

## Chapter 2

# Contextual Analysis and Multilevel Models

*Keeping still to the over-all statistical picture, the causes of apprehension were then considered. To organize our material we followed the well-established idea that all human experiences are determined by two broad groups of elements: the characteristics of the people themselves and those of the environment in which they live and work.*

—Paul F. Lazarsfeld and Wagner Thielens, Jr. (1958, 159–160)

The political sociology of higher education is enjoying a renaissance in the United States, but there are few if any contextual analyses. The findings reported by Gross and Simmons (2007) in their comprehensive review of contemporary research may be paraphrased roughly as follows: Numerous recent studies focus on political differences among professors and on how the attitudes of academics differ from those of the public at large. Some on the right believe that the left has captured academia and that instruction is consequently biased. Others question these assertions, believing that academics exhibit a variety of political beliefs and that many professors do not express their personal politics in the classroom. Given the research aim of either documenting or debunking such assertions, the typical study follows the logic of a public opinion survey: It samples individual professors and compares their responses to those of the general public; the effects of institutional and departmental contexts on political beliefs are not examined in depth. Some studies exhibit methodological flaws of sampling design, questionnaire construction, measurement, data analysis, and interpretation; most often, the investigators do not examine closely the influence processes and social mechanisms that shape faculty opinion.

Blumer (1956) critiqued such survey research studies as these for ignoring the effects of context and social networks and for merely describing relationships among psychological variables that link one attribute of a respondent to other attributes. Taking up Blumer's challenge, Lazarsfeld and Thielens (1958) developed a paradigm for contextual analysis that culminated in *The Academic Mind*. Probing the pressing question of the effects of McCarthyism on academia, the investigators asked: How did the climate of fear—generated globally by the cold war against communism and manifested locally on college campuses by attacks on the character of individual teachers because of their alleged political beliefs—affect colleges and universities

and their social scientists? The following explication of the logic of their study aims to underscore the importance of contextual analysis for contemporary sociological studies, tighten the linkage between contextual analysis and multilevel statistical modeling, and guide future research on “political correctness” in contemporary academia.

## **The Academic Mind**

Lazarsfeld and Thielens hypothesized that variables at the level of the individual teacher (level-1) and at the level of the academic institution (level-2), along with their cross-level interactions, affected the key outcome variable, namely, a teacher’s apprehension about being singled-out and punished for expressing his or her political beliefs. Because they thought that apprehension was jointly determined by variables at the level of the academic institution and by variables at the level of the teacher, they randomly sampled 165 educational institutions and 2,451 social science teachers within these institutions (1958, 371–377). These data, which are available in data archives for secondary analysis, characterize the population of social scientists and academic institutions during April and May 1955, a period when the effects of McCarthyism were still evident. The investigators used the empirical findings to draw inferences about the population of American academic social scientists during that time period. Because apprehension was the key outcome, they referred to this survey informally as the “teachers’ apprehension study.”

### ***Apprehension and Its Correlates***

The investigators developed measures of apprehension by first conducting detailed exploratory interviews. They asked the interviewees to describe any experiences as a teacher that made them feel uneasy about their academic freedom, induced worry about how their political views could affect their professional advancement, or made them cautious about expressing potentially controversial thoughts. On the basis of these detailed interviews, the investigators then created questionnaire items that assessed worry and caution, the two dimensions they had defined for apprehension. Below, marked with “(A)” (for apprehension), are the statements that formed the final six-item apprehension index.

To assess worry, the questions asked (1958, 76), Have you ever worried or wondered that: (A) students could pass on warped views of what you have said leading to false ideas about your political beliefs; (A) potential employers might ask others about your political biases in teaching; (A) there may be gossip in the community about you because of your politics; (A) expression of your political opinions could jeopardize your promotion or job security; your political beliefs could make you unpopular with the alumni; and the college administration may keep a political file or dossier on you and on other faculty members.

Whereas the questions about worry directly tapped the teacher's state of mind, the questions about caution ascertained whether or not the teacher had acted in ways that would prevent potential controversies about his or her political beliefs. These questions essentially asked (1958, 78), Have you at least occasionally: made statements or told anecdotes that made it very clear that you are neither an extreme leftist or rightist; refrained from participating in some political activity so as not to embarrass the trustees or the administration; refrained from discussing political topics with colleagues in order not to embarrass them; (A) not recommended readings that could lead to criticism that these were too controversial; and (A) toned down your writing because you worried that they might cause controversy.

The worry and caution indexes are strongly correlated—the ordinal measure of association gamma ( $\gamma$ ) = 0.70.<sup>1</sup> Nonetheless, the investigators chose the six items that most directly indicate the underlying sentiment of occupational apprehension, the dimension along which the respondents could best be classified. By simply summing the dichotomized replies to the six items, the investigators created an index that ranges from zero (no apprehension) to six (considerable apprehension). They grouped the scores as Low (0, 1) = 54%, Medium (2, 3) = 33%, and High (4–6) = 13%, and, most often, because only countersorters and not computers were then generally available, to simplify the data processing, they dichotomized this variable, analyzing the determinants and consequences of high plus medium = 1 versus low = 0 apprehension.<sup>2</sup>

Having built the index of apprehension, the investigators then turned to validating it by clarifying its relationships with other variables. They found that “vulnerable” teachers, those who had been involved in a personal incident or who were members of a controversial organization, were more likely to exhibit a high degree of apprehension, with personal incidents having the stronger average effect.<sup>3</sup> Other correlations with apprehension were as follows: the higher the teachers' levels of apprehension (at least through scores 0 through 4), the more likely the teachers were to protest bans on controversial speakers and on debates about admission of communist China to the United Nations; to read left-of-center journals like *The Nation*, *The New Republic*, and the now defunct *The Reporter*; and to be alert to issues of academic freedom and civil liberties (1958, 92–112). At each level of vulnerability, teachers who were more concerned about civil liberties were also more likely to exhibit high apprehension (1958, Fig. 4-8, 109).

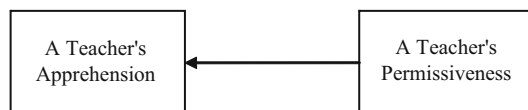
The investigators related a teacher's apprehension to the college context by forming a typology of academic institutions based on size (the number of students) and type of organization (private, public, teachers, colleges, Protestant, and Catholic). The nine types are private (large and small), public (very large, large, small), teachers' colleges, Protestant, Catholic (large and small). The investigators found that teachers at small Catholic institutions and small public institutions were less apprehensive than those at the other types of institutions (see their Fig. 3-8, 90). Attacks were more frequent at institutions of higher quality, but a protective administration could reduce its faculty's amount of apprehension induced by such attacks (1958, 167–174). At the same time, a teacher's breadth of permissiveness (rather than conservatism) increased apprehension.

## *Assessing Permissiveness*

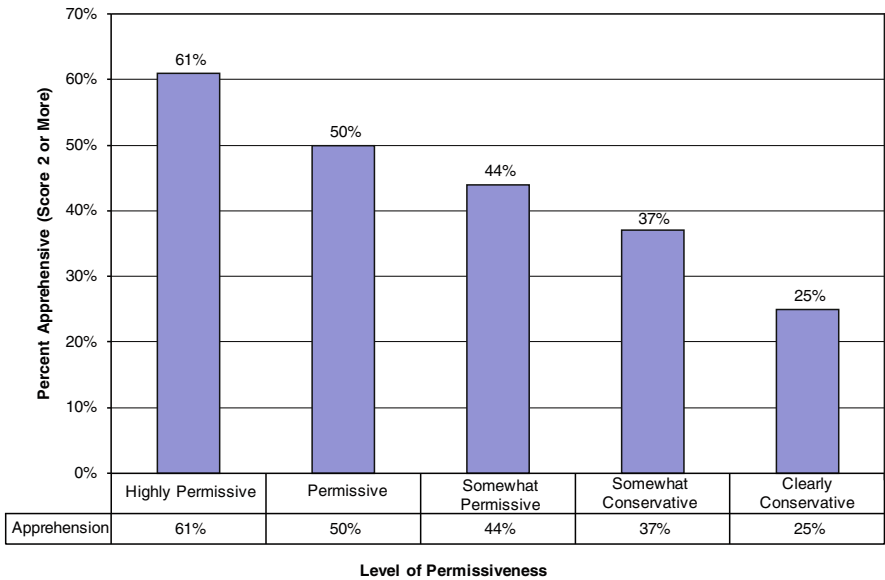
A professor's apprehension was influenced by the scope of his or her permissiveness. Permissive professors were more likely to permit freedom of expression for leftist political views on campus, whereas the more conservative professors were less likely to do so. Other indicators of a permissive outlook were that a professor would not fire a faculty member who admittedly is a communist and would allow the young Communist League on campus. Indicators of a conservative outlook were that a professor: Would not allow Owen Lattimore to speak on campus (Lattimore was an expert on China whom Senator Joseph McCarthy accused of being a spy for the Soviet Union); would fire a store clerk who admitted to being a Communist; would not allow the Young Socialist League on campus; and considered it a luxury to have a radical teacher on the faculty.

From these indicators, the investigators created a bipolar index of permissiveness versus conservatism (see their pages 125–127 for the details). They classified teachers as highly permissive if they gave two permissive replies and no conservative replies. At the other extreme, they classified teachers as highly conservative if they gave two or more conservative replies and no permissive replies. The other teachers exhibited different combinations so that scores on the permissiveness index ranged from: 0 = clearly conservative (14%); 1 = somewhat conservative (14%); 2 = somewhat permissive (29%); 3 = quite permissive (21%); and 4 = highly permissive (22%).<sup>4</sup> Creating a trichotomous index, the investigators combined the two categories at either extreme.

The investigators clarified the meaning of permissiveness by relating its index to a number of indicators that distinguished the political left from the political right; these measures were similar to those they used to validate their apprehension index. Compared with their conservative counterparts, permissive teachers were more likely to vote Democratic, read liberal magazines, belong to professional and controversial organizations, favor classroom discussion of political topics, support academic freedom, be professionally productive, say their own academic freedom had been threatened, say they had been reported to higher authorities, and acknowledge they felt pressures to conform politically (1958: 132–156). Not surprisingly, they also were more likely to exhibit apprehension, which was in part a consequence of their permissiveness. Because the investigators conceptualized permissiveness versus conservatism as a basic attitudinal predisposition, they viewed permissiveness as a predetermining variable that induced apprehension—worry and caution—rather than assuming the opposite.<sup>5</sup> Thus:



The investigators depicted these relationships in a bar chart (Fig. 6-15) similar to that in Fig. 2.1; both charts clearly show that apprehension increases with increases



**Fig. 2.1** Permissive teachers are more apprehensive than conservative teachers

in permissiveness. These variables are measured at level-1, but *The Academic Mind* also reports the effects of incidents, a level-2 contextual variable that describes the professors by a property of their academic institutions.

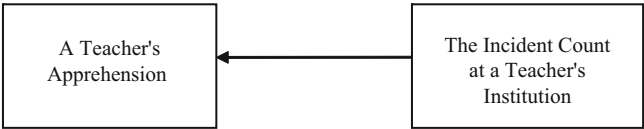
***Institutional Incidents***

The investigators clarified their use of the word “incident” as follows (44):

it describes an episode, long or short, in which an attack, accusation, or criticism was made against a teacher, a group of teachers, or a school as a whole. . . . This [overt] act might be a listing of the names of supposedly “pink” professors in the gossip column of a local newspaper, a student going to a dean with a charge against a teacher, or a teacher reporting that another man had been passed over for promotion because of his politics.

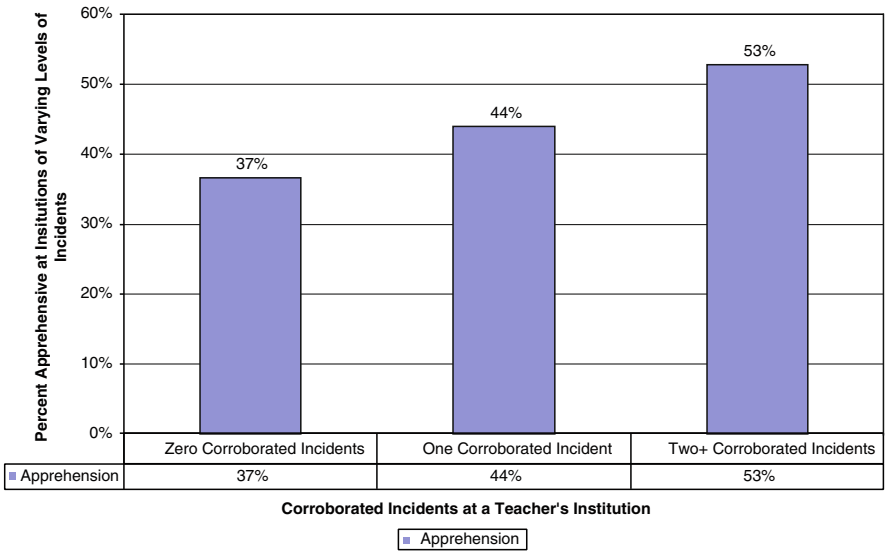
To interpret how the institutions affected their faculties’ apprehension, the investigators applied an “attack and defense” model—a strong defense can mitigate the effects of an attack. At the time of the study, right-wing attacks on teachers and their institutions induced apprehension, but if the institution’s administration defended its faculty from these incidents, this defense alleviated the apprehension. The investigators measured such incidents by relying on reports from their interviewees. They distinguished corroborated from uncorroborated reports and deleted from their contextual analysis those teachers who had personally experienced an attack or a similar incident. They then characterized the institutions by their count of corroborated incidents (1958, 259).

The count of academic freedom incidents that characterized a teacher’s institution was crucial in engendering apprehension, as this diagram depicts:

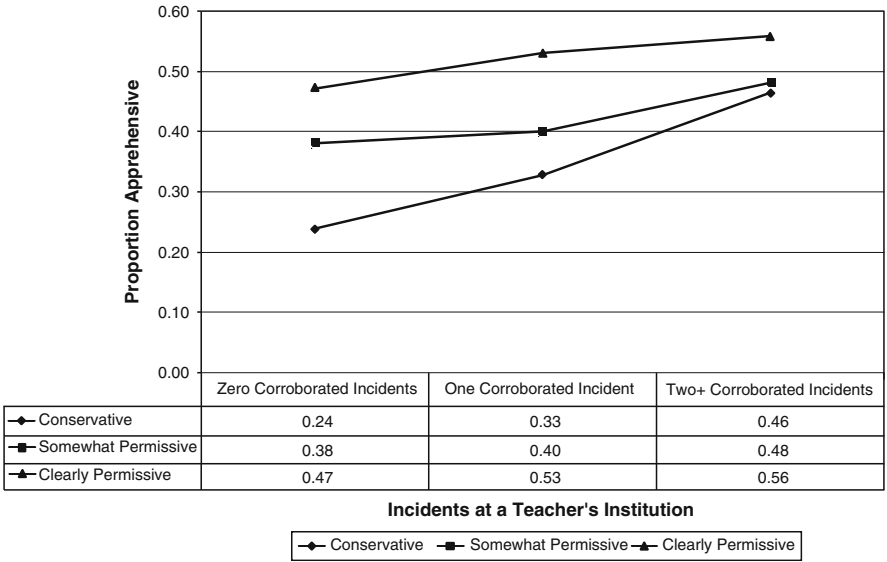


Using data from Fig. 10-9 of *The Academic Mind*, Fig. 2.2 compares the effects of incidents on the apprehension of 1,878 teachers for three types of institutions—those with 0, 1, or 2 or more (hereafter, 2+) corroborated incidents. The bar chart illustrates a *comparative analysis* because it shows how the categories of a level-2 variable shape the extent of a level-1 variable. The teachers included in this analysis had not experienced a personal attack or other political difficulties themselves. Even so, as the number of corroborated incidents at a teacher’s institution increases, the intensity of apprehension at that institution also increases. When there are zero corroborated incidents, the baseline (intercept) level of apprehension is 37%. When there is one incident, then the mean level of apprehension increases by 7 percentage points to 44%. When there are 2+ incidents, then the mean level of apprehension increases from the baseline value by 16 percentage points to 53%. Moreover, when the incidents increase from 1 to 2+, the increase in apprehension is 9 percentage points. All of these differences are statistically significant.

Lazarsfeld and Thielens synthesized the microlevel relationship depicted in Fig. 2.1 and the macrocomparative, cross-level relationship of Fig. 2.2 by first



**Fig. 2.2** The greater the number of corroborated incidents at an academic institution, the higher the teachers’ apprehension at that institution



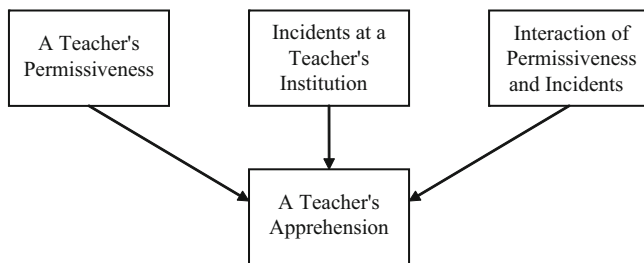
**Fig. 2.3** At each level of permissiveness, the greater the number of corroborated incidents at an academic institution, the higher the teachers’ apprehension at that institution

sorting the data on the teachers into three groups: clearly permissive (highly and quite permissive), somewhat permissive, and conservative (somewhat and clearly conservative). Then, for each of these groups, they cross-tabulated a teacher’s level of apprehension with the number of corroborated incidents at that teacher’s institution and they looked for interaction effects.

Figure 2.3 depicts these relationships quantitatively (it uses the data of the investigators’ Fig. 10-9 and estimates from SAS’s Proc Means, see endnote 6).<sup>6</sup> Holding constant an institution’s count of incidents, one set of relationships links the two microlevel variables: the higher the professor’s permissiveness, the higher the apprehension. Holding permissiveness constant, the cross-level set of relationships compares the amount of apprehension at institutions with varying incident counts: for each amount of permissiveness, the greater the number of corroborated incidents at a teacher’s institution, the greater the amount of apprehension at that institution, even though the teachers included in this figure did not experience attacks or political problems themselves. The institutional context induced apprehension, controlling for the effects of permissiveness.

The effects of context are as follows: the different institutions had different impacts on apprehension, which depended upon the extent of the teachers’ permissiveness or conservatism. The apprehension of conservative teachers increased linearly with the increased number of incidents; the increases for the other teachers were less steep. When there were 2+ incidents, then there was very little difference (1 percentage point) between somewhat permissive and conservative teachers.

When there were no incidents, then the difference was much larger (14 percentage points). When the teachers were not predisposed toward apprehension by their basic conservative political orientation, then the institutional context of incidents induced the greater change in apprehension: for conservative teachers, the change was 22 percentage points compared with 10 percentage points for somewhat permissive teachers and 9 percentage points for clearly permissive teachers—context matters! Diagrammatically, assuming that the key determining variables are on equal footing:



## Conclusion and Implications

Lazarsfeld and Thielens studied a crucial social problem: how the cold war against communism and radical right-wing extremism engendered a climate of fear at academic institutions; this fear constrained academic freedom and freedom of expression. These investigators identified a causal mechanism for the interplay of stimulus, predisposition, and response: the count of corroborated incidents at an institution (the stimulus) interacted with the teachers' political attitudes, assessed by their leaning toward permissiveness or conservatism (the predisposition), to produce the amounts of apprehension, assessed by worry and caution, about infringements to one's academic and political freedoms (the response). Their pivotal contextual analysis combined (1) a level-1 relationship between permissiveness and apprehension, (2) a comparative relationship between an institution's incident count and its teachers' apprehension, and (3) a contextual interaction effect between permissiveness and incidents as these variables jointly determined apprehension. Their nuanced analysis uncovered the varying effects on apprehension among teachers with different amounts of permissiveness at institutions with different counts of incidents. For conservative teachers, apprehension increased linearly from low values to fairly high values as the number of incidents increased. For the more permissive teachers, the amounts of apprehension were high from the start, even when there were no incidents and, as incidents increased, their apprehension increased but not as much as for conservative teachers.



## Notions of Causality

Further developing Lazarsfeld and Thielens's social mechanism view of causality, the next two chapters explicate and provide examples of three basic causal notions; namely, stable association, potential outcomes, and dependency networks. *The Academic Mind* provides elementary examples of all three, as follows: The authors tested the stability of the association between the productivity of a professor ( $x$ ) and voting Democratic ( $y$ ) by controlling for three age categories (1958, Fig. 1-7, page 17). Because their control for differences in age ( $t$ ) did not weaken the  $x \rightarrow y$  relationship, this association was thought to be stable.

The potential outcomes perspective can be roughly illustrated by the relationships among apprehension, and incidents (1958, Fig. 10-9, 259; or Fig. 2.3). Prior to assignment to an academic institution that may have 0, 1, or 2+ numbers of incidents (i.e., these are the alternative treatment conditions), the professor has potential outcomes (i.e., different amounts of apprehensions) under each treatment condition. After random assignment to one of these treatments, the professor has a realized outcome under that treatment and two counterfactual outcomes, one for each of the other treatments he has not received. The causal effect of the incidents for this person is the difference between the amount of apprehension under the treatment that he received and the counterfactual amount of apprehension that he would have, had he received one of the other treatments. Since the person can receive only one of these treatments, the individual-level causal effect of the treatment cannot be quantified. This illustrates the fundamental problem of causal inference; after assignment to a specific treatment, only the effects of that one treatment can be observed, the effects of the other treatments cannot be observed and are counterfactuals. However, the average causal effects of the treatments can be estimated by the differences between the average amounts of apprehension under each treatment condition. Referring to Fig. 2.3, for professors actually receiving the zero-incidents treatment, the average proportion apprehensive is 0.37. Then, the average proportion apprehensive if assigned to an institution with one incident would be 0.44. Therefore, the average causal effect of one incident is  $0.44 - 0.37 = 0.07$ . The average causal effect if assigned to 2+ incidents relative to assignment to 0 incidents would be  $0.53 - 0.37 = 0.16$ . Of course, this model assumes that the professors are randomly assigned to the treatment conditions; that is, assignments to the treatments are not confounded with prior amounts of permissiveness and apprehension, or other variables. The actual data do not meet these criteria.<sup>7</sup>

Dependency networks include a generative mechanism that links a response  $y$  to an  $x$  via intervening variables  $t$ :  $x \rightarrow t_1 \rightarrow t_2 \rightarrow t_3 \rightarrow y$ . Illustrating a dependency network, Lazarsfeld and Thielens's summarizing schematic (1958, Fig. 7-13, 188) has this form: the quality of an academic institution ( $x$ ) influences the permissiveness of the faculty ( $t_1$ ), which influences the external pressures ( $t_2$ ), which influences the performance of the administration ( $t_3$ ), which in turn influences the apprehension of the professors ( $y$ ).<sup>8</sup> This qualitative theory linking context,

mechanism, and outcome challenges analysts to quantify these relationships by applying multilevel modeling to the data of *The Academic Mind* and to the data of contemporary studies of higher education.<sup>9</sup>

## ***Multilevel Models***

Lazarsfeld and Thielens synthesized the level-1 relationship between permissiveness and apprehension and the cross-level relationships by cross-tabulating the three variables. Because of the limitations of their research technology, they could not simultaneously analyze the interrelations among the variables in their summarizing qualitative theory. Using similar cross-tabular procedures, Ladd and Lipset (1976) probed the political polarization of academia induced by the Viet Nam war.

Cross-tabulations may limit the number of variables investigators can consider simultaneously. The development of statistical methods and computing power allowed such contextual analysts as Sewell and Armer (1966) to study comprehensive systems of variables. However, when observations are clustered within units, as they are in multilevel data structures, standard regression procedures are likely to produce erroneous standard errors and confidence intervals; the observations are not independent and the error terms are correlated, thus violating key assumptions of regression analysis. Addressing this problem, Mason, Wong, and Entwistle (1983) developed multilevel modeling and explained their approach to sociological methodologists. The computer programs and explications of multilevel modeling done by Bryk and Raudenbush (1992; Raudenbush and Bryk 2002), Goldstein (1987, 1995, 2003), Littell, Milliken, Stroup, Wolfinger, and Schabenberger ([1996] 2006), and Gelman and Hill (2007), among many others, have made this useful procedure accessible to social and behavioral scientists.

Chapter 5 aims to advance the contextual analysis methods of Lazarsfeld and Thielens by putting forward 11 pivotal uses of multilevel models. The illustrative examples, which are taken from the core chapters of this book, show how multilevel models can advance the earlier method of cross-tabular analysis and the contemporary method of regression analysis. Multilevel modeling can advance contemporary research on pressing social problems because it enables the investigator to study the effects of contexts at one point in time and across time, in systems composed of variables at different levels of the hierarchy of data, for response variables at different levels of measurement.

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## Endnotes

<sup>1</sup>To calculate gamma ( $\gamma$ ), first define A as the number of concordant pairs of observations (++) or (--) and B as the number of discordant pairs of observations (+- or -+). Then,  $\text{gamma} = (A - B)/(A + B)$ . For Table 3-3 (1958, 81):  $A = 1,184 \times 423 = 500,832$ ;  $B = 125 \times 719 = 89,875$ ;  $A - B = 410,957$ ;  $A + B = 590,707$ ;  $\gamma = 410,957/590,707 = 0.70$ .

<sup>2</sup>Lazarsfeld and Menzel ([1961] 1972, 229–230) distinguish properties of members in contexts where collectives have been defined as *absolute*, *relational*, *comparative*, or *contextual*. Apprehension is an absolute property of the professors because its measure was obtained without using information about the academic institution and without taking into account information about social relationships among the professors.

<sup>3</sup>Rough estimates of the average effects of these variables can be calculated by simply taking a simple average of the two conditional relationships. For the data of their Fig. 7-13, the roughly estimated average effect of involvement in an incident on apprehension, controlling for membership in a controversial organization =  $((75\% - 56\%) + (71\% - 36\%))/2 = (19\% + 35\%)/2 = 27\%$ . The roughly estimated average effect on apprehension of membership in a controversial organization, controlling for involvement in an incident =  $((75\% - 71\%) + (56\% - 36\%))/2 = (4\% + 20\%)/2 = 12\%$ . The roughly estimated interaction effect on apprehension of not being involved in an incident but belonging to a controversial organization is the difference between these differences divided by 2. It equals  $(20\% - 4\%)/2 = (35\% - 19\%)/2 = 8\%$ . These rough estimates do not take into consideration the different sample sizes and the limitations of the linear probability model.

<sup>4</sup>Similar to apprehension, permissiveness is an absolute property of the professors.

<sup>5</sup>The direction of the effect between permissiveness and apprehension has perplexed some scholars (personal communication). Lazarsfeld and Thielens assumed that permissiveness led to apprehension (see their Fig. 7-13). Implicitly, they may have conceptualized permissiveness-conservatism as roughly analogous to the cluster of variables indicative of authoritarianism. The conservative pole of permissiveness is somewhat analogous to political and economic conservatism, whereas the openness-to-ideas aspect of permissiveness suggests stronger commitments to anti-authoritarian democratic values. If authoritarianism is a variable of personality, then, given this analogy, it is logical to assume that apprehension is in part a manifestation of permissiveness, rather than the opposite. However, both variables could mutually influence each other.

<sup>6</sup>Here is the SAS data set and syntax that relates permissiveness, apprehension, and academic freedom incidents:

```
Data Chapter2;
input incidents permissive apprehension count;
DATALINES;
0 2 1 113
0 2 0 127
0 1 1 108
0 1 0 176
0 0 1 55
0 0 0 175
1 2 1 148
1 2 0 131
1 1 1 84
1 1 0 126
1 0 1 46
1 0 0 94
2 2 1 170
2 2 0 134
2 1 1 65
```

```

2 1 0 70
2 0 1 26
2 0 0 30
;
data chapter2; set chapter2;
Title 'Grouped Data Similar to Figure 2.1.';
proc means Nmean;
var apprehension;
class permissive;
freq count;
Run;
Title 'Data for Figure 2.2.';
proc means Nmean;
var apprehension;
class incidents;
freq count;
Run;
Title 'Data for Figure 2.3.';
proc means Nmean;
var apprehension;
class permissive incidents;
freq count;
Run;

```

<sup>7</sup>Smith (1985a, 68–79) formalizes the key findings of *The Academic Mind* in terms of a generative computer simulation model and a mathematical analysis of some of its implications. The programmed model can be used to conduct Monte Carlo experiments that conform to the potential outcomes causal perspective.

<sup>8</sup>Pawson (1989, 2006) and Pawson and Tilley (1997) advocate a realistic social science that link contexts, mechanisms (i.e., generative processes), and outcomes. Angus Deaton (2009, 4) agrees with this perspective, writing:

I concur with the general message in Pawson and Tilley (1997), who argue that 30 years of project evaluation in sociology, education and criminology was largely unsuccessful because it focused on *whether* projects work instead of on *why* they work. In economics, warnings along the same lines have been repeatedly given by James Heckman. . . .

<sup>9</sup>Smith (2010a) applies generalized linear mixed models to quantify further the data above in endnote 6; that is, the data from Lazarsfeld and Thielens's Fig. 10-9.

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