political choice. In this section we will contend that it is at least possible to argue that registration can be incorporated into a rational calculus, and that the choices of exclusion or inclusion of registered voters and of the statistical model have important consequences on conclusions reached.

The argument that incorporation of registration into the rational choice framework is at least plausible will be made in three parts. First, legal

restrictions were not so severe that it is impossible to imagine the registration decision being made during the presidential campaign. For example, laws regulating the closing date of registration ruled few ineligible until well into the campaign. In 1960, 34 states closed registration after October 1 (10 within the last 10 days of the campaign), ten more closed after September 1, one did so in August, and in only two states did one have to meet voting legalities prior to the nomination conventions (the other three states had no statewide law, see Smith [1960, Chart III]). Secondly, Kelley, Ayers, and Bowen (1967, pp. 359–377) found this legality to be the most important in their seminal study of variations in registration and turnout rates across 104 cities in 1960. Moreover, they found registration rate variations very predictable (R^2 = .79), and predictable primarily on the basis of variables they justified on a cost-benefit basis. In fact, the variable with the largest single impact (standardized beta) was interparty competition, indicating that the closer that elections typically are in a city, the higher the registration rate.

The third part of our argument is that under at least one reasonable formulation of the theoretical problem, the decision process is unchanged with respect to variables we can measure. If we consider registration and voting as subsumable under one model of decisionmaking, then we expand the number of actions available to the citizen in a two-candidate, plurality election from three (vote for candidate 1, for candidate 2, or abstain) to four (the two vote possibilities [V_1 and V_2], register and abstain [R,A], or do not register [NR]). There will be three separate kinds of costs which must be considered. Let C_1 denote the cost of turning out and voting, per se; let C_2 denote the cost of registering; and let C_3 denote any "opportunity costs" associated with failing to register. That is, C_3 captures any prospective "loss" from deciding to not register and discovering on election day that you would like to vote. This leads to the expanded utility table with four choices and five "states of the world" (Ferejohn and Fiorina, 1974, p. 527) found in Table 2. As can easily be seen, the relationship between V_1, V_2, and R,A is identical to the original case. A positive cost for having registered has been added to all of these 15 cell entries. Thus, we need only concern ourselves with the choice of failing to register. Since nonregistration is one kind of abstention, it is not surprising that the only difference is in the costs. Note that if $C_2 < C_3$, registering without voting dominates failing to register and this latter alternative can be ignored. If $C_2 > C_3$, then not registering dominates the other form of abstention (and *it* can be ignored). The choice then is between V_1 and N R. A set of conditions for voting parallels those found in Ferejohn and Fiorina. The calculus of voting would predict voting if the probability of making or breaking a tie exceeds $2(C_1+C_2 - C_3)$. Minimax

TABLE 2

A Decision Table of Utilities Incorporating Registration

	Possible Outcomes or "States of the World"[a]				
Choices Available	S_1 Preferred Candidate Wins by More Than One Vote	S_2 Preferred Candidate Wins by One Vote	S_3 Tie	S_4 Preferred Candidate Loses by One Vote	S_5 Preferred Candidate Loses by More than One Vote
V_1 Vote for Preferred Candidate	$1-C_1-C_2$	$1-C_1-C_2$	$1-C_1-C_2$	$1/2-C_1-C_2$	$-C_1-C_2$
V_2 Vote against Preferred Candidate	$1-C_1-C_2$	$1/2-C_1-C_2$	$-C_1-C_2$	$-C_1-C_2$	$-C_1-C_2$
R,A Register but Abstain	$1-C_2$	$1-C_2$	$1/2-C_2$	$-C_2$	$-C_2$
N R Do Not Register	$1-C_3$	$1-C_3$	$1/2-C_3$	$-C_3$	$-C_3$

[a]These mutually exclusive and exhaustive potential outcomes are determined without counting this citizen's choice.

regret would predict voting if $(C_1+C_2 - C_3)<1/4$. Including registration in this fashion as an additional alternative, therefore, induces changes only in the unmeasured costs associated with voting.

With turnout and registration considered simultaneously, let us reconsider the Ferejohn-Fiorina hypothesis for all but the 1968 election over the 1952–1972 period. In examining the 4-fold classification of the P and B dichotomies, they propose the following general model which "nests" both rational models of turnout:

P: \ B:	Low	High
Low	γ	$\gamma+B_1$
High	γ	$\gamma+B_2$

Under this rubric, the minimax regret model, positing that P is irrelevant, predicts a "column effect" with only B being consequential, i.e.:

$$H_{mmr}: (\gamma+B_1) = (\gamma+B_2) > \gamma$$

Null hypotheses for minimax regret, then, would include:

$$(\gamma+B_1) \leqslant \gamma, \textit{ or} \qquad (\gamma+B_2) \leqslant \gamma, \textit{ or} \qquad (\gamma+B_1) \leqslant (\gamma+B_2)$$

The calculus of voting postulates both P and B as important determinants of turnout, with interaction between the two. Therefore, hypotheses of interest under their general model in this case are:

$$H_{eu}: (\gamma+B_2) > (\gamma+B_1) > \gamma$$

The null model for the expected utility model is also composite, being:

$$(\gamma+B_1) \leqslant \gamma, \textit{ or} \qquad (\gamma+B_2) \leqslant \gamma, \textit{ or} \qquad (\gamma+B_2) \leqslant (\gamma+B_1)$$

Notice that under their general model, nothing is said about the high P, low B cell. The failure to consider this cell different than low P, low B follows from this treatment of low values as equivalent to zero. This treatment does some injustice to the operationalization of both P and B. For example, a low B value is scored if the respondent did not care at all *or* cared a little, which is not necessarily the same as a perceived zero differential benefit. We will follow this procedure, primarily to maintain a maximum verisimilitude. However, we will find occasions in which turnout will be significantly greater in the high P, low B cell than in the low P, low B cell. Such findings clearly do

not fit with the minimax regret model and may be taken as evidence that P is consequential and, therefore, as support for the calculus of voting.

Both specific models would not be supported if either of the following null hypotheses cannot be rejected:

$$H_o: (\gamma+B_1) \leqslant \gamma \textit{ and } (\gamma+B_2) \leqslant \gamma$$

If we can reject H_o, we can test for the interaction effect. In this case, acceptance of the following null, H_o', would imply rejection of the calculus of voting in favor of minimax regret:

$$H_o': (\gamma+B_2) \leqslant (\gamma+B_1)$$

As Ferejohn and Fiorina note (1975, p. 923), these tests can be indeterminante, either rejecting both specific models or rejecting neither. This latter case of true indeterminance occurs upon rejection of all null hypotheses. While this is as far as tests of statistical significance take us under this design, we might conclude that the evidence weighs in favor of the calculus of voting if all null hypotheses, including that of no interaction, are rejected.

We will use the test of difference of proportions to investigate these hypotheses. Due to the failure to consider the high P, low B cell, there are in effect two estimators of γ (i.e., the proportion voting in the low P, low B cell and that in the high P, low B cell). The strongest test of our hypotheses (i.e., that least likely to reject the null hypotheses) would be to use the larger of these two entries, the procedure we follow. The data for these tests and the results are found in Table 3.

The most obvious feature of the statistical tests summarized in Table 3 is that the results are mixed. The null hypotheses directed towards the minimax regret model are uniformly rejected. Thus, there is a "column effect" of B in each election. The hypothesis of no interaction is rejected only in 1956 and 1960. In 1952 and 1964 there is a small increase in proportionate turnout in the interaction cell, but the increase is too small to enable us to reject the null hypothesis. In 1972, there is no effect of P at all. If anything, it is negative. Later we will consider additional data for 1964 and 1972 pointing towards the opposite conclusion. For now, we must conclude that the evidence supports minimax regret in all five elections, while supporting an expected benefit calculation in two. Since this is the first time that we have employed the 1964 and 1972 data we should point out that few thought either election would be close and, especially in 1972, few voted. Thus, the aggregate

TABLE 3

Test of Joint Effects of P and B

1952

	Low B	High B
Low P	.635[a] 85	.772 228
High	.642 424	.813 822

1956

	Low B	High B
Low P	.618 131	.733 262
High P	.637 491	.822 793

1960

	Low B	High B
Low P	.571 28	.835 85
High P	.728 342	.904 603

1964

	Low B	High B
Low P	.675 191	.821 380
High P	.684 171	.856 424

1972

	Low B	High B
Low P	.623 220	.829 449
High P	.603 126	.829 211

Hypothesis Tests[b]	1952	1956	1960	1964	1972
H_o: $(\gamma+B_1)\leqslant\gamma$	.130[d]	.096[d]	.107[c]	.137[d]	.206[d]
$(\gamma+B_2)\leqslant\gamma$	.171[d]	.185[d]	.176[d]	.172[d]	.206[d]
H_o': $(\gamma+B_2)\leqslant(\gamma+B_1)$	.041	.089[d]	.069[c]	.035	.000

[a]Entry in each cell is proportion of respondents in that cell having reported voting.
[b]Entry is difference in proportion; γ is based in all cases on the higher estimate.
[c]Significant at .05.
[d]Significant at .01.

changes in P still support the calculus, even though cross-sectional variations provide at best mixed evidence.

Campaign Participation

In this section, the participation act is generalized from turnout to other forms of campaign participation, and the previous analyses are conducted on this new dependent variable.

The theory underlying the calculus of voting has recently been proposed as a general theory of participation (Riker and Ordeshook, 1973, ch. 3). While no such generality has been claimed for minimax regret, it seems plausible to suggest that the decision to participate in elections can be modeled by the same process, whether this participation takes the form of voting, of donating time or money, or whatever. In fact, we would expect other forms of campaign participation than voting to be more closely connected to "instrumental" calculation, i.e., the B and/or PB terms, and less so to obligation and citizen duty. However, we should also expect differences which may be imperfectly captured by available measures. Clearly, there are different costs involved, so that the failure to be able to measure C may be more important in this context. There may as well be differing perceptions of the probability that an act other than voting will affect the outcome, although we would still expect that the closer the election is perceived to be, the higher will be the probability that any act will be consequential. The one variable clearly unaffected by the changing context is B, since the candidates and associated differential benefits are the same. Much the same is true for D, even though we expect it to be more weakly related to campaign participation than to turnout.

To measure campaign participation, we will use the series of questions asked in all C.P.S. election surveys. Respondents are asked if they tried to influence the voting behavior of others, if they gave money, bought tickets, etc. in aid of a party or candidate, if they attended any rallies, meetings, or dinners, and if they worked for a party or candidate. A respondent has been classified as a participator if he/she performed any one of the above acts, irrespective of voting behavior. Two criticisms can be leveled against this dichotomy. On the one hand, we may be comparing incommensurate acts (even though they typically form quite satisfactory Guttman scales). (See also, Verba and Nie, [1972] for an alternative indicator of commensurability.) On the other hand, and this may be the more critical point, potentially useful information may be lost by collapsing to a dichotomy. This sort of criticism will be raised in the next section.

The replication of the Riker-Ordeshook test (see Table 1) is found in Table 4. One must be struck by the massive increases in participation rates during the 1952–1960 period, a factor we will return to shortly. Of those included in the analysis, 34.8% performed at least one act in 1952, 42.9% in 1956, and 50.2% in 1960.

Examining the test of the calculus, we note that where participation proportions are expected to decrease, they generally do decrease. The four exceptions are small and/or associated with small cell sizes. However, the P variable has a very small impact within any one election. Here, too, we find most of the incorrect predictions and rather few statistically significant increases in participation as perceived closeness of the election increases. Clearly, B and D exert much more substantial explanatory leverage. The D term is related to participation much as it is related to turnout. In general, its impact is substantial, contradicting our expectations. The B variable has a very strong relationship with campaign participation. Its effect certainly approaches if not exceeds that of D and is much stronger here than in predicting turnout. Overall, it appears that rational choice models can account for participation at least as well as turnout and probably better.

While the rational choice model in general appears to be supported, it is equally as clear that these data support only one specific formulation, i.e., the minimax regret over the expected utility decision rule. For example, replication of the hypothesis tests of the last section and Table 3 (not reported here) are unambiguous. The null hypotheses, H_o, are all rejected with probability very close to or greater than .99, while the interaction null hypotheses, H_o', are never rejected. In short, the data clearly support minimax regret and cannot support a hypothesis of P and B interacting. A final note of support can, however, be found for the calculus model. Examining changes between the three elections, we observe that the proportion participating more or less uniformly increases with time for all three variables. This pattern suggests that there is an important variable excluded from the system, but suggests little about variables of concern here. The frequency distribution of responses to P, B, and D changes much as before, of course. It appears that differential participation between 1952 and 1956 must be attributed primarily to an increased feeling of citizen duty in the latter election. However, the 1960 participation rate, in comparison to those of the 1950s, does seem to be attributable primarily to the increased frequency of perceived closeness of the election. This last point suggests that even though the weight of the evidence appears to favor minimax regret over the expected utility formulation, it may be premature to eliminate the P term in examining campaign participation.

TABLE 4
Test of the Calculus of Campaign Participation

1952

	D	High		Medium		Low	
	B	High	Low	High	Low	High	Low
P	High	.450[a] 302	.212 85	.415 289	.198 111	.299 87	.119 59
	Low	.412 97	.200 25	.412 85	.167 30	.326 43	.087 23

1956

	D	High		Medium		Low	
	B	High	Low	High	Low	High	Low
P	High	.535 357	.336 140	.484 252	.340 103	.431 51	.191 63
	Low	.527 129	.250 56	.457 105	.353 34	.074 27	.167 30

1960

	D	High		Medium		Low	
	B	High	Low	High	Low	High	Low
P	High	.597 268	.438 89	.574 162	.346 78	.192 26	.240 25
	Low	.610 41	.300 10	.471 34	.286 7	.300 10	.222 9

[a]Entry in each cell is proportion of respondents in that cell who reported having performed one or more of the campaign participation acts (as detailed in text) in that election.

Alternative Measures

A recurring theme throughout this paper has been the importance of measurement and the effects measurement problems may have on conclusions made. For example, one of our major findings is that, while variations in perceived closeness of the election *within* any one election may be weakly related to abstention rates, variations in closeness *between* elections appear to be more consequential. Thus, we must ask which variation in P is the more theoretically meaningful. Similarly, the contention that there is more favorable evidence of an interaction between P and B in leading to turnout than previously claimed rests on the argument that registered voters should be included in the analysis. Both of these points, therefore, can be understood as resting on claims about the proper operational procedures. In this section, this argument is expanded. We will examine one instance where measurement error can at least be partially checked, consider an alternative measure of each of the independent variables, and in the process, we will be able to include as similar a set of tests on the 1964 and 1972 election data as possible (once again, the multicandidate 1968 election must be excluded). We will close this paper with additional measurement problems which need further investigation.

Perhaps the least consequential form of measurement error, a pure "noise" component, may itself have important consequences for analysis, especially in its well-known attenuation effects. Rarely are we able to capture the extent of these consequences. However, in 1964, the then S.R.C. did actually verify the registration and turnout behavior of its sample. Clausen's justly famous analysis of these data (1968–1969, pp. 588–606) suggests that even as "hard" a datum as turnout is liable to significant response error. In Table 5, we compare the 4-fold, P/B interaction table for 1964 with that obtained by eliminating any whose survey response was demonstrated to be erroneous (i.e., those whose responses were verified or who were unable to be checked are included in the table). While differences are not vast, it is clear that the elimination of the certain measurement error has improved the PB effects, especially that of P. In fact, the major change is in the difference in turnout between Low P/High B and High P/High B, i.e., in the crucial cell for the test of combined effects. Thus, the conclusion we would draw from the crucial test between the two formulations is reversed, and we can no longer reject the expected utility formulation in 1964.

The 1972 election survey provides several alternative measures for the independent variables. The questions making up the citizen duty scale have not been asked since 1960. In 1972, however, alternative questions related to

TABLE 5

Test of Joint Effects of P and B in 1964: The Effect of Response Error

	Vote Report			Response Error Eliminated	
	Low B	High B		Low B	High B
Low P	.675[a] 191	.821 380	Low P	.652[b] 178	.803 370
High P	.684 171	.856 424	High P	.671 164	.862 398

Hypothesis Tests[c]	Report	Error Removed
H_o: $(\gamma+B_1) \leqslant \gamma$	.137[e]	.132[e]
$(\gamma+B_2) \leqslant \gamma$	.172[e]	.191[e]
H_o': $(\gamma+B_2) \leqslant (\gamma+B_1)$	.035	.059[d]

[a]Entry in each cell is proportion of respondents in that cell who reported having voted in 1964.

[b]Entry in each cell is proportion of respondents in that cell who reported having voted in 1964, having eliminated those whose reports were incorrect.

[c]Entry is difference in proportion; γ is based on higher estimate.

[d]Significant at .05.

[e]Significant at .01.

the D term were asked, and these alternatives, like the originals, form a quite satisfactory Guttman scale.[2] As can be seen in Table 6, it is also related to turnout in much the same fashion as the earlier citizen duty scale.[3]

The pattern of P and B earlier discussed can be seen in Table 6, too, but with a slight complication. While B is strongly related to turnout, P is not,

[2] The questions used to make up the new citizen duty scale were three "agree/disagree" items asked in the preelection wave. The questions are "It isn't so important to vote when you know your party doesn't have any chance to win," "So many other people vote in the national elections that it doesn't matter much to me whether I vote or not," and "If a person doesn't care how an election comes out he shouldn't vote in it." Notice that even though it is related to turnout much like the earlier duty scale, the questions making up the 1972 version are much more intimately related to the concepts underlying P and B.

[3] Much the same relationship is found if the efficacy scale is substituted for citizen duty. The major change from this substitution is the fairly even distribution of respondents across the three categories compared to the more heavily skewed D scale responses.

TABLE 6
Test of the Calculus of Voting in 1972

	D	High		Medium		Low	
	B	High	Low	High	Low	High	Low
P	High	.904[a] 125	.788 66	.770 74	.556 36	.417 12	.167 24
	Low	.863 255	.721 111	.815 173	.607 84	.524 21	.240 25

[a]Entry is proportion of respondents in cell who reported having voted in 1972.

except when citizen duty is high. However, it could well be argued that there is a better measure of P than has historically been used. In 1972, the C.P.S. asked not only how close the election was felt to be in the nation as a whole, but also how close the election was expected to be in the respondent's own state. A much greater proportion, perhaps not unreasonably, felt the election would be closer in their state than the nation. If the "federal" structure of our presidential elections is perceived, the statewide P term might be expected to be at least marginally more strongly related to the vote. Table 7 compares the nationwide with the statewide P measure for the 4-fold P/B dichotomy. In fact, it is quite clear that the statewide P measure is related (if weakly) to turnout, whereas the nationwide P term is, as we have earlier demonstrated, totally unrelated.[4] While the difference does not allow us to reject the interaction null hypothesis at commonly accepted significance levels, the differential proportion is significant at the .1 level. Thus, both

[4]It might be argued that the probability of affecting the outcome depends upon the perceptions of likely outcomes in both the state and nation. As it happens, the data suggest that turnout is lower only if the election is not perceived as close in either the state or the nation, but that there is little difference in abstention rates if the election is expected to be close in the state or in the nation, or both. The following table uses this dichotomization of P, with results much like that found in examining only the statewide P variable. What minor differences there are are primarily in reducing turnout in the low P, low B cell.

	Low B	High B
Low P in state and nation	.588 102	.811 238
High P in state or nation or both	.650 197	.866 365

TABLE 7

Test of Joint Effects of B and Various Measures of P in 1972

	P = National Closeness			P = State Closeness	
	Low B	High B		Low B	High B
Low P	.623[a] 220	.829 449	Low P	.605 147	.812 324
High P	.603 126	.829 211	High P	.653 173	.865 318

Hypothesis Tests[b]	P = National	P = State
H_o: $(\gamma+B_1)\leqslant\gamma$	.206[d]	.159[d]
$(\gamma+B_2)\leqslant\gamma$	.206[d]	.212[d]
H_o': $(\gamma+B_2)\leqslant(\gamma+B_1)$	.000	.053[c]

[a]Entry is proportion of respondents in that cell who reported having voted in 1972.
[b]Entry is difference in proportion; γ is based on the higher estimate.
[c]Significant at .10.
[d]Significant at .01.

1964 and 1972 elections may move from clear support of minimax regret over the calculus of voting to the category of "mixed results" at best.[5]

Thus, a better measure of P improved the relationship of the closeness measure with turnout, much as a less error-ridden measure of turnout improved the "fit" of the model. It may be, of course, that a theoretically superior measure may prove to be more weakly related. For example, the B dichotomy measures only how much a person cares about the outcome. This variable is related to differential benefits to be gained from the election of the preferred candidate only by a chain of several inferences. A much more direct measure of differential benefits would be a difference in evaluation of the two candidates. For example, Brody and Page have demonstrated that the 100° point, candidate "thermometer scale" evaluations were strongly related to turnout in 1968 (1973, pp. 1–18). However, such does not appear to be the case in 1972. In Table 8, we report results of the 4-fold P/B comparisons using the statewide measure of P and dichotomizing thermometer evaluation

[5]The extended tables including the D variable do nothing to alter the conclusions about P or the following discussion about B.

TABLE 8

Test of Joint Effects of Statewide P and Various Candidate Evaluations in 1972

	Thermometer Difference = 0°	Thermometer Difference = 1–97°
Low P	.733[a] 45	.758 422
High P	.740 50	.798 450

	Thermometer Difference = 0–24°	Thermometer Difference = 25–97°
Low P	.749 167	.760 300
High P	.789 171	.793 329

	Thermometer Difference = 0–49°	Thermometer Difference = 50–97°
Low P	.746 283	.747 198
High P	.783 327	.794 180

	Thermometer Difference = 0–74°	Thermometer Difference = 75–97°
Low P	.742 350	.816 87
High P	.784 431	.841 69

Hypothesis Tests[b]	Thermometer Evaluation Difference = 0° vs. 1–97°	0–24° vs. 25–97°	0–49° vs. 50–97°	0–74° vs. 75–97°
H_o: $(\gamma+B_1)\leqslant\gamma$	.018	−.029	−.036	.032
$(\gamma+B_2)\leqslant\gamma$	.058	.004	.011	.057
H_o': $(\gamma+B_2)\leqslant(\gamma+B_1)$	.040	.033	.051	.025

[a]Entry is proportion of respondents in that cell who reported having voted in 1972.
[b]Entry is difference in proportion; γ is based on the higher estimate.
None of the relationships are significant.

differences at each of the points used by Brody and Page. The four low B breaking points are (1) no difference, (2) less than 25° difference, (3) less than 50° difference, and (4) less than 75° difference with a maximum difference of 97°.[6] For reasons unknown to us (especially given the Brody-Page results for 1968), it is quite clear that the thermometer-based measure of

[6]The actual range of thermometer scores is 0° (for very unfavorable evaluation) to 97° (for very favorable evaluation). Codes of 98 and 99 are reserved for missing data of various types.

differential benefits has a very small or no relationship to turnout. In fact none of the null hypotheses can be rejected, including those testing P. Much the same pattern results if the national or state-nation-based P variable is substituted for the statewide P variable or if D is included as a third variable. Therefore, we end our data analysis with a striking anomoly.

To this point, we have examined two sources of measurement error, purely "random" response error and error which might be called "validity error," since which measure is the more appropriate is above all a question of validity. There is one other source of error which should be mentioned. Attitudinal data in particular seem to be especially vulnerable to various forms of "rationalization." It may well be that a citizen responds that he is greatly concerned about the election, that he believes the election to be very close, or that it is his duty as a citizen to vote because he has already decided–perhaps for quite different reasons than his responses might indicate–to go to the polls. This and related sorts of measurement error cannot be treated as simply as we have done to this point. Rather, more complex methodology suitable for estimating the implicit simultaneous (and perhaps nonrecursive) equation model underlying the "rationalization" argument must be employed.

Conclusion

In this paper we have attempted to raise some new facets to a continuing debate over the rationality of participation. First, within the established context, we have attempted to show that over-time variations are more suggestive of an expectational calculus than the more common cross-sectional analysis. Secondly, we argued that the incorporation of registration into the rational decision framework is possible and that if so done, there is greater support for the calculus of voting. However, the evidence for the two rational models is mixed. Thirdly, we expanded the participation context to include more general forms of campaign participation. Campaign participation proved to be somewhat better accounted for than voting in the cross-section, yet it is clearly accounted for by the minimax regret model. There was very little evidence favoring an expected utility model. Our final set of concerns actually incorporates some of the previous analysis. We raised a number of operational problems common to survey research in general. Such problems as measurement error, the selection of the appropriate subset of sample to include in the analysis, and the choice of both valid and reliable indicators were shown by example to have substantial consequences for the conclusions reached. That this list is not exhaustive is evident (e.g., our discussion of causation and rationalization makes this point). While the efforts to test

formal models is to be applauded, we hope that we have raised at least a few of the problems which must be faced to make empirical tests as elegant as the logical structure.

Manuscript submitted June 17, 1975.
Final manuscript received January 9, 1976.

REFERENCES

Barry, Brian M. 1970. *Sociologists, Economists and Democracy.* London: Collier-MacMillan Ltd.

Barzel, Yoram, and Silberberg, Eugene. 1973. "Is the Act of Voting Rational?" *Public Choice*, Fall 1973, pp. 51–58.

Brody, Richard A., and Page, Benjamin I. 1973. "Indifference, Alienation and Rational Decisions: The Effects of Candidate Evaluation on Turnout and the Vote," *Public Choice*, Summer 1973, pp. 1–18.

Clausen, Aage R. 1968–69. "Response Validity: Vote Report," *Public Opinion Quarterly*, Winter 1968–69, pp. 588–606.

Downs, Anthony. 1957. *An Economic Theory of Democracy.* New York: Harper and Row.

Ferejohn, John, and Fiorina, Morris. 1974. "The Paradox of Not Voting: A Decision Theoretic Analysis," *American Political Science Review*, June 1974, pp. 525–536.

———. 1975. "Closeness Counts Only in Horseshoes and Dancing," *American Political Science Review*, September 1975, pp. 920–26.

Fiorina, Morris. 1974. "The Voting Decision: Investment and Consumption Aspects," Caltech Social Science Working Paper No. 46. July 1974.

Kelley, Stanley, Jr.; Ayers, Richard E.; and Bowen, William G. 1967. "Registration and Voting: Putting First Things First," *American Political Science Review*, June 1967, pp. 359–79.

Riker, William H., and Ordeshook, Peter C. 1968. "A Theory of the Calculus of Voting," *American Political Science Review*, March 1968, pp. 25–42.

———. 1973. *An Introduction to Positive Political Theory.* Englewood Cliffs, New Jersey: Prentice-Hall.

Smith, Constance E. 1960. *Voting and Election Laws.* New York: Oceana Publications.

Tullock, Gordon. 1967. *Towards a Mathematics of Politics.* Ann Arbor: University of Michigan.

Verba, Sidney, and Nie, Norman H. 1972. *Participation in America: Political Democracy and Social Equality.* New York: Harper and Row.