PRESIDENTIAL ELECTIONS: AN EXPLANATION OF VOTING DEFECTION

BY

RICHARD W. BOYD
Indiana University

Reprinted from THE AMERICAN POLITICAL SCIENCE REVIEW
Vol. LXIII, No. 2, June, 1969

PRESIDENTIAL ELECTIONS: AN EXPLANATION OF VOTING DEFECTION*

RICHARD W. BOYD
Indiana University

This paper proposes and tests a modest theory of voting defection, the act of voting contrary to party identification. The relevance of voting defection to popular control of government is clear. Except for the infrequent elections that Key calls "critical,"[1] the identification of people with their parties is very stable over time. The percentage of Democrats and Republicans in the electorate changed only slightly in the four presidential elections from 1952 to 1964.[2] Short term shifts in public attitudes, then, are reflected not in shifts in the distribution of party identification, but in the degree that people vote in accordance with their identification. When they are disenchanted with the President, defection will be high among members of the opposition party and low among members of the party in office. In 1952 people were weary of the Korean War; this weariness was apparent in the massive numbers of Democrats who thought Eisenhower a man capable of ending the conflict and who backed up their convictions with Republican votes.[3] In short, in the rate of defection we have a mirror that reflects popular discontent with the politics of the President. My present concern is to explore some personal attributes of the voters who make up this critical electorate, to augment the propositions surrounding party identification with one explanation of why it is that people vote contrary to their party allegiance.

I. POLITICAL ORIENTATIONS AND CROSS-PRESSURES

In a theory of electoral behavior, we would expect to give a large place to political attitudes. In terms of the immediacy of their impact upon behavior, political attitudes lie close to the voting act. Variables farther back in the causal network relate to voting primarily through the intervening variables of political attitudes. Thus, these attitudes have a high predictive quality.[4]

In *The Voter Decides,* the first major Michigan study, political attitudes are organized under three main heads: attitudes toward parties, candidates, and policies. These factors are explored as they affect both participation at the polls and choice of candidates.[5] The later Michigan studies have not preserved the simplicity of *The Voter Decides'* trichotomy. Rather, a variety of political attitudes are grouped together. One cluster of six attitudes is consistently associated with electoral choice.[6]

But the factors which affect an individual's vote do not always impel him in the same direction. Frequently, these forces are in conflict. From this observation comes the concept of cross-pressures, formulated originally by Lazarsfeld, Berelson, and Gaudet in their study of the 1940 Presidential campaign.[7] The Lazarsfeld

* For their helpful criticisms of an earlier version of this paper, I would like to thank Leroy N. Rieselbach, Roderick A. Bell, C. Richard Hofstetter, and David J. Hadley. Elton F. Jackson, Alden Miller, and John Gillespie gave the paper close methodological scrutiny. However, I offer this acknowledgment as a note of appreciation, not as an implication of their sanction of the method of analysis.

[1] V. O. Key, Jr., "A Theory of Critical Elections," *Journal of Politics,* 17 (Feb., 1955), 3–18. The notion of critical elections has been broadened to include a whole typology of elections. See Angus Campbell, "A Classification of the Presidential Elections," in Angus Campbell *et al., Elections and the Political Order* (New York: John Wiley and Sons, Inc., 1966), pp. 63–77.

[2] Philip Converse, "The Concept of a Normal Vote," in Campbell, *ibid.,* p. 13.

[3] The images of the parties and candidates in the 1952 election are discussed in Angus Campbell, Gerald Gurin, and Warren E. Miller, *The Voter Decides* (Evanston: Row, Peterson and Co., 1954), pp. 41–68.

[4] This argument, of course, is the one made in Angus Campbell *et al., The American Voter* (New York: John Wiley and Sons, Inc., 1960), chapter 2.

[5] Campbell, *The Voter Decides.*

[6] Since the 1952 election the multiple correlations of these predictors have varied between .72 and .75. See Donald E. Stokes, "Some Dynamic Elements of Contests for the Presidency," *American Political Science Review,* 60 (March, 1966), 19–28.

[7] Paul Lazarsfeld, Bernard Berelson, and Hazel Gaudet, *The People's Choice* (2nd ed.; New York: Columbia University Press, 1948), p. 56. For a discussion of cross-pressures that places the concept into balance theory, see Ithiel de

study uses cross-pressures primarily as an explanation of the time of voting decision during the campaign and of the level of political interest.[8] In *Voting,* the impact of cross-pressures is extended to the stability of vote intention during the campaign, its relation to the selective perception of political events, and to participation at the polls.[9] A major concern of *The Voter Decides* is cross-pressures—the consistency and conflict of political orientations and their impact on candidate preference and participation.[10]

With the development of the concept of party identification in the Michigan studies, we also see the impact of cross-pressures on voting in accordance with party affiliation. Indeed, cross-pressure remains one of the few concepts used to explain voting defection.

> . . . the influence of party identification on perceptions of political objects is so great that only rarely will the individual develop a set of attitude forces that conflicts with this allegiance. But when other antecedent factors lead to evaluations of the elements of politics that strongly contradict the individual's party identification, we anticipate that behavior will conform to these evaluations rather than to party allegiance.[11]

That people develop political attitudes which conflict with party identification should not startle us. Party identification is usually acquired early in life—well before more specific attitudes about policies or candidates.[12] Further, this identification is usually the most enduring of our political beliefs. Our more specific political values are vulnerable to change, to the influence of new peer groups created by social or geographical mobility. At some point the estrangement of political beliefs from party allegiance may become so great that consistency is regained by switching party allegiance. We can get a glimpse of this process in the South today. But even in the South, where mobility and the revolution in civil rights are straining traditional ties, identification with the Democratic Party remains strong.[13]

Following *The Voter Decides,* political orientations are here subsumed under three inclusive heads: images of parties, images of candidates, and policy beliefs. Each of a voter's attitudinal orientations is measured in terms of its compatibility with his party identification. For example, a pro-Republican candidate preference combined with a pro-Democratic party identification is classified as low candidate compatibility. Low compatibility is the adopted definition of cross-pressures. Similarly, indices of Party Compatibility and Policy Compatibility are constructed for each identifier.[14] The following hypothesis is to be tested.

H 1. Taken singly, each index of compatibility relates monotonically to voting defection—the higher the compatibility, the less the likelihood of defection.

The question remains as to how these indices will interact statistically in their effect upon voting defection.[15] It seems likely that there will be a tendency for attitudes that move the voter in the same direction to reinforce one another.[16] For example, if a voter has unfavorable views toward both his party's candidate and the policies he associates with his party, he may defect in rates above what one would predict from simply summing the independent effects of each of his political attitudes. Thus, the following hypothesis.

H 2. Taken together, certain combinations of the indices are mutually reinforcing. Voters whose indices consistently reveal high compatibility with party identification defect less than an additive model would predict. Conversely, voters with consistently incompati-

Sola Pool, Robert Abelson, and Samuel Popkin, *Candidates, Issues, and Strategies: A Computer Simulation of the 1960 and 1964 Presidential Elections* (Rev. ed.; Cambridge: The M.I.T. Press, 1965), pp. 9–15.

[8] Lazarsfeld, *op. cit.,* pp. 52–64.

[9] Bernard Berelson, Paul Lazarsfeld, and William McPhee, *Voting* (Chicago: The University of Chicago Press, 1954), pp. 129–32, 230–31, and 283–84.

[10] Campbell, *The Voter Decides,* p. 87.

[11] Campbell, *The American Voter,* p. 141. The prediction is successfully tested, p. 142.

[12] Herbert H. Hyman, *Political Socialization* (Glencoe: The Free Press, 1959), p. 46.

[13] Philip Converse, "On the Possibility of Major Political Realignment in the South," in Campbell, *Elections and the Political Order,* pp. 212–244.

[14] A section on specific measurement procedures follows.

[15] Statistical interaction is a change in the relationship between two variables over a range of a third. If the relationship is constant, it is said to be additive. See the Appendix for a lengthy discussion of the meaning of interaction and a method of measuring it.

[16] For an explicit statement of the proposition of interaction among attitudes, see Milton Rokeach and Gilbert Rothman, "The Principle of Belief Congruence and the Congruity Principle as Models of Cognitive Interaction," *Psychological Review,* 72 (Jan., 1965), 128–142.

ble indices defect more than an additive model would predict. Inconsistent indices combine additively.

II. STATUS INCONSISTENCY AND MOBILITY

We have to this point discussed the consequences of political orientations and cross-pressures for voting defection. Working back into the theory, we would like explanations of these intermediate variables. How, in other words, do orientations become incompatible with party identification? For possible answers, we explore status inconsistency and mobility.

Much has been made in recent years of the implications of a multi-dimensional status structure. A man's position in the eyes of others may be determined by several of his characteristics: his ethnic background, income, education, and occupation. Often he moves up and down his individual status ladders at different rates. For some the result is a high position on one status dimension and, concomitantly, a low position on another. This condition is called variously status inconsistency, status discrepancy, and low status crystallization. The effects of status inconsistency may be conceptualized as interaction: certain combinations of status positions affect other variables in ways not predictable by a knowledge of the positions viewed independently.[17]

Lipset and Bendix have theorized on the impact of status inconsistency upon cross-pressures. They state that "The mobile individual, who is in many ways a marginal man, retaining old ties and experiences, is more likely to be subjected to cross-pressure than the nonmobile person."[18] Here, they are speaking of the status discrepant individual. One such tie to the past may be party identification, a loyalty increasingly strained by attitudes formed in new situations.

The relationship of inconsistency to cross-pressures is supported by other literature. Several studies link status inconsistency with political attitudes of the left and the right. Lenski and, to a lesser extent, Kelly and Chambliss present evidence of an association of discrepancy with economic or welfare liberalism.[19] Goffman finds inconsistency associated with a desire for a change in the distribution of power in American society.[20]

Other research binds discrepancy to right-wing extremism. The notion of status politics, the subject of Daniel Bell and others in *The Radical Right,* is grounded to status inconsistency.[21] The research of Rush supports the radical right hypothesis.[22] Kelley and Chambliss reveal associations between inconsistency and unfavorable attitudes toward civil rights and civil liberties.

In short, status inconsistency is associated with extreme attitudes of the right and the left, attitudes which can come into conflict with durable party loyalties. This conflict should be manifest especially in the degree to which a voter's party identification is compatible with his image of the parties and with the policies he associates with them.

H 3. Status inconsistency increases political cross-pressures above the level an additive model would predict.

The same rationale which argues that status inconsistency produces cross-pressures applies to mobility as well. One might reasonably expect inter-generational mobility to be related to cross-pressures. Given the tendency to inherit party affiliation from parents and given the durability of party affiliation, one would predict the grown son of a Democratic skilled worker to be a Democrat also. If, however, the son were a professional man, his association with peer groups likely to hold Republican attitudes could create cross-pressures for the professional man. In statistical terminology, here again is an argument for the existence of interaction. When a

[17] This does not mean that empirically one's method of analysis will always reveal an inconsistency effect as statistical interaction. The Appendix discusses the method of analysis.

[18] Seymour Martin Lipset and Reinhard Bendix, *Social Mobility in Industrial Society* (Berkeley: University of California Press, 1964), p. 69.

[19] Gerhard Lenski, "Status Crystallization: A Non-Vertical Dimension of Social Status," *American Sociological Review,* 19 (Aug., 1954), 405–413. See also Gerhard Lenski, "Status Consistency and the Vote: A Four Nation Test," *American Sociological Review,* 32 (April, 1967), 298–301. K. Dennis Kelly and William J. Chambliss, "Status Consistency and Political Attitudes," *American Sociological Review,* 31 (June, 1966), 375–382. For a dissenting view, see William F. Kenkel, "The Relationship Between Status Consistency and Politico-Economic Attitudes," *American Sociological Review,* 21 (June, 1956), 365–368.

[20] Irwin W. Goffman, "Status Consistency and Preference for Change in Power Distribution," *American Sociological Review* 22 (June, 1957), 275–281.

[21] Daniel Bell (ed.), *The Radical Right* (Anchor Books ed.; Garden City: Doubleday and Co., Inc., 1964), pp. 39–61, 63–80, and 259–312.

[22] Gary B. Rush, "Status Consistency and Right-Wing Extremism," *American Sociological Review,* 32 (Feb., 1967), 86–92.

person occupies a very different position in the status game than his father did, he may suffer a level of political cross-pressures substantially above what we would predict from a knowledge of the separate effects of the status levels of the father and son.[23] In fact, the sole impact of generational statuses is likely to be interactive, for there is little reason to suspect an additive relationship between the statuses and cross-pressures.

H 4. Inter-generational mobility increases political cross-pressures above the level an additive model would predict.[24]

Finally, geographical mobility may tear at the ties of a man to old loyalties. If a man grew up in, say, a predominantly Democratic area and later moved to a predominantly Republican area, his exposure to the political attitudes of new peer groups might place strains upon the party loyalty he had previously acquired.

H 5. Geographical mobility increases political cross-pressures above the level an additive model would predict.

III. MEASURES OF THE VARIABLES AND SOURCE OF THE DATA

Space does not permit an elaborate description and evaluation of the measures of the concepts previously defined. For that the reader is referred to the longer work from which this article is taken.[25] However, a brief explanation of the more complicated measures is in order. We may begin with voting defection.

It seems obvious that the defection of a strong partisan is of greater significance than that of a weak identifier. A measure of defection should reflect differences in the sum of the forces necessary to push a man to vote contrary to his party identification. This sum is gauged in the following manner. Since the 1952 election, the Survey Research Center has asked a standard set of questions designed to measure a man's long term attitudinal attachment to his party. The questions yield an index ranging from Strong Democrat to Strong Republican. To create a measure of defection, the average percentage of defections over the three elections since 1956 may be used as an indicator of the strength of the forces necessary to pull a voter away from his party. The formula $D = 2(P - 50)$ estimates this force, where D is the defection score and P is the average categoric percentage of non-defectors.[26] For example, if a Strong Democrat defects, he is given a score of 80, because the average percentage of Demo-

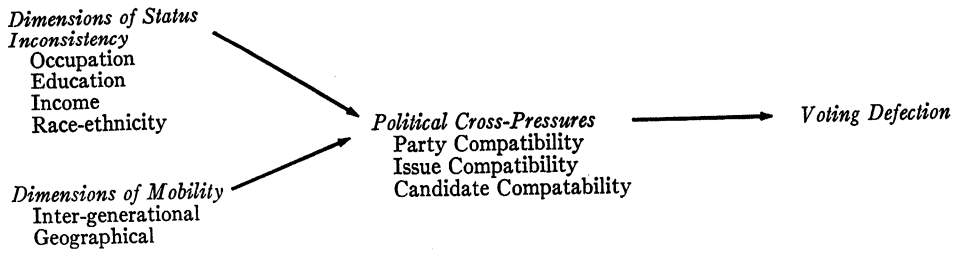
[23] For example, Blau notes that mobility affects a whole range of behavior, including voting. ". . . the upwardly mobile are more likely to vote Republican than people who have remained workers and less likely to do so than those who have originated in the middle class," Peter M. Blau, "Social Mobility and Interpersonal Relations," *American Sociological Review,* 21 (June, 1956), 291. Presuming that there is not a commensurate change in the disposition among the mobile to switch party identification, then the mobile would be more likely to be numbered among the defectors that the non-mobile.

[24] Analogously, to the degree that a man gains or loses in the status race during his mature years, attitudes formed in one social situation are likely to conflict with attitudes formed in another. Thus, if adequate measures were available in the SRC data, we would also test the hypothesis that intra-generational mobility increases cross-pressures.

[25] Richard W. Boyd, *A Theory of Voting Defection: Attitudinal Cross-Pressures and Political Alienation* (Unpublished Ph.D. Dissertation, Department of Government, Indiana University, 1967), pp. 35–43.

[26] The three elections are chosen because they are recent and because they cover the elections which serve as the tests of the hypotheses. The debt that this measure of voting defection owes to the concept of the normal vote should be obvious. See Converse, "The Concept of a Normal Vote," *op. cit.* In brief, the rationale for the averaging procedure is the assumption that across elections the balance of partisan forces changes, not the pressure required to make a voter defect. What is being assumed, then, is that individuals have threshold points beyond which they cannot resist partisan forces counter to their identification. Furthermore, all men within a given category of identifiers have approximately the same threshold point; i.e., they have a similar degree of allegiance to their party. Different percentages of defectors over different elections are assumed to reflect changes in the strength of the attacks that partisan forces mount against men's threshold points. While men may change their identification, the threshold remains the same—for the category which they leave and for the one into which they move. Within any given category the reason some defect while others do not is simply that some individuals are exposed to more intense partisan forces running counter to their identification than are others. Using the average of the three elections for the measure keeps this threshold point constant and allows the partisan forces of the day to change.
The formula $D = 2(P - 50)$ is itself somewhat arbitrary. The multiplication by 2 allows the theoretical range of the variable to extend from 0 to 1. The multiplication has no effect on the analysis.

FIG. 1. The Presumed Causal Order of the Concepts in the Theory



cratic votes among Strong Democrats is 90 percent. If he does not defect, his score is zero. A Weak Democratic defector receives a lesser score of 44. Republican identifiers are similarly scored. Independents and non-voters are excluded definitionally from the analysis.[27]

The Index of Party Compatibility is adapted from one used by Matthews and Prothro.[28] As many as five responses are coded to each of the questions, "Is there anything in particular that you (don't like) (like) about the (Democratic) (Republican) party?" A maximum of 20 responses, then, is coded for the set. Each favorable remark about the Democratic party or unfavorable remark about the Republican party is scored +1. Each favorable remark about the Republican party or unfavorable remark about the Democratic party is scored −1. To determine the degree of compatibility with party identification, the total score of each Republican is multiplied by −1. Eleven is added to all scores to yield a positive index ranging from 1 to 21. Similarly, Indices of Candidate Compatibility and Policy Compatibility are created from the respondents' views on the candidates and the issues. The issues selected (9 in 1956 and 1960, 10 in 1964) cover the three fields of domestic, foreign, and civil rights policy.[29] The issue index measures only those policy beliefs that are perceived by each respondent to have partisan implications.

There is no need to discuss the measures of status and mobility at length here, for such a description appears in the appendix. Each measurement is straightforward. All four of the dimensions of status that appear in the literature on status inconsistency are included. These are occupational prestige, racial-ethnic prestige, income, and education.

The hypotheses are tested on Survey Research Center data obtained from the Inter-University Consortium for Political Research. This secondary analysis includes the three Presidential elections of 1956, 1960, and 1964. Thus, the hypotheses are exposed to a set of elections which differ in outcome and political environment. If uniformity is found over these three elections, we can have substantial confidence in the generality of these propositions.

IV. THE TESTS OF THE HYPOTHESES

The first hypothesis makes a statement about the effects of cross-pressures upon voting defection. Again, cross-pressures are defined in terms of the degree to which a man's attitudes toward the parties, the candidates, and the policies he associates with the parties are compatible with his party identification. Low scores on any of the three indices of compatibility are said to reflect the voter's state of political cross-pressure.

H 1. Taken singly, each index of compatibility relates monotonically to voting defection—the higher the compatibility, the less the likelihood of defection.

The data amply support the first hypothesis. Table 1 lists the mean voting defection scores for each category of each index of compatibility.

As Table 1 shows, the defection rate drops off sharply as one moves from the categories of low compatibility with party affiliation to those of high compatibility with party affiliation. This is true for every election for each of the party, candidate, and policy indices.

[27] Independent Republicans and Independent Democrats are excluded along with Independents.

[28] Donald R. Matthews and James W. Prothro, "The Concept of Party Image and its Importance for the Southern Electorate," in M. Kent Jennings and L. Harmon Zeigler (eds.), *The Electoral Process* (Englewood Cliffs: Prentice-Hall, Inc., 1966), p. 159.

[29] It does not matter whether or not all these questions elicit responses which fall upon a single liberal-conservative continuum. All that is important is that the questions probe beliefs that are relevant to the voting decision. To the extent that issues ever affect electoral outcome, the questions that make up this index are important questions.

The amount of variance in voting defection accounted for by each of the indices is presented in Table 2. The entry in each cell is the unbiased correlation ratio, an estimate of the percentage of variance in a dependent variable explained by an independent variable.[30]

[30] For a description of the unbiased correlation ratio, see Hubert M. Blalock, Jr., *Social Statistics* (New York: McGraw-Hill Book Co., 1960), p. 267. These ratios are based on a series of one-way analyses of variance. The estimate of the percentage of variance explained is obtained by multiplying the ratio by 100. For example, party compatibility explains 5.8 percent of the variance in voting defection in 1956.

TABLE 1. MEAN DEFECTION SCORE WITHIN CATEGORIES OF COMPATIBILITY FOR 1956, 1960, AND 1964[a]

Index of Compatibility	Category of Compatibility		
	Low	Medium	High
1956			
Party	25.14[b]	10.09	5.18
	(74)[c]	(447)	(435)
Candidate	29.73	7.36	2.12
	(158)	(425)	(373)
Policy	29.61	9.82	3.42
	(93)	(455)	(408)
1960			
Party	31.78	9.41	2.02
	(82)	(495)	(522)
Candidate	28.83	7.17	0.90
	(162)	(448)	(489)
Policy	27.16	7.07	0.97
	(134)	(613)	(352)
1964			
Party	37.60	10.14	2.29
	(86)	(452)	(349)
Candidate	41.35	6.16	1.67
	(145)	(308)	(434)
Policy	25.22	9.21	2.04
	(185)	(351)	(351)

[a] The grand mean defection score for 1956 is 9.02; for 1960, 7.57; for 1964, 9.17.

[b] The entry is the mean defection score for a specific category of compatibility for a specific index for a single year. The higher the score, the greater the defection.

[c] The number within the parentheses is the number of respondents upon which the cell mean is based. In all cases, the category of low compatibility includes all respondents below the theoretical zero point of the index.

TABLE 2. ESTIMATES OF VARIANCE IN DEFECTION EXPLAINED BY INDICES OF COMPATIBILITY

Index of Compatibility	1956	1960	1964
Party	.058	.155	.187
Candidate	.196	.255	.386
Policy	.118	.158	.141

As the cell frequencies in Table 1 reveal, in 1956 and 1960 the largest numbers of voters are cross-pressured in their orientations toward the candidates. Table 2 supports the importance of attitudes toward the candidates. In every election, the Index of Candidate Compatibility explains the most variance in voting defection. The correlation ratio for this index increases each election to a high of .386 in 1964. In 1964, numerous voters had misgivings about the candidacies of both Johnson and Goldwater.[31]

In the two-way analyses of variance (where one variable is controlled for the effects of another), orientations toward the candidates consistently cut into the variance explained by party orientation. An example is Table 3. The marginal means of the two indices are fairly

[31] We might note in this regard the rather low amount of variance in defection explained by policy compatibility in 1964 relative to candidate and party compatibility. Perhaps the direct impact of issues upon voting in 1964 was not as great as is popularly supposed.

TABLE 3. MEAN DEFECTION SCORES WITHIN CATEGORIES OF PARTY AND CANDIDATE COMPATIBILITY IN 1964

Index of Party Compatibility	Index of Candidate Compatibility			
	Low	Medium	High	Marginal Mean
Low	50.36[a]	20.89	6.77	37.60
	(55)[b]	(18)	(13)	(86)
Medium	36.67	7.46	1.46	10.14
	(78)	(196)	(178)	(452)
High	30.50	0.62	1.55	2.29
	(12)	(94)	(243)	(349)
Marginal Mean	41.35	6.16	1.67	9.71
	(145)	(308)	(434)	(887)

[a] Mean Defection Score.

[b] Cell Frequency.

TABLE 4. ESTIMATES OF VARIANCE IN DEFECTION EXPLAINED BY EACH INDEX OF COMPATIBILITY, CONTROLLING FOR ANOTHER INDEX FOR THE PRESIDENTIAL ELECTIONS OF 1956, 1960, AND 1964[a]

Year Control Index	Independent Index		
	Party	Candidate	Policy
1956			
Party		.152	.076
Candidate	.014[b]		.038
Policy	.016	.116	
1960			
Party		.119	.088
Candidate	.050		.064
Policy	.085	.131	
1964			
Party		.224	.060
Candidate	.025		.024
Policy	.106	.268	

[a] The estimate of variance explained by the interaction of the two indices is not included in these totals.

[b] The entry is the unbiased correlation ratio (adjusted for unequal cell sizes). The ratio is taken from Hays, who calls the measure the estimated omega squared. William L. Hays, *Statistics for Psychologists* (New York: Holt, Rinehart and Winston), pp. 406–407. These ratios are adjusted for unequal cell sizes, on the basis of a rationale presented in the Appendix. For the adjustment procedure, see B. J. Winer, *Statistical Principles in Experimental Design* (New York: McGraw-Hill Book Co., 1962), pp. 224–227.

similar. The influence of party compatibility appears to be almost as great as that of candidate compatibility. The cross-classification tells a different story, however. The mean defection scores drop more precipitously within categories of party compatibility (looking across the rows) than within categories of candidate compatibility (looking down the columns). Thus, within levels of candidate compatibility, the impact of party compatibility upon defection is substantially less than when the influence of party compatibility is explored independently of the candidate index. That candidate compatibility soaks up much of the variance explained by party compatibility is evident by a comparison of unbiased correlation ratios for Table 3. Uncontrolled, party compatibility explains 18.7 percent of the variance in defection. Controlled for candidate compatibility, party compatibility explains only 2.5 percent. In comparison, candidate compatibility, uncontrolled, explains 38.6 percent of the variance in defection. Controlled for party compatibility, candidate compatibility still explains 22.4 percent of the variance in defection. Table 4 gives a breakdown of the results of the two-way analyses of variance for all indices and all years.

Thus, attitudes toward the candidates are the major statistical explanation of voting defection. The statistical importance of the candidate orientation may reflect in part an ability among voters to articulate attitudes toward candidates more easily than attitudes toward parties and policies. To state likes or dislikes about parties and policies may require a more sophisticated or abstract set of political concepts than those required to state preferences between candidates. Alternatively, disenchantment with a party or its policies may be displaced upon the candidates as visible symbols of the parties. In any case, our attitudes toward the candidates have a significant impact upon our loyalty to the parties they lead.

Having accepted the first hypothesis, we turn now to a test of the second. It concerns the interrelationships of the indices of compatibility in their effect upon voting defection. Interaction is predicted for individuals who are simultaneously high or low on each of two indices of compatibility. Specifically, the hypothesis reads as follows.

H 2′. Taken together, certain combinations of the indices are mutually reinforcing. Voters whose indices consistently reveal high compatibility with party identification defect less than an additive model would predict. Conversely, voters with consistently incompatible indices defect more than an additive model would predict. Inconsistent indices combine additively.

This is a hypothesis one would like to reject. It is a statement of the existence of interaction, and both theory and statistics deal fitfully with interaction. The world of additive relationships is a simpler world. If additive generalizations do not distort a description of the world too much, additive propositions are preferable to interactive ones.

The amount of variance in voting defection explained by the interaction of the indices of compatibility is small. There are three pairwise comparisons between the three indices in each of the three election years.[32] The range for the

[32] In any year the three pairs are party and candidate, party and policy, and candidate and policy.

nine estimates of variance attributable to interaction is .003 to .022. At maximum, then, only 2.2 percent of the variance in voting defection is explained by interaction among two of the indices. The range of the nine F ratios is 1.834 to 9.773.[33] Six of the nine F ratios are statistically significant above .01.

Despite their statistical significance, the magnitude of the F ratios is not great. Were it not for the consistent pattern of the interaction, the hypothesis of interaction could be rejected in favor of an additive proposition. But there is a pattern to the interaction, a pattern which holds for each pair of indices for each election year. Of the nine tables of pairwise cross-classifications, only one cell of one table departs from the pattern. The pattern (outlined below) involves three cells in each table for a total of 27 separate predictions. The predictions hold in 26 of 27 instances.[34]

The pattern itself differs somewhat from the one predicted in the second hypothesis. (Thus, the 27 predictions above are post-facto observations.) Hypothesis 2 correctly states that individuals who hold two orientations that are both incompatible with their party identification defect more than one would predict from just adding together the separate effects of the two orientations; rather the orientations have a reinforcing impact upon one another, and, thus, combine interactively to produce an additional probability of defection. There are no exceptions to this prediction in any of the three elections. (As the appendix argues, the deviation of the means predicted by an additive model from the observed means is an estimate of the interaction effect for each cell.)

On the other hand, the hypothesis predicts that individuals who hold inconsistent orientations—e.g., a candidate orientation of high compatibility and a policy orientation of low compatibility—conform to an additive model. In fact, voters with inconsistent orientations defect less than the additive model predicts. Table 5 shows

[33] The F ratio for interaction is the interaction mean squares divided by the total mean squares.

[34] When one is testing a proposition about interaction in specific cells, measures of association or F tests should not be a final determinant of acceptance or rejection in any case. These measures of association and F tests are not specific to certain cells. The impact of interaction in one cell is diluted by additivity in another. Thus, the variance explained by interaction may be small in spite of a large impact upon individuals in the interaction cell. This dilution is especially critical when, as is often the case, relatively few people occupy the cell manifesting the interaction effect. For this reason, we assign as much importance to a pattern the interaction displays as to either the variance the interaction explains or its statistical significance.

TABLE 5. THE INTERACTIVE RELATIONSHIP BETWEEN CANDIDATE COMPATIBILITY, POLICY COMPATIBILITY, AND VOTING DEFECTION IN THE 1960 ELECTION

Index of Candidate Compatibility	Index of Policy Compatibility					
	Means Predicted by an Additive Model[a]			Observed Means		
	Low	Medium	High	Low	Medium	High
Low	38.53[b]	24.42	20.77[d]	44.25 (56)[c]	23.65 (85)	8.67[d] (21)
Medium	20.56	6.45	2.79	20.81 (52)	6.95 (283)	1.42 (113)
High	15.89[d]	1.78	−1.88	3.08[d] (26)	1.46 (245)	0.00 (218)
Deviations of Predicted from Observed Means						
Low	5.72	−0.78	−12.10[d]			
Medium	0.25	0.50	−1.38			
High	−12.81[d]	−0.31	1.88			

[a] The prediction equation is

$$\hat{Y}_{ij} = -1.88 + 22.65C_1 + 4.67C_2 + 17.77P_1 + 3.66P_2$$

[b] The entry is the mean defection score, here predicted by an additive model.

[c] The number of respondents upon which the cell mean is based.

[d] Cells of inconsistent orientations.

that if we simply add together the effects of a low Index of Candidate Compatibility and a high Index of Policy Compatibility, we would predict a defection score of 20.77. The observed mean defection score for voters with this combination of orientations is a much lower mean of 8.67. Table 6 presents a slightly abbreviated version of Table 5 for all pairs of indices for every year. In all, there are nine such tables of pairwise comparisons—three tables for each of the three elections. The 18 extremely inconsistent cells from the nine tables are relevant to the test of the combination of inconsistent orientations. In only one of 18 cells is the observed mean defection score not lower than the score predicted by an additive model. What seems to be occurring, then, is a smothering effect of one orientation upon another. A position of high compatibility on one orientation more than offsets a low position on another. When one orientation smothers or countervails another, allegiance to party in voting is greater than one would predict on the basis of the separate effects of the two orientations.

In brief, interaction exists, but it is not the interaction predicted by the second hypothesis. For future tests, we alter the hypothesis to read as follows.

H 2.′ Taken together, certain combintaions of the indices of compatibility combine interactively. Voters whose political orientations reveal low compatibility with party identification defect more than an additive model predicts. Voters who occupy inconsistent positions on two indices defect less than an additive model predicts. All other combinations conform to an additive model.

To this point we have examined cross-pressures as a cause—their additive and interactive impact upon voting defection. We must now ask an additional question, the question of how cross-pressures arise. Earlier, we argued that rates of social mobility provide one explanation of voters acquiring political attitudes which conflict with party allegiance. People at times come to occupy different positions on different status hierarchies. This inconsistency is a source of anxiety and frustration, conditions which can lead to extreme and salient political attitudes. Since attitudes such as these have sources and supports apart from party identification, the hypothesis predicts that these attitudes often conflict with party identification. The effect of status inconsistency, then, is cross-pressure, the incompatibility of political orientations with party allegiance.

H 3. Status inconsistency increases political cross-pressures above the level an additive model would predict.

The data give no support to the hypothesis that status inconsistency increases cross-pressures, no support relative to any of the three indices of compatibility for any pair of the four dimensions of status.[35] Table 7 is a typical example of the lack of a relationship between status inconsistency and cross-pressures.

If the interaction hypothesis were true, in the inconsistent cells the observed mean Index of Candidate Compatibility would be lower than the predicted mean, yielding a negative mean deviation. While one cell mean deviation is negative, the other is positive. The magnitude of the deviations are in both cases small. This is the typical pattern.[36]

Table 7 indicates another finding consistent in the data. There is no additive relationship between the dimensions of status and political cross-pressures. Income, education, occupational prestige, racial-ethnicity, all are unrelated to a disposition to hold political attitudes contrary to party identification.

The importance of status inconsistency in current sociological theory justifies a pause to consider why it proved so impotent an explanation in this particular case. Any of the following four conclusions may be justified. 1) We might simply say that no one has ever demonstrated that status inconsistency is, empirically, a powerful concept. For example, Jackson and Burke explained only about 2 percent of the variance in symptoms of stress with status inconsistency.[37] In short, we could conclude that we have been seduced by the theoretical attraction of a concept which at this point should be discarded. I, personally, am hesitant to do this, simply because the concept still makes substantial intuitive sense to me. Certainly, alternative conclusions are possible. 2) For example, we might conclude that the concept was related to an inappropriate dependent variable. That is, we might say that, while status inconsistency does produce extreme political attitudes, it does not

[35] The four dimensions of status upon which Hypothesis 3 is tested are racial-ethnic prestige, occupational prestige, family income, and education.

[36] Because the tables yield negative results they are omitted. They do appear in Boyd, *op. cit.*, Appendix C.

[37] Elton F. Jackson and Peter J. Burke, "Status and Symptoms of Stress: Additive and Interaction Effects," *American Sociological Review,* 30 (Aug., 1965), 556–564. See also Elton F. Jackson, "Status Consistency and Symptoms of Stress," *American Sociological Review,* 27 (Aug., 1962), 469–480.

TABLE 6. INTERACTION AMONG THE INDICES OF COMPATIBILITY AND VOTING DEFECTION. DEVIATIONS OF PREDICTED FROM OBSERVED MEANS IN 1956, 1960, 1964

1956

	Candidate			*Policy*		
Party	Low	Medium	High	Low	Medium	High
Low	2.62[a]	1.28	−11.59	4.00	0.90	−13.61
Medium	0.96	0.42	−1.32	−1.89	0.24	0.14
High	−3.42	−0.88	1.30	−1.95	−0.52	0.53

1. $\hat{Y}_{ij}=0.86+10.73P_1+2.69P_2+25.22C_1+4.27C_2$
2. $\hat{Y}_{ij}=2.03+11.58P_1+2.87P_2+22.52I_1+5.37I_2$

	Policy		
Candidate	Low	Medium	High
Low	5.53	−1.22	−5.38
Medium	−2.94	1.21	−1.24
High	−16.78	−1.44	1.50

1. $\hat{Y}_{ij}=0.49+22.63C_1+3.50C_2+16.30I_1+3.46I_2$

1960

	Candidate			*Policy*		
Party	Low	Medium	High	Low	Medium	High
Low	3.73	−3.91	−7.78	2.18	0.50	−13.31
Medium	1.45	1.44	−2.81	5.05	0.18	−3.06
High	−9.17	−1.36	1.71	−9.51	−0.30	2.02

1. $\hat{Y}_{ij}=-0.89+18.67P_1+4.30P_2+22.18C_1+4.55C_2$
2. $\hat{Y}_{ij}=-1.47+23.07P_1+5.88P_2+20.28I_1+3.95I_2$

	Policy		
Candidate	Low	Medium	High
Low	5.72	−0.78	−12.10
Medium	0.25	0.51	−1.38
High	−12.81	−0.31	1.88

1. $\hat{Y}_{ij}=-1.88+22.65C_1+4.67C_2+17.77I_1+3.66I_1$

1964

	Candidate			*Policy*		
Party	Low	Medium	High	Low	Medium	High
Low	1.17	2.38	−8.25	3.49	−5.86	6.46
Medium	−0.23	1.24	−1.27	1.45	1.16	−2.65
High	−3.85	−3.05	1.37	−6.79	−0.45	1.73

1. $\hat{Y}_{ij}=0.18+14.84P_1+2.55P_2+34.17C_1+3.49C_2$
2. $\hat{Y}_{ij}=-0.87+28.41P_1+5.86P_2+16.02I_1+3.79I_2$

	Policy		
Candidate	Low	Medium	High
Low	3.54	−0.21	−17.58
Medium	−0.70	0.70	−0.73
High	−4.31	−0.71	1.26

1. $\hat{Y}_{ij}=-0.19+35.49C_1+3.19C_2+10.34I_1+2.12I_2$

[a] The entry is the deviation of the mean predicted by an additive model from the observed mean. From this entry and the prediction equation, predicted and observed means can be reconstructed.

[b] Prediction equations for an additive model. The higher the mean, the greater the defection. In the equation, "*I*" stands for the policy index.

TABLE 7. MEAN CANDIDATE COMPATIBILITY SCORES FOR COMBINATIONS OF RACIAL-ETHNIC STATUS AND INCOME IN THE 1964 ELECTION

Racial-Ethnic Status	Income					
	Observed Means			Deviation of Predicted from Observed Means[a]		
	Low	Medium	High	Low	Medium	High
High	13.39[b] (64)[c]	12.43 (91)	12.94 (87)	0.29[b]	−0.46	0.27
Medium	13.23 (64)	13.73 (120)	13.04 (149)	−0.36	0.35	−0.13
Low	13.83 (64)	13.53 (74)	13.26[b] (84)	0.08	−0.00	−0.06[b]

[a] Means are predicted by the equation

$$\hat{Y}_{ij} = 13.32 - .64R_1 - .15R_2 + .43I_1 + .21I_2$$

[b] Inconsistent Statuses.

[c] Cell frequencies.

act upon these attitudes in such a way as to create a discrepancy between these attitudes and party identification. The status inconsistent person might be more inclined than others to change his identification to coincide with his attitudes, because political attitudes are more salient for him than the average individual. 3) We might also conclude that some of the measures of status are wrongly applied to national populations. It is one thing, one might say, to rank all of the people in regard to income or education. It is quite another thing to attempt to construct an index of race-ethnicity that is equally applicable to all sections of the country. Being a Jew in New York simply does not affect the life-style of a person like being a Jew in, say, Plainview, Texas. Since some of the more interesting findings in the work of Lenski and of Jackson and Burke do relate to the dimension of race-ethnicity, we might infer that this particular dimension of status should only be applied to populations that live in homogeneous sub-cultures. 4) Finally, we might conclude that status inconsistency is more applicable to some political strata than others. That is, it may be that status inconsistency has its major impact on a small number of real political activists, rather than to a population of rank-and-file voters. Here, we might point to the political careers of highly educated members of various minority groups. In sum, there are a number of refinements we might make in our theories of status inconsistency that argue against its wholesale rejection. The fourth alternative seems especially plausible to me.

In addition to status inconsistency, we have other possible explanations of political cross-pressures. Earlier, I argued the reasonableness of Hypothesis 4.

H 4. Inter-generational mobility increases political cross-pressures above the level an additive model would predict.

A test does not, however, bear out the hypothesis that inter-generational mobility creates cross-pressures. When father's occupational prestige and respondent's social class when growing up are cross-classified, in turn, against the respondent's present occupation and income, in no case does a relationship between inter-generational mobility and political cross-pressures appear.

As a final test, the relationship between geographical mobility and cross-pressures is explored.

H 5. Geographical mobility increases political cross-pressures above the level an additive model would predict.

Two indicators of geographical mobility are available in the SRC election studies. The first is a question asking the length of time the respondent has lived at his present residence. The second indicator is a comparison of the area of the nation in which the respondent grew up with the area in which the respondent lived at the time of the election interview. Neither of these measures of geographical mobility bears any relation to the disposition to hold political attitudes conflicting with party identification. All indices of compatibility in all years conform to the pattern of Table 8.

If Table 8 is collapsed, the mean compatibility score is actually *lower* for those who reside in the area where they grew up than the mean

score for those who have moved away. This result holds for each index in each election, although in no case is the magnitude of the difference great.[38]

V. SUMMARY

1. Cross-pressures relate monotonically to voting defection—the greater the cross-pressures, the greater the likelihood of defection. The degree of cross-pressure is measured by three indices of compatibility, which, in turn, are measures of the extent to which a man's political beliefs support his party identification. A person may hold attitudes about a) the political parties, b) the nominees of those parties, and c) the policies he associates with the parties. If any of these sets of attitudes is in conflict with his party identification, the person is defined as being politically cross-pressured in regard to that attitude. The greater the cross-pressures, the more likely he is to defect, to vote against the candidate of his party.

Cross-pressures are not a wide-spread occurrence. Party identification is a cognitive anchor for our political attitudes. The member of a party is prone to look with approval upon his own party's conduct and to be suspicious of the conduct of the other. He has nice things to say about his party's candidate; he wonders about the other man. He has his notions about public policy, and he sees a difference between the parties in their support of his notions. In short, the influence of party identification upon political attitudes is great. As a rule, the individual holds attitudes that support his identification. To hold such attitudes is usually sufficient to prevent an individual from defecting.

At times, however, forces arise which move some men to acquire attitudes that conflict with their party identification. When they do, these political attitudes tend to prevail over this identification. The greater the conflict between a person's political attitudes and his party identification, the more likely he is to vote for the candidate of the opposing party.

2. The three sets of political attitudes combine interactively in their impact upon the voting act. For example, a man may have unfavorable attitudes toward both the candidate of his party and the policies he associates with his party. Alternatively, he may be favorable in regard to one attitude (such as the candidate of his party), but unfavorable in regard to another (say, his perception of his party's policies). If a voter's political orientations consistently conflict with his party identification, he defects in rates that are higher than one would predict simply from adding together the separate effects of each of the orientations. Orientations that consistently conflict with party identification, then, reinforce one another in their impact on his vote.

Interaction is also manifest when a voter has one favorable and one unfavorable orientation at the same time. In this case the favorable or compatible orientation smothers the impact of the incompatible orientation. The attitudes of such a voter push him in opposite directions, and he defects less than one would predict merely from adding together the separate effects of the two orientations. All other combinations of political orientations conform to an additive model. That is, for all other combinations of pairs of political attitudes, our prediction regarding the likelihood of defection is most accurate when we simply add together the separate impact of each of the two attitudes.

While cross-pressures prove to be an important source of voting defection, the causes of cross-pressures remain unknown. Status inconsistency was wrongly hypothesized as a cause. Alternative explorations of inter-generational status mobility and geographical mobility also failed as explanations of cross-pressures.

In closing, we might speculate upon the relevance of the cross-pressure findings to campaign strategies. The simple and obvious advice is to run attractive candidates. In each of the three elections, attitudes toward the candidates explain the most variance in voting defection. The 1956 and 1964 elections testify to the impact of the candidates. In these two elections a substantial proportion of the electorate seemed at-

[38] The same is also true for the relationship of mobility to voting defection in the three elections. The non-mobile defect more than the mobile in all three elections, though, again the magnitude of the differences is not great.

TABLE 8. MEAN POLICY COMPATIBILITY SCORES FOR COMBINATIONS OF GEOGRAPHICAL MOBILITY IN THE 1964 ELECTION

Area Where Respondent Now Lives	Area Where Respondent Grew Up			
	Northeast	Midwest	South	West
Northeast	*12.55*[a]	14.40	12.42	0.00
	(177)[b]	(5)	(12)	(0)
Midwest	12.00	*12.35*	14.00	13.00
	(10)	(210)	(34)	(1)
South	12.83	14.00	*12.73*	14.20
	(18)	(15)	(231)	(5)
West	11.25	12.94	14.70	*13.59*
	(4)	(32)	(23)	(82)

[a] The cell entry is the observed mean Index of Policy Compatibility. The higher the mean, the higher the degree of compatibility. The consistent cells are italicized.

[b] Cell frequencies.

tracted to the victorious candidate and repelled by the other. In spite of the fact that he represented a minority, the difference in the appeal of Stevenson and Eisenhower alone was probably sufficient to elect Eisenhower in 1956. In 1964, of course, the Goldwater candidacy produced an overwhelming majority for Johnson.

The importance of issues is more problematic than the importance of candidates. In the 1956 and 1960 elections, attitudes towards the policies that the public associated with the parties ranked second to candidate appeal in impact upon defection.[39] If not as much as candidates, issues do influence the outcome of elections. The impact of issues is problematic because issues seem to have significance beyond any one campaign. That is, it seems a reasonable hypothesis that candidates affect the outcome of specific elections, while issues and their relation to historical events affect the distribution of party identification. The minority does not seek just an occasional victory. Rather, it hopes to realign party allegiance, to become the majority party. To affect a realignment, a President from a minority party may have to identify his administration with attacks on problems the public deems critical.[40] This Eisenhower did not do, and his administration left the distribution of party identification unaltered. In regard to campaign strategy, it would not seem necessary for the candidate of a minority party to emphasize the critical issue or issues in the campaign of his initial victory. But in the course of his administration, he must identify his regime with these critical issues. Undoubtedly, then, future campaigns would be fought on these issues. In short, the impact of a candidate is substantial but of short duration. The impact of issues, while rarely great at any single moment, accumulates over a period of time. Overall, issues may outweigh candidates in affecting the outcome of elections, for issues have the capacity to alter the greatest single determinant of a vote, party identification.

[39] See Table 4. In the 1964 election, however, the rank-order of the importance of the three sets of orientations as judged by their ability to statistically explain voting defection was candidate, party, and policy orientation. The impact of party attitudes is not discussed in relation to its possible impact upon campaign strategy, because there seems little a party could do directly to alter its image with the public. Changes in attitudes toward the parties probably result from candidates and issues.

[40] Quite likely, the type of issue necessary to affect a realignment is a "position issue" rather than a "valence issue." For the distinction between the two, see Donald E. Stokes, "Spatial Models of Party Competition," in Campbell, *Elections and the Political Order,* pp. 171–172.

APPENDIX

THE CONCEPT OF STATISTICAL INTERACTION

In the theory presented in this paper, several of the relationships share a problem of analysis: The independent variables (the presumed causes) are said to combine *interactively* in their impact upon the dependent variable (the presumed effect). Since the exact meaning of statistical interaction is often misunderstood, a brief explanation of the term is perhaps in order.

In normal English usage interaction simply means factors mutually related. This is not its statistical meaning. *Multicollinearity,* the condition of highly related independent variables, is the statistical term that is closest to the English sense of interaction. *Statistical interaction* is a *change* in the relationship between two variables over different levels of a third. The way in which independent variables combine in their effect upon the dependent variable becomes an important datum. If statistical interaction is absent (i.e., if the relationship is *additive*), the relationship between two variables remains *constant* over various categories of the third variable. For example, economic status varies directly with conservatism on welfare issues. But the relationship between welfare conservatism and status may change over different categories of religion. That is, the relationship may be more pronounced with Protestants than, say, Jews. Religion and status, then, combine interactively in their impact upon welfare conservatism.

Multicollinearity and interaction are independent phenomena. As Figure 2 indicates, all combinations of interaction and multicollinearity are possible.[41]

The importance of interaction must not be underestimated. In the first place, there is every reason to think that the world is more complex than additive models suggest.[42] In the second, interaction submits but grudgingly to present

[41] For an illuminating discussion of the subject, complete with graphic examples, see James N. Morgan and John A. Sonquist, "Problems in the Analysis of Survey Data, and a Proposal," *Journal of the American Statistical Association,* 58 (June, 1963), 415–434.

[42] For just a few of the many examples of social phenomena explicitly or implicitly conceptualized in terms of interaction, see the following article and the notes cited therein. Hubert M. Blalock, Jr., "Status Inconsistency, Social Mobility, Status Integration and Structural Effects," *American Sociological Review,* 32 (Oct., 1967), 790–801.

FIG. 2. Statistical Interaction and Multicollinearity

		In their impact upon a dependent variable, the independent variables may combine	
		Additively	Interactively
The independent variables may be	Related (Multicollinearity)	Possible	Possible
	Unrelated	Possible	Possible

statistical methods. For example, an ordinary multiple or partial correlation coefficient is a weighted average of the relationship between two variables over the range of a third.[43] Such a coefficient assumes this relationship to be constant. If it is not constant, one cannot speak with fidelity to the world of the relationship between, say, A and Y, B controlled.[44] One may physically control for B, but this procedure may suffer a loss of cases. (Of course, it is possible to recover the loss of cases by averaging the measures of association from the individual contingency tables produced by the control from B. However, this procedure presumes that each of the measures is approximately the same, i.e., that there is not interaction.)

One means of handling statistical interaction is analysis of variance. Analysis of variance meets several needs in the tests of the hypotheses in this paper. First, the procedure yields estimates of the total amount of variance in the dependent variable attributable to the additive and interactive effects of the independent variables.

Second, the statistical technique is able to accept unequal cell frequencies. In analysis of variance, specific methods differ, depending on whether cell frequencies are equal, proportionate (which requires the independent variables to be uncorrelated), or disproportionate.[45] If the cell sizes are disproportionate one has to decide whether or not the inequality of cell sizes results from happenstance or from a correspondence of the sample to the population from which the data was drawn. If the latter is true, and it is in my case, then a least squares solution to the problem of unequal cell sizes is probably appropriate.[46]

Third, if one's hypotheses predict that interaction will occur in specific cells, then the technique must be able to locate the cells in which the interaction occurs. Following the lead of Duncan,[47] Jackson and Burke[48] and Treiman[49] have developed one least squares procedure that estimates the specific location of interaction. This procedure utilizes a dummy weighting technique whereby each category of variable A becomes a separate variable A_1, A_2, A_3, etc. For every individual the dummy variables have a value of either 0 or 1 depending on whether or not he falls into that category.[50] Below is an equation of this type specifying an additive model.

$$\hat{Y}_{ij} = a + b_1A_1 + b_2A_2 + b_3B_1 + b_4B_2$$

This is to say that the prediction of a dependent variable score ($\hat{Y}_{ij}$) may be computed from a knowledge of three components: one common to all individuals (a); another common to individuals sharing an attribute (A_i); and a final one common to those sharing a second attribute (B_j). Figure 3 is a graphic form of the equation.

One can see from Figure 3 why it is not necessary to include categories A_3 and B_3 in the equa-

[43] Blalock, *Social Statistics*. p. 332.

[44] As in the case of interaction, problems also crop up when multicollinearity is present. See Hubert M. Blalock, Jr., "Correlated Independent Variables: The Problem of Multicollinearity," *Social Forces*, 42 (Dec., 1963), 233–237.

[45] The remainder of the discussion applies only to multiple-way analysis of variance. One-way analysis of variance, which is used to test some hypotheses, does not require an adjustment of unequal cell sizes.

[46] Winer, *Statistical Principles in Experimental Design*, p. 224. The method has been around a long time. See F. Yates, "The Analysis of Multiple Classifications with Unequal Numbers in the Different Classes," *Journal of the American Statistical Association*, 29 (March, 1934), 51–66.

[47] Otis Dudley Duncan, "Residential Areas and Differential Fertility," *Eugenics Quarterly*, 11 (June, 1964), 82–89.

[48] Elton F. Jackson and Peter J. Burke, *loc. cit.*

[49] Donald J. Treiman, "Status Discrepancy and Prejudice," *American Journal of Sociology*, 71 (May, 1966), 651–664.

[50] Daniel B. Suits, "Use of Dummy Variables in Regression Equations," *Journal of the American Statistical Association*, 52 (Dec., 1957), 548–551.

FIG. 3. A Graphic Representation of an Additive Equation

	B_1	B_2	B_3
A_1	$\hat{Y}_{11}=a+A_1+B_1$	$\hat{Y}_{12}=a+A_1+B_2$	$\hat{Y}_{13}=a+A_1$
A_2	$\hat{Y}_{21}=a+A_2+B_1$	$\hat{Y}_{22}=a+A_2+B_2$	$\hat{Y}_{23}=a+A_2$
A_3	$\hat{Y}_{31}=a+B_1$	$\hat{Y}_{32}=a+B_2$	$\hat{Y}_{33}=a$

tion. The model uses these categories for the constant a. (If we had followed the procedure of Kempthorne and others of setting the constant equal to the grand mean, then a term for A_3 and B_3 would have been included.[51])

Once the regression coefficients in the equation are solved, the differences between the observed cell mean and the mean predicted by the additive equation is an *estimate* of the interaction effect for that cell.[52] If interaction exists, by including an appropriate interaction term in the equation, e.g., $b_5A_1B_3$, differences between the observed and the predicted means are reduced. In this manner one specifies a *form* the interaction may be taking, in this example a multiplicative effect for individuals concomitantly in category A_1 and in category B_3.[53]

To be sure, the knotty problems of statistical inference appear with the use of the least squares method just as with other methods. Several factors other than a status inconsistency effect or a mobility effect can produce statistical interaction. With no claim of being exhaustive, Blalock has noted eight alternative explanations for interaction grouped under the headings of sampling error, measurement error, and specification error.[54] This is just to emphasize that the analyst must always be on guard against the possibility that his results are dependent on (to quote another) "statistico-empiricalistic factors and anti-factors." Conversely, it is also true that an interactive world can produce additive statistics under certain limited conditions. For example, if there are, say, mobility effects in opposite corners of a table that affect the dependent variable in

[51] Oscar Kempthorne, *The Design and Analysis of Experiments* (New York: John Wiley and Sons, Inc., 1952), pp. 79–87; George W. Snedecor, *Statistical Methods Applied to Experiments in Agriculture and Biology* (5th ed.; Ames, Iowa: The Iowa State College Press, 1956), pp. 338–391; and R. L. Anderson and T. A. Bancroft, *Statistical Theory in Research* (New York: McGraw-Hill Book Co., 1952), pp. 278–284.

[52] The assumptions which permit the determination of the coefficients are the following: (1) The sum of squares due to interaction shall be minimized.

$$\sum\sum n_{ij}(\overline{AB}_{ij} - a - A_i - B_j)^2 = \text{minimum}$$

(2) The sum of the interaction terms (the deviations from an additive model), weighted by the cell frequencies, shall sum to zero over each row and each column.

$$\sum n_{j.}A_i = 0 \quad \text{and} \quad \sum n_{.j}B_j = 0$$

In short, the additive pattern in each table is defined as that pattern which minimizes the sum of squares attributable to interaction. The only difference between the procedure used in this paper and the more familiar method of analysis of variance is that, in this procedure, the distribution of cell frequencies is allowed for theoretical reasons to influence the estimates of interaction. The program that computed the coefficients and the adjusted sums of squares was written jointly by C. Richard Hofstetter of Ohio State University and this author.

[53] The use of a least squares technique to estimate the location of interaction is not uncontroversial. In the first place, so long as one's cell means conform to an additive model, the pattern of cell frequencies has no effect on the size of the regression coefficients. However, if one's cell means do *not* conform to an additive model, the pattern of cell frequencies will affect the coefficients and, thus, the magnitude of the deviations from an additive model. Furthermore, because the technique is based on least squares, the largest deviations will tend to be found in the cells with the smallest cell sizes. To guard against the possibility that my results are an artifact of the method I used, I also ran the analysis, substituting equal cell sizes while retaining the original cell means. The same results obtained. In the second hypothesis, the direction of the deviations in the 27 critical cells remained the same in every instance. The size of the deviations did not vary greatly from those in Table 6.

[54] Hubert M. Blalock, Jr., "Tests of Status Inconsistency Theory: A Note of Caution," *Pacific Sociological Review*, 10 (Fall, 1967), 69–74.

FIG. 4. An Additive and an Interactive Equation Both Producing Additive Cell Means

	B_1	B_2
A_1	00	30
A_2	10	40

1. Additive equation:
$\hat{Y}_{ij} = 0A_1 + 10A_2 + 0B_1 + 30B_2$
2. Interactive equation:
$\hat{Y}_{ij} = 0A_1 + 20A_2 + 0B_1 + 20B_2 + 10A_1B_2 - 10A_2B_1$

opposite directions, the data can be quite consistent with an additive model.[55] In Figure 4 it may be seen that both the additive and the interactive equation produce the same pattern of cell means. Fortunately, opposite effects in opposing cells do not seem to be a likely complication in the hypotheses presented in this paper.

Analysis of variance requires that the dependent variable have an interval level of measurement. Except for education and income, this is true of no variable in this study. All other measurements meet ordinal assumptions. In this case it seems preferable to sacrifice strict adherence to assumptions for the power of the variance technique. Given our interest in measuring interaction, the alternative is no analysis.[56]

In addition, the sampling design of all three studies is a clustered design. In tests of significance, this design violates the assumption of a simple random sample. Also, the 1960 election is a weighted sample, with some respondents appearing as many as four times. Taking these individuals out would destroy the sampling design, but leaving them in violates the assumption of uncorrelated error terms in analysis of variance. Because of the clustered design and because of the weighted sample in 1960, we should be cautious in interpreting measures of statistical significance. Thus, all measures of significance reported here are viewed as estimates of the figures that a simple random sample would yield.

Finally, regression analysis can be misleading if substantial multicollinearity exists. To the degree that the independent variables are intercorrelated, sampling and measurement error begin to dominate the estimates of the regression coefficients.[57] As a check upon the amount of multicollinearity among the cross-pressure indices, each of the three indices was run against the other in an ordinary linear regression program. For the three elections, the range of the resulting product moment correlations was .34 to .52. While these figures did not seem excessively high, the precaution was taken to run the three indices against the dependent variable, voting defection, in a multiple regression program (the BMD 03R).[58] This program computed the standard error of the regression coefficients associated with each of the indices. Had multicollinearity been a problem, the standard errors would have been large enough that the coefficients would not obtain statistical significance. However, of the nine coefficients (three coefficients for three years), all were significant at the .01 level. A final bit of evidence against the charge that the results are unduly affected by sampling (as opposed to measurement) error is the fact that the findings are consistent over each of three elections. This consistency would be unlikely if the analysis were really dominated by random error.

THE MEASUREMENT OF THE STATUS VARIABLES

1. Occupational Prestige. The ranking of occupations follows those categories established in the ICPR codebooks.[59] These categories are consistent with those used by others who have ranked occupational groups according to their prestige.[60] These categories are collapsed into three groups:

[55] See the following works by Blalock, "Review Symposium," *American Sociological Review,* 33 (April, 1968), 296–297. "Status Inconsistency and Interaction: Some Alternate Models," *The American Journal of Sociology,* 73 (Nov., 1967), 305–315. "The Identification Problem and Theory Building: The Case of Status Inconsistency," *American Sociological Review,* 31 (Feb., 1966), 52–61.

[56] A few attempts have been made to partition chi-square into additive and interactive effects as in analysis of variance, but the technique seems as yet undeveloped. For example, diochotomization of the dependent variable is required. K. V. Wilson, "A Distribution-Free Test of Analysis of Variance Hypotheses," *Psychological Bulletin,* 53 (1965), 96–101.

[57] J. Johnston, *Econometric Methods* (New York: McGraw-Hill Book Co., 1963), pp. 201–207.

[58] W. J. Dixon (ed.), *Biomedical Computer Programs* (Berkeley: University of California Press, 1967), pp. 258–275.

[59] ICPR Codebooks, Survey Research Center, University of Michigan, Occupation Code.

[60] For example, see Jackson, *op. cit.,* p. 471. See also Albert J. Reiss, Jr., *Occupations and Social Status* (New York: The Free Press of Glencoe, 1961), pp. 109–161 and Robert W. Hodge, Paul M. Siegel, and Peter H. Rossi, "Occupational Prestige

a. Professionals, etc.; self-employed businessmen
b. Clerical and sales; skilled workers and craftsmen
c. Farmers; semi-skilled workers; service workers; and unskilled laborers.

All respondents are classified according to the occupation of the head of the household. The retired and the unemployed are assigned to their former occupations.

2. Racial-ethnic Prestige. Respondents are ranked according to the categories used by Jackson in his study of status inconsistency and psychological stress.[61] The basis of the ranking is both race and the birthplace of the respondent and his family.

a. Old English or Old American
b. Northern European
c. Southern and Eastern European, Jew, and Non-caucasian.

Race and religion have priority in the rankings. This is, non-caucasians and Jews are automatically assigned to the third category. If the respondent is foreign-born, he is assigned to the category of the country of his birth. If not, if his father is foreign born, the respondent is classified according to the country of the birth of his father. If his father was also native-born, the respondent is classified according to the statement of the country from which his family originally came. If the respondent doesn't know, he is omitted from the analysis. In the 1956 study, the question regarding the origin of the family is absent. Respondents are classified on the basis of the country of his own birth, his father's birth, or his father's father's birth.[62] A large number of respondents are not classifiable under this scheme. The respondent whose family had been in the country long enough to escape classification on the basis of his father's father being native born is classified as Old American.

3. Income. Respondents are ranked according to the income of the whole family.[63] It is this figure than the income of the respondent or the head of the family alone that determines a respondent's life style. The income is trichotomized into approximately equal thirds in the analysis.

4. Education. Education is measured in terms of the number of grades completed, including college.[64] The scale is collapsed into three categories. Following the procedure of Lenski and Jackson, slightly different rankings are established for people above and below the age of 45. The reason, as Jackson states, is that "an older person would not be expected to have as much education as a younger person of the same occupational and ethnic rank."[65] For the older respondents the following categories are set:

a. College education and attended college
b. High school graduate and attended high school—with or without other non-college training
c. Eight years of school or less.

To adjust for age, a respondent under 45 years of age who attended high school only and had no non-college training is assigned to the third category.

---

in the United States, 1925–63," *American Journal of Sociology,* 70 (Nov., 1964), 286–302.

[61] Jackson, *loc cit.* For 1964, see ICPR Codebook, Deck 7, Col. 12, Deck 8, Col. 33, Deck 9, Cols. 11–13, 15–17, 21.

[62] For 1956, *ibid.,* Deck 6, Cols. 10, 20–22, 25, Deck 5, Col. 27.

[63] For 1964, *ibid.,* Deck 9, Col. 44.

[64] For 1964, *ibid.,* Deck 7, Cols., 27–28.

[65] Jackson, *loc. cit.*