

**SIMULATING THE EFFECT OF SOCIAL INFLUENCE ON
COLLECTIVE DECISION-MAKING: THE CASE OF
EDUCATOR REPORTING OF CHILD ABUSE**

by

Roy Woodrow Wilson

M.S. in History and Policy, Carnegie Mellon University, 1993

M.H. in Humanities, University of Colorado, 1990

M.S. in Computer Science, University of Denver, 1983

M.A. in Mathematics, University of Denver, 1978

B.A. in Mathematics and Philosophy, Metropolitan State College of
Denver, 1976

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the Department of Administrative and Policy Studies in partial
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This dissertation was presented

by

Roy Woodrow Wilson

It was defended on

11 October 2005

and approved by

M. B. Ginsburg, Professor, Department of Administrative and Policy Studies

T. J. Fararo, Distinguished Service Professor, Department of Sociology

D. T. Martin, Associate Professor, Department of Administrative and Policy Studies

J. Skvoretz, Dean, College of Arts and Sciences, University of South Florida

W. B. Thomas, Professor, Department of Administrative and Policy Studies

Dissertation Director: M. B. Ginsburg, Professor, Department of Administrative and Policy
Studies

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ABSTRACT

SIMULATING THE EFFECT OF SOCIAL INFLUENCE ON COLLECTIVE DECISION-MAKING: THE CASE OF EDUCATOR REPORTING OF CHILD ABUSE

Roy Woodrow Wilson, PhD

University of Pittsburgh, 2005

The dissertation is directed toward a simulation study of social influence in small, task-oriented, groups composed of education professionals of differing status who hold differing beliefs about what constitutes the reportable physical abuse of elementary students by parents. It is asserted on philosophical grounds that simulation allows the development and refinement of computational, process-based, models that reflect the stratified nature of social and educational reality. More practically, simulation makes it possible to trace socio-cultural processes over time rather than simply settle for an input-output analysis. The possibility of more adequate explanation, and transformation, of social and educational systems makes simulation relatively superior to other research methods.

Persons are modeled as computational objects that participate in social relations. The simulation is based on the social-psychological theory of expectation states and is expressly framed to allow comparison of: (1) a static model and process model of social influence and (2) the social theories of Giddens and Archer regarding the timing of social tie formation. National data are used to formulate models of professional belief concerning $N = 111$ cases of reported physical abuse. The chief findings are: (1) as applied to the group task of child abuse reporting, the collective decision outcomes obtained from the two models of social influence disagree by a number greater than that expected by chance alone, and (2) as modeled, there is essentially no difference in the simulated collective decision outcomes generated under each theory concerning the timing of social tie formation.

Several refinements are needed. First, it is important to construct a more adequate characterization of the relevant beliefs of education professionals, best done via the construction of an ethnographic decision model for each professional type. Second, given the importance of social influence, the simulation should be extended to incorporate socio-linguistic, especially argumentative, behavior. Third, it is important to extend the model to take into account the constraining power of belief with respect to social action. These extensions would add believability to the model and its outputs, thus enhancing its power to inform social and educational theory and practice.

Keywords: Education, Sociology, Simulation, Methodology, Philosophy, Child Abuse.

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PREFACE

I have incurred numerous debts in the long course of completing this dissertation. For constant encouragement of various sorts, I owe my wife Diane. I am indebted to Mark Ginsburg who, as editor, provocateur, and patient observer of glacial progress, fulfilled his promise to help me (despite my tendency to bricolage) increase the yield of my little plot. I owe Tom Fararo for inspiration, instruction (especially regarding modeling social influence), and tolerance of my refusal to adopt the purer path that he has taken in the space of social theory. At a critical time, Norm Hummon (now deceased) provided example and encouragement that object-based simulation was not a crackpot idea, although we came to differ about how to best go about it. I know John Skvoretz only by a portion of his work, but that portion has been a lynchpin of my thinking and this dissertation. In addition to securing my entry to the educational setting that motivated this study, Bill Thomas early led me to a fork in the road where I was forced to choose the sociology of education over the history of education as my disciplinary focus. The original culprit in this story is Don Martin who, by his personality as much as his intellect, encouraged me to look at education as a field for both theory and action. Finally, Chris Schunn provided me gainful, interesting, and dissertation-related employment that allowed me to complete the task and prepare to move into the complex field of research related to education.

1.0 INTRODUCTION

1.1 AIMS OF THIS CHAPTER

The purposes of this, introductory, chapter are numerous. They are to: describe the concrete setting out of which the idea for this study grew; describe the research questions that animate the dissertation and the answers which it provides; give the reader an overview of how the dissertation is organized; provide historical background concerning the social problem of child maltreatment; present evidence regarding the incidence of child maltreatment in the United States and in Pennsylvania; give an *intellectual* justification for the study of educator reporting of child maltreatment; situate the simulation modeling approach within a broader social, intellectual, context.

1.2 THE ORIGINS OF THIS STUDY

Several years ago, I conducted ethnographic fieldwork at an urban elementary school attended by mostly poor African-American children [202]. I noted three phenomenon: (1) the social (especially class) composition of the student body was such that a relatively high rate of maltreatment could be expected based on previous studies of maltreatment in connection with class, race, and gender; (2) nearly every educator with whom I spoke stated “If I see abuse, I report it.”; and, (3) virtually no cases of maltreatment were, or had been, reported. One non-structuralist way to account for these phenomena might be to look for the contingencies in the situations that educators find themselves in and to describe the observed outcomes as practical solutions to the problems such indeterminacy poses (e.g., [166] and [22]). It seemed to me that a *structural* (perhaps constructivist structural [188, p. 510]) approach was needed to *explain* the collocation of these events: that is, I wanted to

discover/hypothesize mechanisms that might generate these events.

1.3 A SHORT HISTORY OF CHILD MALTREATMENT

Teacher responsibilities have long included “the whole child,” although the attention given to child maltreatment issues has oscillated. State policies requiring the reporting of suspected child maltreatment are perhaps laudable but are based on common-sense views of the work environment of educators (and perhaps other mandated reporters). They do not take into account the effects of material, social and cultural factors on the child maltreatment identification and reporting process, especially within schools.

The emergence of child abuse as a social problem [59] is often dated to 1962, when it came to public attention through a combination of medical support and media attention triggered by the publication of *The Battered Child Syndrome* [111]. Child abuse legislation diffused through the states [139], culminating in *CAPTA* and the establishment of the National Center on Child Abuse and Neglect (*NCCAN*).¹ During the 1930s and 1940s, social and economic conditions had occasioned a social policy emphasis on neglect rather than abuse of children, and also brought ideological factors into play. “Most significant, the conflicting goals of family privacy and child protection precluded consideration of a mandate to report alleged child abuse” [49, pp. 99-100]. Moreover, the hardships caused by The Great Depression and The Second World War generated a national obsession with the sanctity of the family [124]. As a result, the idea of involuntary intervention into family life “was unthinkable, almost abhorrent ... [and ... by 1959] child abuse had disappeared not only from public consciousness but from the agenda of professional social workers” [49, p. 99]. Despite the importance of the publication of *The Battered Child Syndrome* and the movement it helped generate, neither resolved the question whether protection meant *coercion* (by removal of the child from the home or incarceration of the offender) or *prevention* (by providing individual or family casework).²

The period from 1900 to 1920 was “replete with significant advances in public policy for children” [49, p. 83]. Yet, by the end of the First World War it had become “evident to child

¹The official mission of the *NCCAN* has been to fund research on the causes, consequences, prevention and treatment of child abuse.

²Of course, as then conceived, the “training” of parents and child was implicitly part of casework.

welfare professionals that cruelty to children was an obstinate problem that would not yield easily in the existing society” [49, p. 86]. By the 1920s, the anti-cruelty movement was spent and there emerged an emphasis on “prevention” [49, p. 87].

The anti-cruelty movement was borne when, in 1896, the New York chapter of the American Society for the Prevention of Cruelty to Animals (*ASPCA*) successfully lobbied to extend to children the same protections afforded horses and dogs [186]. By 1910 more than two hundred organizations in the United States alone could be counted under the umbrella of the Society to Prevent Cruelty to Children (*SPCC*) [49, p. 46]. Yet, within the early *SPCCs* there were serious philosophical disagreements concerning the meaning of child protection.³ The conflict between protection and prevention, which reflects conflicting interpretations of child abuse, helps generate the cyclic ebb and flow of interest in child abuse [142].

1.4 WHAT IS CHILD ABUSE AND HOW WIDESPREAD IS IT?

Child abuse legislation in the United States was, and continues to be, renowned for its ambiguity [133]. Of particular relevance to this study is the acknowledgment of the *NCCAN* that

consensus has yet to be reached concerning the precise meaning of . . . [“abuse” and “neglect”], with different *professional groups* and individuals maintaining widely varying perceptions concerning the kinds and degrees of problems that constitute “child abuse” and “child neglect”. [163, p. 2-7, emphasis added]

No wonder then that the incidence, prevalence, and social distribution of child maltreatment has been a subject of heated debate among child welfare and social policy analysts [26, 71] as well as politicians.

In its First National Incidence Study of Child Abuse and Neglect (NIS-1), the *NCCAN* attempted to provide “a single, objective set of definitions” of abuse and neglect in order to make it possible to generate a methodologically sound estimate of the annual incidence of child maltreatment in the United States. The authors of both the NIS-1 (1980) and NIS-2 (1986) attempted to provide “operational definitions of child maltreatment that were both clear and able to be reliably applied in order to specify whether or not a given situation should be included in the study” [163,

³Unfortunately, despite the nobility of the desire to “save” children, the practice of child protection in the United States is also marked by the fact that such sentiments have sometimes been colored by judgments that presuppose the cultural (or mental) inferiority of various ethnic, racial, and class groups [94].

p. 2-7]. Quite reasonably, it seems, only those sampled “situations” conforming to “scientific” definitions of abuse and neglect would be used as the basis for statistically estimating the incidence of child maltreatment in the United States.

Like the preceding NIS reports, the NIS-3 Final Report does not define maltreatment, instead providing a list of acts and examples. Consider the following discussion of physical abuse.

Acts constituting physical abuse include hitting with a hand, stick, strap, or other object; punching; kicking; shaking; throwing; burning; stabbing; or choking a child. . . . In the NIS-3, children who were classified as physically abused included a 1-year old child who died of a cerebral hemorrhage after being shaken by her father; a teen whose mother punched her and pulled out her hair; a child who sustained second- and third-degree “stocking” burns to the feet after being held in hot water; a preteen whose grandfather gave her a black eye; a teen who sustained bruises after being beaten with an extension cord; and a 3-year old who had welts and bruises from being beaten with a belt by his father. [163, p. 2-10]

As indicated by the qualifier “includes”, the above list is not comprehensive, nor does the NIS-3 provide a set of definitions that are operational in the sense that they provide criteria for distinguishing what is and is not physical abuse.

The NIS-3 did, however, stipulate two “standards” for study personnel to use when judging cases of interest observed by study sentinels. Study sentinels (most of whom were teachers) were *not* trained to apply either standard to the children they observed: rather, they relied on whatever training and experience they had received prior to participation in the study. In this dissertation, an analytical distinction is made between the sentinels who served as data sources for the NIS-3 study, and actors in the simulation, whose initial beliefs are modeled on the basis of observed sentinel behavior. Cases identified by study sentinels were subsequently classified by study personnel according to the Harm Standard and the broader Endangerment Standard.

The Harm Standard applies to children judged to have already experienced harm (e.g. stabbed with a knife). The Endangerment Standard applies to children who have not yet been harmed, but are judged to be in imminent danger of harm (e.g., threatened with being stabbed with a knife). According to the NIS-3 study definition, each child meeting the narrower Harm Standard also meets the broader Endangerment Standard.⁴ The problem with these two Standards, however, is that

⁴The NIS-3 statistical estimates are based on how study personnel classified the cases identified by study sentinels. More specifically, NIS-3 statistical estimates are based on four numbers: (1) the number of distinct children observed during the study period that were regarded by study sentinels as maltreated; (2) the number of such children that study personnel regarded as maltreated by a study definition of maltreatment (e.g., the Harm Standard); (3) the total number of children observed during the study; (3) the total number of children in the U.S.A. at the time of the study. The incidence rate during the NIS-3 study period was computed as the ratio of the number of maltreated children observed

neither specifies criteria for determining whether an given act has resulted in harm, endangerment, or neither.

Despite these difficulties, the authors of the NIS-3 Final Report state the following.

More children are now being abused and neglected than in 1986, and their injuries are more serious . . . ;⁵ Community professionals are better at recognizing abused and neglected children, especially those endangered but not yet harmed by maltreatment . . . ; Better targeting is needed to ensure CPS investigations for the children who most need it [and those who don't] . . . ; Forging working relationships between CPS agencies and schools [is needed]. *The NIS has consistently demonstrated that professionals in schools play a central and critical role in identifying children who are abused and neglected. As policies are developed . . . , they should capitalize on the unique role of school professionals as front-line observers.* [163, p. 8-19, emphasis added]

Not surprisingly, child protection advocates cite the claim by the NCCAN that child maltreatment more than doubled between the time periods covered by the NIS-1 and NIS-3 studies as support for the claim that the State child protection apparatus needs greater powers. If school professionals are indeed front-line observers, this suggests the need for greater involvement by school professionals.⁶ Predictably, opponents of increased child protection have focused on schools as the first line of defense.

While the application of the term “maltreated” may draw upon seemingly objective features of children and their situations, the outcome of the classification process is best seen in terms of “social construction” (understood in the more restrictive sense described in [36, p. 16]). Given the difficulties of defining child maltreatment noted earlier, this dissertation focuses instead on modeling the sociological and psychological mechanisms that affect the likelihood of reporting.

and the number of children observed. The estimated number of children maltreated under the Harm Standard during the NIS-3 study period was calculated by multiplying the incidence rate by the total number of children in the country at the time.

⁵An estimated 1.5 million children in the United States were maltreated under the Harm Standard. The NIS-3 incidence rate of maltreatment is 23.1 per 1,000 children, in comparison with the rate of 14.8 per 1,000 in NIS-2 (1986), and 9.8 per 1,000 in NIS-1 (1980) [163, p. 3-3]. These numbers suggest that incidence of child maltreatment has increased by factor of 2.4(23.1/9.8) between 1980 and 1993.

⁶According to a report by the Carnegie Foundation for the Advancement of Teaching, most teachers come in contact with abused children but under-report [179]. Over the last twenty years, perceived educator (generally teacher) under-reporting has been “explained” as the result of a lack of both diagnostic skill and procedural knowledge. Although greater training is the implied solution, it has not been widely provided [152]. Yet, some research suggests that increased training has little impact on educator reporting decisions [51].

1.5 THE SOCIAL CONTEXT OF THIS STUDY

Although most of the literature on child abuse deals with causes, consequences, and treatment of child maltreatment [82], some researchers have also investigated the recognition and reporting by members of occupations mandated to report. For example, psychologists (especially those in private practice) note that they often choose not to report instances that they understand to be reportable because reporting might make matters worse by causing removal of the child from the parental home, the termination of therapy, or both [109]. Other studies have suggested occupationally based differences in the perception and reporting of child maltreatment [100].

Similarly, researchers from different disciplines, professions, and research programs often take different approaches to child maltreatment itself as a research topic. With the division of expert labor that the professions (and the disciplines that support them) represent [1], each profession/discipline offers an approach (and, hence, a solution) to child maltreatment that reflects a distinctive combination of ontology, epistemology, and methodology [174]. The partial view of each occupational group is reflected in what Abbott terms different exclusionary schemes in diagnosis, inference, and treatment.

Child maltreatment research has been dominated by psychiatry, social work, and psychology. There are substantial disagreements over subject matter, forms of explanation, and methods. For example, the structure and content of consciousness is of primary interest to a Psychologist, but a Psychiatrist focuses on the organic substrate that enables and constrains structures of consciousness and its contents. Such differences can plausibly be expected to play out at the organizational level in various forms of inter-professional competition. I give an account of child maltreatment reporting in schools that takes into account the social, cognitive, and cultural differences amongst different knowledge communities.

Working within the framework of “strong (research) program of contemporary critical theory” (because of its emphasis on *rationality*) [135], it is my view that critical theorists interested in the problem of domination ought to work toward: (1) identifying different senses of domination and (2) the mechanisms and conditions which make interventions more or less likely to succeed. As a step in that direction, such researchers would be well-served to embed the problem of domination (in minimal form) within the formal framework provided by general theoretical sociology. Although

such a procedure will, like any other, be inadequate to the full variety and complexity of the phenomena, it may lead to the development of a family of theories (or at least different models representing different formulations of a theory) of domination.

Given the increasing specialization of knowledge and the proliferation of research programs, those engaging in multidisciplinary work can expect, “punishment” from all directions for having committed, as Durkheim and Mauss might have put it, the “crime” of linguistic or conceptual pollution. Hence, interdisciplinary work, viewed from the perspective of evolutionary epistemology, is likely to fail for reasons related to the increasingly specialized character of knowledge and its social production. Why, then, undertake an multidisciplinary study of child maltreatment reporting?

Divide-and-conquer is a research strategy that often yields “good enough” solutions to nearly-decomposable problems [167]. If the problem is messier, however, problem decomposition along disciplinary/professional lines may generate sub-optimal social solutions, a (perhaps) unanticipated consequence of specialization [87, 159]. Given the persistence of child maltreatment as a social problem, it seems clear that uni-disciplinary research efforts have not yielded optimal social solutions.

1.6 WHY STUDY EDUCATOR REPORTING OF CHILD ABUSE?

In this study, I seek to *explain* the phenomenon of educator detection (non-detection) and reporting (non-reporting) of possible child maltreatment. I attempt to both identify a subset of situation-specific conditions and posit a set of psychological mechanisms and social mechanisms [190] that together generate detection (non-detection) interpretations and reporting (non-reporting) behaviors in a concrete setting. There are three reasons why it is important to treat educator recognition and reporting of possible child maltreatment in a theoretical way.

First, identifying the ways in which school personnel aid in social/cultural reproduction or transformation is an important item in the agenda of contemporary critical theory as applied to education [39, 7, 136]. It seems almost axiomatic that that physical abuse is evidence of domination, one of the central concepts of contemporary critical theory [135] (though it is explicable in other terms as well [68]). It has been suggested that children who experience corporal punishment are

likely to endorse and adopt its use as adults [176] so that one effect of corporal punishment is to perpetuate its use. Assume now that the use of corporal punishment increases the relative odds of physical abuse occurring [176]. If educator responses to corporal punishment help reproduce that practice, then these same responses are indirectly reproductive of physical abuse. Hence, by their responses to corporal punishment and possible physical abuse, educators may help reproduce certain forms of domination.

Second, understanding the interplay of structure and agency [136] is also part of the agenda of contemporary critical theory. I assume that: (1) administrative decisions affecting students (and their families) are outcomes of interpretive acts [38] and (2) such acts may exhibit relatively weak structural regularities [116] involving class, race, gender, and age classifications. For example, the assignment of students to academic tracks, whether formal or informal, often depends less on “objective” indicators of ability than class-based judgments. Such assignments often contribute to the short- and long-term reproduction of inequalities that are at least partly grounded in matters of class, race, and gender. Likewise, the act of classifying a student as a receiver of parental physical abuse may help maintain that student in a position that is in one or more respects subordinate. Hence, understanding child maltreatment reporting in terms of the interplay of structure and agency may help identify some of the mechanisms by which schools may aid in socio-cultural reproduction/transformation via their response to child discipline/abuse.

Third, it has been claimed that Giddens’ structuration theory, an element in the “research program” of critical theory [135, 87], highlights the problematic of structure and agency [190], but obscures the nature of the interplay between structure and agency [6]. In particular, it is held that structuration theory eliminates the effect of time. In this study, I assess the effect of temporally constrained structure-agency interaction on the outcome of small-group deliberations by school professionals concerning cases of possible child maltreatment. This study thus affords an opportunity to assess more concretely the explanatory power of structuration theory and a “neofunctionalist” competitor.

1.7 HOW THE DISSERTATION IS ORGANIZED

In addition to the introductory and concluding chapters, the dissertation consists of three parts. Part *I* consists of six chapters, entitled, respectively: *Realist Ontology*; *Social Theories*; *Methodology*; *Cultural Systems*; *Social Systems*; and *Socio-Cultural Systems*. The intent of these chapters is to provide conceptual frameworks and theories pertinent to the use of computational simulation. Part *II* consists of two chapters, respectively entitled *Context: Social Workers and Reporting* and *Context: Educators and Reporting*. The aim of these chapters is to describe several professional cultures as they relate to child abuse reporting by educators. The third part consists of two chapters entitled *Initial Beliefs and Status Distributions* and *The Simulation Model: Inputs, Outputs, and Outcomes*.

1.8 RESEARCH QUESTIONS AND ANSWERS

This study addresses two questions. First, do the decision outcomes generated by a process model of social influence (based on the status and task participation model) systematically differ from the decision outcomes obtained from a static model of social influence (not based on the status and task participation model)? Second, does the theoretical difference between how time is represented in realist social theory and structuration theory produce systematic differences in the decision outcomes produced via the simulation? How each question is answered bears on the potential practical import of the issue addressed.

To allow the reader to assess the argument as it proceeds, I am describing my findings as they pertain to the two research questions. First, as applied to the group task of child abuse reporting, the outcomes obtained from the process model differ systematically from those obtained from the static model of social influence. As modeled, the theoretical difference regarding the representation of time does *not* produce a systematic difference in simulated group decision outcomes. Hence, the answers obtained to the two research questions posed confirm the expected practical import of a dynamic model of collective-decision making that is based on social influence while casting doubt on the practical import of the difference between how time is represented (or, perhaps, how it is modeled).

1.9 CONCLUSION

Ordinary language is the necessary instrument [96, p. 126] with which to begin to formulate sociological and educational theory, but verbal formulations alone are not sufficient [47]. For example, determining the meaning or adequacy of “duality of structure” may require assessing the theoretical and other consequences of this concept [44]. Yet, if part of the theoretical meaning and adequacy of this concept lies in its purported ability to illuminate spatio-temporal networks of social action, then it must be possible to represent such networks and interpret their state and evolution in terms of the concepts of structure and agency. If agency is interpreted in terms of actors constrained and enabled by their positions within evolving social networks [65, 87], then it seems particularly unlikely that verbal formulations alone can track the fine-grained, longer-term, consequences of social action, among them the emergence of such networks.

The idea of using simulation to compare competing theories (in this dissertation, realist social theory and structuration theory) is certainly not new. More than a quarter of a century ago, sociologist Murray Straus called for the development of a simulation model in which the explanatory powers of competing theories might simultaneously be brought to bear on domestic violence [175]. Computer simulation modeling has not only been called for but also criticized [160] in a number of fields.

Some historians hold professional ideologies that make the use of computer simulation irrelevant or sacrilegious. One might ask the following sorts of questions: How does this study address, if at all, the social problem of child abuse? Why hasn't greater attention been given to issues of culture and ideology, for example, via a historical approach? In my view, this study does address the social problem of child abuse, both by framing child abuse as a social problem to be understood both historically and sociologically, and by proposing an approach and a method by which findings from diverse professions might be integrated as part of a structural explanation of one aspect of the phenomena of child abuse: namely, when it is or isn't reported. While conceding the importance of a more historical/cultural approach, it is by design that this study does not directly address child abuse (but see [108, 83, 139, 94, 100, 204, 142]).

One traditionally trained cultural anthropologist acknowledges the deep suspicion that use of simulation inspires in some colleagues.

Computer modeling, because it abstracts cultural processes and [sometimes] quantifies social variables, is often seen as contradictory to the rich qualitative rendering of culture that ethnography offers. . . . [But] agent-based models, simulated over time, can elucidate the relationship between individual or group (human) decisions and the social structures which both result from and constrain those decisions. In so doing, simulation can provide new insights into the ethnographic record, edifying structural relationships, helping to generate explanations for phenomena . . . [170, p.1]

The agent-based computer simulation model that forms the core of this study is an implementation of a structural approach to explaining how education professionals make group-based decisions regarding possible child maltreatment.

2.0 REALIST ONTOLOGY

2.1 AIMS OF THIS CHAPTER

The purpose of this chapter is to suggest that simulation methods promise the most adequate *explanation* of social behavior because simulation offers the possibility of showing how and why social behaviors are generated. I give a philosophical justification for computational simulation by claiming that the nature of social reality favors the use of (process-based) computational simulation. If so, then the exclusive use of statistical methods is likely to mistake that reality.

2.2 OFF TO THE PARADIGM WARS

Many social and educational researchers or policy-analysts who use computer simulation do not attempt to justify its application other than by an appeal to expediency. Implicit in this absence of justification is the shared “prejudice” [79] that the use of methods based on mathematics or statistics does not require theoretical or philosophical justification. I assume that educational actions and outcomes cannot be adequately understood without taking the “intentions” of the actors into account [96, 87].

Weber’s distinction between understanding (*Verstehen*) and explanation (*Erklaren*) is by now a part of methodological common sense and helps set the initial terms of debate. Results obtained by members of the quantitative-only sect of educational research methodology may indeed be “adequate” in the sense of explanation as prediction. Likewise, results obtained by members of the qualitative-only sect of educational research methodology may indeed be “adequate” in sense of explanation as understanding. Whatever their other differences, the disputants in what has been

variously termed the “conventional discourse of methodology” [135] and “the paradigm wars” [80] stand on common ground.

Qualitative-only and quantitative-only educational researchers are apt to say that the method of their nemesis misrepresents or distorts the phenomena it is intended to explain. Both, then, presuppose the existence of entities and processes that are at least partially autonomous in relation to the researcher. Without such a realist presupposition, educational and social researchers are committed to the assertion that they are making something (nothing) out of nothing (something).

It has been observed that the notion of “explanation” does not play a major methodological role in statistics [91, p. 12]. Because of the demarcation between correlation and causation that is usually insisted upon by statisticians, statistically-oriented educational research methodologists often take the view that it is the job of subject matter experts to determine when and whether a statistical effect should be given a causal interpretation.¹ Hence, it is up to subject-matter experts to explain phenomena using substantive theory and the results obtained via proper use of statistical methods.

This ideal-typical division of labor does not prevent quantitative educational research methodologists from dismissing non-quantitative approaches.² It is fairly easy to see why this might be so. It is often observed that a claim asserting a causal relationship between variables *A* and *B* presupposes their covariation. Since it is hard to see what public evidence one might advance for causation in the absence of covariation, attempts to characterize a phenomena in causal terms would seem to presuppose the use of statistical methods. Such reasoning may prompt many quantitative-only educational research methodologists to dismiss other methods as weak or unreliable.

The primary tacit assumption of quantitative-only educational research methodologists who view other methods as inherently flawed can be expressed as follows: Whatever the *processes* involved in the phenomena under investigation, the *causal effects* generated by these processes are adequately expressed by a set of variables and the relationships between them.³ The remainder of

¹There are, however, researchers examining the conditions under which causal inferences from statistical data are warranted. For them, it is prior causal knowledge, expressed in the form of a directed graph, that provides the constraints needed to infer causal order from empirical data [147].

²I have in mind an exemplar who maintained that qualitative approaches were valuable, if at all, only in exploratory research.

³Although not addressed here, several other assumptions are also involved: given the need to rely on samples, only statistical methods can reliably and objectively estimate the population values of the variables and the relationships between them; whatever degree of approximation that is required to apply statistical methods, this is a necessary price

this chapter calls into question the philosophical assumptions that undergird that methodological assumption.

2.3 THREE TRADITIONS IN THE PHILOSOPHY OF SCIENCE

Critical realism is the philosophical position that the *nature* of the world is *logically* independent of how we come to know it. If a meteor hits Mars, it produces waves *capable* of being heard regardless of whether astronauts are present to do so. It is critical in that it rejects the view that the world itself determines what we know of it and how we come to that knowledge. The core of critical realism, as developed by Roy Bhaskar, is a particular view about the nature of the entities in the world.

According to Bhaskar, in classical empiricism as represented by Hume, the objects of knowledge are atomistic events. The idea of causation consists in the constant conjunction of such events so that knowledge is about atomistic events and, especially, their conjunction [30]. Much of psychology and educational psychology is rooted in classical empiricism wherein facts are sovereign and theories derivative.

In contrast to classical empiricism is the transcendental idealism spawned by Kant. In this tradition, the constant conjunction of atomistic events is a necessary, but insufficient, condition of causation. The objects of scientific knowledge are artificial constructs, models perhaps, that depend upon human activity in general but not upon the activity of particular humans. Knowledge in this tradition is a construction of the human, specifically scientific, mind.

According to Bhaskar,

Neither classical empiricism nor transcendental idealism can [philosophically] sustain the idea of the independent existence and action of the causal structures and things investigated and discovered by science. [30, p. 21]

Let us try to unpack this a bit.

For critical realists, science (social and natural) investigates and discovers causal structures. Causal structures are distinguished sets of objects that are *internally* related on the basis of the *nature* of each object [53, pp. 205-6]. Since classical empiricism takes causation as the *exter-*

to pay since there are no available objective and reliable alternatives.

nal relation of constant conjunction between events, it cannot give an adequate account of causal structures. Transcendental idealism, on the other hand, makes order in the world the imposition of humans via their cognitive activity, so that causal structures cannot have an independent existence and action.⁴ Since, for critical realists, scientific practice presupposes the idea of the independent existence and action of the causal structures and things both investigated and discovered, neither classical empiricism nor transcendental idealism can account for the practice, let alone the success, of science. Critical realism, then, is based on upon a transcendental argument from the actuality of scientific practice to what must be necessary for such practice to be possible.

Why are both classical empiricism and transcendental idealism both inadequate to the reality of scientific practice? For Bhaskar,

It is in their shared ontology that the source of this common incapacity lies. . . . This ontological legacy is expressed most succinctly in its commitment to empirical realism, and thus to the concept of the 'empirical world'. [30, p. 21]

The concept of the empirical world, says Bhaskar, contains several philosophical mistakes.

First, it reduces the world to experience and hence reduces ontology to epistemology. Put otherwise, it reduces knowledge about the nature of the world to knowledge about the nature of the knower. Second, the concept of the empirical world makes the capability of being experienced an *essential* property of the world rather than an *accidental* one. For example, when the ancient Cretans encoded a tablet with Linear B script, it was possible, not necessary, that the script would later be decoded at a later time by a being capable of such an experience. Third, the concept of the empirical world neglects the social circumstances under which experience plays an epistemologically significant role in science.

Undoubtedly, many quantitative research methodologists would claim that their account of social science is ontology-free. The critical realist claims that every account of science presupposes an ontology in the sense that it at least tacitly based upon “a schematic answer to the question of what the world must be like in order for science to be possible” [30, p. 22]. Although such schematic answers come from philosophers, not scientists, (says Bhaskar) this does not mean that the ontological assumptions of scientists are without impact on the practice and, therefore, the yield of science.

⁴As Bhaskar puts it, “Saying that light travels in straight lines ceases then to express a proposition about the world; it expresses instead a proposition about the way men understand it.”

What might be the practical consequences of empirical realism for quantitative educational research? First, because science seeks causal accounts and, on the classical empiricist model, that means the constant conjunction of events, quantitative educational research would focus on the recording of events and the analysis of covariation among classes of events. Second, since science is focused on events, processes that are not or cannot be experienced cannot generate the events needed for scientific work and thus have little or no scientific meaning. Third, if the social circumstances under which scientific coming to know occurs are ignored, then the social circumstances under which coming to know occurs as a part of schooling are likewise ignored. Perhaps not surprisingly, much of the criticism leveled against quantitative research in education has taken one of the above three forms.

For Bhaskar,

Structures and mechanisms . . . are real and distinct from the patterns of events they generate; just as events are real and distinct from the experiences in which they are apprehended. [30, p. 41]

In principle, says Bhaskar, failing to distinguish between structures, events, and experiences blocks the possibility of understanding how (natural or social) science is possible. To open up that possibility, it is necessary to distinguish between different strata of reality and to seek explanations that take such stratification into account.

2.4 STRATIFIED EXPLANATION

The idea of ontological stratification is easy to illustrate:

Entities inhabiting one stratum will be composed of entities inhabiting a lower one. Societies are composed (in part, at least) of people; living cells are composed of molecules, and so on. [45, p. 264]

To theorize about ontological stratification and its consequence for explanation, critical realism introduces three, increasingly inclusive, strata. The domain of *the empirical* consists of experiences; the domain of *the actual* consists of experiences and events; and the domain of *the real* consists of experiences, events, and mechanisms. Quantitative-only and qualitative-only researchers alike reduce reality to the domain of the empirical: they differ in the kind of experiences they privilege.

Mechanisms “. . . combine to generate the flux of phenomenon that constitute the actual states and happenings of the world” [30]. To *explain* an event to which our experience has provided

access, then, is to identify the mechanisms that generated that event. After a mechanism has been discovered that explains some event, it often happens that underlying mechanisms are subsequently sought and found which explain the initially discovered mechanism.

Consider, for example, a particular chemical reaction, an event that we can assign (for illustrative purposes) to Stratum I. What does it mean to explain the event? In the early history of chemistry, chemical reactions were explained by invoking mechanisms described by the theory of atomic number and valency. Thus, an event (the chemical reaction, at Stratum I) was explained in terms of a lower-level mechanism (described by the theory of atomic number and valence, at Stratum II). As suggested by the history of science, there is no reason to assume that explanatory mechanisms cannot themselves be explained. It turns out that the mechanisms described by the theory of atomic number and valency (at Stratum II) can indeed be explained by mechanisms described by the theory of electrons and atomic structure (at Stratum III). It is the critical realist thesis that the stratification of knowledge, and the process of deepening explanation associated with it, is founded in the real stratification of the objects of the sciences [45, pp. 260-61].

The preceding discussion of how a chemical reaction might be explained calls to our attention the need to distinguish philosophical and scientific ontology. A philosophical ontology lays out what, in general terms, the world must be like in order for natural or social science to be possible [53, p. 206]. It “does not tell us what the structures, entities and mechanisms which make up the world actually are: this is a matter for the individual sciences” [144, p. 283]. If reality is stratified, one might expect to be able to identify another level of presuppositions less general than philosophical ontology that might inform social scientific ontology.

2.5 PRESUPPOSITIONS OF GENERAL THEORETICAL SOCIOLOGY

The purpose of this section is to suggest that Whitehead’s philosophy of process provides a link between the broad philosophical ontology of critical realism and the narrower social scientific ontology required presupposed by general theoretical sociology [66]. In *Process and Reality*, the mathematician, philosopher, and social thinker Alfred North Whitehead lays out a philosophy of “organic realism” based on an attempt to generalize key developments in early twentieth-century physics, biology, and sociology. It is Whitehead’s view that the “finally real”, and hence actual,

entities of the universe are self-completed occasions of experience [198, p. 22]. For Whitehead, each actual occasion completes itself by creatively forming a unique perspective on everything in its causal past.

In the process philosophy of Whitehead, creativity and the autonomy that it presupposes lie at the core of all experience. In the process of completing itself, and thereby becoming actual, every entity creatively appropriates a relevant set of physical and conceptual entities. A collection of entities constitutes a “society”, says Whitehead, if the members of the collection share a common feeling derived from a history of interaction (a view not unlike that expressed by Homans [102]).

Whitehead’s thought is relevant to the interpretivist branch of general theoretical sociology. A person is for Whitehead (not unlike Collins [46]) an enduring object. The dominant occasion of human experience, the personality, depends upon, but is not reducible to, experiences “inherited” from what Whitehead calls the animal body. Although consciousness is for Whitehead a light that occasionally flickers in the dark room of the cosmos, this does not diminish what he terms its causal efficacy. Indeed, Whitehead would probably concur with the observation that consciousness is an emergent causal power capable of acting back upon the body and the material universe out of which both arise [29, p. 601].

Macroscopic objects, Aristotelean “substances” like human bodies and chairs, are conceived by Whitehead as spatio-temporally extended, interacting, societies that exhibit the kind of stability that makes them, for human perception, enduring objects. Of course, human societies as ordinarily understood may also satisfy Whitehead’s definition of society. By virtue of the importance it accords to societies, Whitehead’s process philosophy is of particular relevance to the social network branch of general theoretical sociology [64, p. 87].

A small, task-oriented, group satisfies Whitehead’s definition of a society. According to the theory of expectation states, as explained in greater detail in Chapter 6, members share a common definition of task success, a commitment to that success, and a common set of evaluative standards concerning what behaviors are likely to lead to task success. The social network branch of general theoretical sociology focuses on the analysis of social action in terms of a set of (static or emergent) ties between group members.

Whitehead’s concept of society is more general than the social scientific concept of social network, but less general than the ontological concept of structure. The social scientific concept of

social network (or pattern) instantiates the ontological concept of structure. Hence, Whitehead's philosophy of process provides an link between the broad philosophical ontology of critical realism and the narrower social scientific ontology associated with the social network branch of general theoretical sociology. I have emphasized the role of process philosophy with respect to the network, rather than interpretivist, branch of general theoretical sociology because it is on the former that this study draws most heavily.

2.6 CONCLUSION

If the reader accepts the ontology of classical empiricism in which only that which is experienced is real, then this chapter will seem a distraction from the work to be done. Such a reader will return to the job of extracting knowledge of the real from knowledge of the empirical. Although such work might represent a great achievement, it will also be necessarily limited in scope.

It has been suggested that the realist ontological hierarchy advanced by Whitehead provides a set of presuppositions relevant to general theoretical sociology. Although Whiteheadian organic realism cannot license any particular social ontology, it may "provide a framework in which . . . alternative social ontologies can be rationally compared and discussed . . . [rather than] brushed aside, as in the positivist and conventionalist traditions" [144, p. 292]. I now examine the social ontologies that underly structuration theory and realist social theory.

3.0 SOCIAL THEORIES

3.1 AIMS OF THIS CHAPTER

The purpose of this chapter is to link the preceding philosophical discussion in the preceding, and the methodological discussion in the succeeding, chapters. The link is established by providing a social ontology that instantiates the philosophical ontology of Chapter 2. Without that link, the philosophical discussion has no value, since it cannot constrain method.

3.2 INTRODUCTION

It has been suggested that process philosophy provides a link between realist philosophical ontology and realist social explanation. The process world-view can be implemented in empirical research by giving realist accounts of human action systems: that is, accounts in terms of generative mechanisms and generative rules [65, pp. 42-43]. Of course, a shared commitment to broad principles of realist social explanation does not rule out disagreements concerning social ontology, social epistemology, or social methodology.

In a recent discussion of contemporary critical theory, Morrow and Brown observe that “critical realism provides a post-empiricist alternative [to positivism] that is largely compatible with critical theory” [135, p. 136]. Critical realism aims to establish (by means of transcendental argument) that the intelligibility of [even social] science presupposes the existence of (possibly) as yet unknown entities independent of the experiences through which they come to be known [27]. Morrow also affirms the view that it is “no longer right” to put critical theory and critical realism into opposition [135, p. 168n12]. Of course, critical theory is not monolithic.

In a survey of social theory, Morrow argues that the work of Habermas constitutes the strong, and that of Giddens the weak, “research program” of contemporary critical theory. Crudely put, the “weak” program is less, and the “strong” program is more, interested in providing an epistemological and normative grounding to critical theory [135, p. 173]. Morrow does not indicate whether the “weak” program of critical theory is also “largely compatible” with critical realism. Making the kind of detailed comparisons need to assess the compatibility of the “weak” program of critical theory and critical realism is beyond the scope of this dissertation.

In what follows, I examine the nature of theoretical integration and the sense in which this study attempts to integrate the structuration theory of Giddens and the realist social theory of Archer via E-state structuralism, an element of general theoretical sociology. E-state structuralism is a procedure for the development and assessment of sociological theories [68]. The central concept, that of an E-state, is based on certain features of an expectation state: an expectation state itself is an abstraction of the concept of expectation.

As detailed in Chapter 6, for expectation states theory, individual “behavior is a function of expectation states and such states arise in prior social interaction” [65, p. 325]. The occurrence of a particular social behavior, such as a gesture that (in a particular setting) expresses deference or dominance, may shape the expectation states associated with *a* and *b* (and other actors *z* who have observed that behavior) concerning the future behavior of each. A *social relation* is dyadic. A social behavior involving actors *a* and *b* may, but need not, result in the formation of one or more social relations. Once it forms, however, a social relation shapes, via status organizing processes, the subsequent expectation states (and, therefore, the social behavior) of each actor in the relation. A *pattern* is a collection of dyadic social relations of a particular kind with respect to a particular, concrete, collection of agents.

Attempts at theoretical integration of traditions within sociology may not only be possible, but desirable [155, 136], despite the conceptual and linguistic “pollution” this entails. In the context of considering social reproduction in education, it is possible to combine ontology, epistemology, and methodology in historically novel [136, p. 28] yet meaningful ways. By attempting a theoretical integration of realist social theory and critical social theory via E-state structuralism, I hope to provide part of the material basis for future integration within the sociology (of education) and

across the educational research methodologies it may span.¹ Since integration is one of the avowed tasks of metatheory, I turn to metatheory as a way of situating the integrative aim of this study.

3.3 VARIETIES OF METATHEORY

3.3.1 Mapping

Over the last several decades, an increasing awareness of disciplinary fragmentation [85, 141, 159] has led to calls for theoretical integration. Some sociologists have advocated moving from the meta-theoretical strategy of theory reduction [31] to that of theory linkage [3]. As suggested by the terms “fragmentation” and “linkage” [113], the interpretation of theory as a kind of discourse [74] invites the consideration of theory in spatial terms. Because of their potential for increasing or decreasing “distance”, maps have become a popular meta-theoretical tool in the quest for theoretical integration.

Educational and sociological theorists have created and deployed “maps” for both coarse- [136] and fine-grained [193] metatheoretical analysis. For example, Fararo has (implicitly) “mapped” sociological theories by characterizing their “closeness” to each of three “pure” theoretical forms: normative social theory (instanced by Habermas), world-historical sociology (instanced by Weber), and general theoretical sociology (instanced by Parsons) [65]. Metatheoretical mapping might serve important expository and pedagogical purposes and, more grandly, generate new knowledge of “the discursive field” [146].

Mapping is not presupposition-less nor do maps “speak” for themselves: maps are both integrative and dispersive [197, p. 20]. One social cartographer in comparative education suggests that, after confronting an objectionable “discourse map”, a critic ought to revisit the source texts and reconstruct the map [145]. Although this approach offers a kind of “empirical”, iterative, process that promises the possibility of convergence (with respect to a given, or perhaps emergent, community), it nevertheless seems sociologically (and perhaps philosophically) question-begging. Ironically, social cartography is as yet insufficiently social, for it does not yet (aspire to?) identify

¹I say “material basis” because the material result of any work process can, in principle, form part of the basis for future work processes.

sociologically “real [versus abstract] potentials” [198] for social and educational change [185]. Of course, mapping is not the only tactic open to an integrative meta-theoretician.

3.3.2 Textual analysis

Consider the following verbal formulation (which nevertheless invokes certain spatial relations).

There are important differences between *trying to integrate* macro (e.g., structural functionalism) and micro (e.g., symbolic interactionism) theories and *attempting to develop a theory* that can deal with the relationship between macro (e.g. social structure) and micro (e.g. personality) levels of social analysis. [155]

As we shall see, although the distinction between (a) *integrating* micro- and macro-theories and (b) *developing a theory* of the relation between micro- and macro-levels may be useful, that distinction is misrepresents the integrative aims of E-state structuralism.

For Ritzer, some meta-theoretical works are more “integrative” than others. The meta-theoretical work of Giddens and Bourdieu is, he says, “inherently integrative” and “the most promising effort” to achieve a “dialectical approach” to micro-macro integration [155, p. 358]. One virtue of that work, says Ritzer, is that Giddens has “explicitly sought to give a time dimension to the analysis of micro-macro linkages” [155, p. 360].

Of course, these virtues may reflect a particular way of reading Bourdieu and Giddens in accordance with a set of metatheoretical prejudices [79, 154]. Consider van den Berg’s rather different assessment:

The fact that these two virtually indistinguishable positions [of Giddens and Bourdieu regarding the “agency vs. structure” problem] could prompt such entirely opposite responses [by critics] is itself, I think, a sure sign of their effective vacuousness. [190]

Less polemically, it has been noted that

[s]uch concepts [namely, agency and structure] are solutions only if they are accompanied by sophisticated and detailed accounts of mechanisms of change. Otherwise, they simply deny over-socialization without offering a real alternative. [56]

Ritzer may have also misread an early work by Fararo and Skvoretz [68] as oriented toward the integration of theories rather than the development of a theory. In another work, perhaps unknown to Ritzer, Fararo differentiates between two types of elements involved in an integrative episode: (1) theories invented in research programs and (2) ideas and techniques (as distinguished from theories) associated with research programs [65, p. 334]. In the work cited by Ritzer, Fararo and

Skvoretz expressly adopt the second of these two approaches to integration. Before describing E-state structuralism, I now turn to the ideas and techniques of structuration theory and realist social theory that are represented formally in this dissertation.

3.4 STRUCTURATION THEORY AND REALIST SOCIAL THEORY

Realist social theory, critical social theory, and general theoretical sociology each accord great importance to Giddens' structuration theory. Realist social theory as developed by Archer is in large measure a critical response to structuration theory [6, 7]. Other expositors view structuration theory as one of the major research programs of critical social theory [135]. Working under the banner of general theoretical sociology, Fararo and others [106, 67] have created social system simulations that formalize several key notions of structuration theory. The remainder of this chapter attempts to achieve a theoretical integration of realist and critical social theories by expressing certain key notions of each, especially the duality of structure, in terms of formalizations developed under the rubric of general theoretical sociology.

Although structuration theory is of importance to this study, I have not adopted the expository strategy of beginning with a detailed account of structuration theory, followed by an overview of realist social theory, and concluding with a detailed comparison. That would constitute a sizable task, given the considerable primary [85, 86, 87] and secondary [165, 188] literature concerning structuration theory. Since realist social theory [6, 7] is very much defined in opposition to structuration theory, a detailed consideration of the former would necessitate close consideration of the latter. I have chosen to simply select and sketch broad areas of difference between realist social theory and structuration theory claimed by Archer.

Archer acknowledges that 'structure and agency' is indeed a central problem of social theory, for reasons both academic and existential [6, p. 65]. Somewhat surprisingly, Archer acknowledges the principle of mutual constitution expressed in the key notion of 'duality of structure' [6, p. 87]. Yet, according to Archer, structuration theory "sinks" rather than "links" structure and agency [6, p. 65].

What is "structuration"? Giddens summarizes it as the "structuring of social relations across time and space, *in virtue of* the duality of structure" [86, p. 376, emphasis added]. Hence, "duality

of structure” is a key notion of structuration theory. Giddens offers the following summary of “duality of structure”:

Structure is the medium and outcome of the conduct it *recursively* organizes: the structural properties of social systems do not exist outside of action but are chronically implicated in its production and reproduction. [86, p. 374, emphasis added]

Giddens and others, both friends and critics, have labored to - as some philosophers put it - unpack the concept of “duality of structure”.

The concept of time is also, apparently, a matter of dispute. According to Giddens, social theory “*must acknowledge, as it has not done previously, time-space intersections as essentially involved in all social existence*” [85, p. 54]. According to Archer, although Giddens stresses that “theorizing must have a temporal dimension: what is missed is that time is an actual variable in theory” [6, p. 89].²

Archer claims that structuration theory actually “suppresses time” and such suppression makes it impossible to give an account of the conditions under which reproduction or transformation are likely to occur [6, p. 87]. According to Archer, Giddens’ methodological bracketing of the duality of structure entails that both structural properties and strategic conduct (the two bracketed aspects) are “co-terminous in time”. If the two aspects are simultaneous, says Archer, there is no logical basis for examining temporal relations between structure and agency [6, p. 88]. For Archer, “structure and agency can only be linked by examining the interplay between them over time, and that without the proper incorporation of time the problem of structure and agency can never be satisfactorily resolved” [6, p. 65].

The dispute of Giddens and Archer over the role of time in the “mutual constitution of structure and agency” may illustrate the claim that the linearity of language sometimes makes it poorly suited to rendering non-linear phenomena. Although language is the primary vehicle for the articulation of social theory [47], the numerous efforts of Giddens and others [165] to clarify the concept

²In discussing social integration, Giddens invokes the Heideggerian distinction between time and temporality [99]: Roughly put, temporality is that essential characteristic of human being which is presupposed by the ordinary human experience of measuring time. This is evident in Giddens’ description of the body, not in terms of time-space coordinates, but in terms of “the situation of the active body oriented towards its tasks” [86, p. 65] and his citing of Merleau-Ponty [132]. Yet, in subsequent discussion, when discussing Hagerstrand’s time-space geography [95], which deals with time as ordinarily understood, Giddens does not explicitly relate time and temporality. Indeed, the discussion in *Central Problems in Social Theory* alternates so easily between the terms time and temporality that the reader can easily miss what might be taken as a “merely philosophical” distinction between the two. In short, Giddens employs language in ways that conflate time and temporality and Archer does not take exception [81]. Of course, since Giddens and Archer are sociologists, not philosophers, this is easy to forgive and forget.

of structuration testifies to the insufficiency of language alone for the clarification and assessment of structuration theory. I hope to show, in the context of the social problem of child abuse reporting, that general theoretical sociology offers technical and linguistic resources for characterizing, clarifying, and assessing, the positions of Giddens and Archer concerning the mutual constitution of agency and structure.

3.5 GENERAL THEORETICAL SOCIOLOGY

Recall from Chapter 2 that, for critical realists, the world consists of events, mechanisms, and structures [27, p. 57]. The relations among these different ontological strata are summarized in Figure 3.1 [161, p. 116].

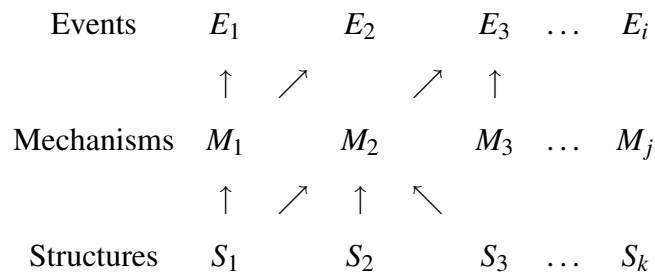


Figure 3.1: Relations between events, mechanisms, and structures

Figure 3.1 is intended to suggest several things. First, when activated, the same mechanism may produce different events, as depicted by causal arrows from M_1 to both E_1 and E_2 . Second, an event may have different or multiple causes, as depicted by causal arrows from both M_2 and M_3 to E_3 . Third, a structure can cause one or more mechanisms to be activated, as depicted by causal arrows from S_1 to both M_1 and M_2 . Finally, the cause of a mechanism being activated can be multiple structures, as depicted by the causal arrows from S_1 , S_2 and S_3 to M_2 . Figure 3.1 depicts the ontological stratification of the real and suggests, as discussed in Chapter 2, the need for a corresponding stratification of knowledge.

It might be objected that, as human being differs from the being of things, the analysis of social reality in terms of mechanisms is at best tangential. That human being presupposes a material, thing-like, being is not inconsistent with a phenomenologically fundamental (human) ontology.

Likewise, the agency [87] required in any adequate account of social reality presupposes the materiality of the actors. In the realist view, mechanisms are rooted in the causal powers of things, which in turn express their tendency to act (or refrain from acting) in particular ways because of the kind of things they are. As “reasons” sometimes figure as constitutive elements of human being, reasons are sometimes causes and can, therefore, count in mechanism-based explanations of social reality [96]. Hence, although they both stress the importance of mechanisms, social realism ought not be confused with the social physics of classical empiricism.

It might also be objected that, for social realists, the ultimate cause of all things social is located in the structural since, in Figure 3.1, the forest of arrows is rooted in the level of structures. In order to clarify this, consider the social ontology shown in Figure 2, adapted from [65, p. 327], which is intended (roughly speaking) to instantiate the philosophical ontology depicted in Figure 3.1.

Social	Philosophical
Social behaviors	Events
Status organizing processes	Mechanisms
Patterns of social relations	Structures

Figure 3.2: Elements of a *social* ontology

A *social behavior* involving two actors a and b is stipulated to be observable. The occurrence of a particular social behavior, such as a gesture that (in a particular setting) expresses deference or dominance, shapes the expectation states of a and b (and other actors z who have observed the behavior) concerning the future behavior of each.

Status organizing processes are elements of expectation states theory. According to the theory of expectation states, social behaviors are causal elements in the formation of expectation states and, in turn, expectation states shape the selection of social behaviors by actors. For expectation states theory, individual “behavior is a function of expectation states and such states arise in prior social interaction” [65, p. 325].

A *social relation* is dyadic. During each communication involving actors a and b , a social relation may or may not form. Once it forms, however, a social relation shapes the subsequent expectation states (and, therefore, the social behavior) of each actor in the relation. The distribution

of a social relation over a population constitutes a *pattern*. Put otherwise, a pattern is a collection of dyadic social relations of a particular kind with respect to a particular, concrete, collection of agents. Given a fixed population, the set of dyadic social relations over the population may be different at two points in time: if this occurs, a distinct pattern exists at each point in time.

For each of two populations, at least one pattern will exist at some point in time. Considered in abstraction from the populations involved, the two patterns may be equivalent in some formal sense. A set of patterns that are *formally* equivalent is termed a *structure*.

What Fararo terms a structure is an abstract entity constructed by the social theorist according to some criteria. For social network theory, “social structures are bundles of interconnected social relations, each represented by a type of tie [or line connecting two points] in a [mathematical] graph [structure consisting of a set of such points]” [65, p. 324]. For Fararo, a structure is *not* a causal element: rather, a structure expresses the stability of a set of patterns. Put otherwise, the set of patterns realizes a structure considered as an abstract, conceptual, element.

Since Figure 3.1, however, shows causal arrows from structures to mechanisms, there appears to be a contradiction. In the models created for this study, the social system begins in an unstructured state. Initially, no social relations exist between any of the actors represented in the model.³ The actors do, by hypothesis, share a set of expectation states. Each actor *a* selects a communication partner *b* based on the current set of expectation states. When *a* addresses *b*, one or more social relations may form. At each point in simulated time, the set of social relations constitutes the state of the social system. Hence, the social system evolves from an unstructured into a structured state. For the purposes of coordinating the vocabulary of E-state structuralism and critical realism, what critical realists term a structure would be termed a pattern. Patterns *are* causal elements.

Fararo’s “hybrid generativity” of mechanisms and rules seems part of an attempt to render formally Giddens’ notion of the duality of structure. Archer, whose social theory is explicitly rooted in the realist philosophical ontology of Bhaskar, criticizes the social ontology of Giddens. Fararo, while anchored in realist history and philosophy of science, does not seem perturbed by Giddens’ alleged lack of concern with ontology.

Sounding very much like Giddens, Fararo glosses structuration theory as follows:

Social practices . . . are recursive [emphasis added]: They are continually re-created by the actors

³In a simulation, it is possible to initialize the social system to any particular set of social relations.

in such a way as to reproduce the conditions that make these same activities possible. [65][pp. 199-200]

This suggests the possibility of representing the interplay of structure and agency in the mutual causation of social behavior and social patterns, mediated by expectation states.

Although Giddens wishes to distance his concepts from the linguistic homonyms deployed by modelers, it seems that formal recursion is a “root metaphor” [148] of structuration theory. After citing a major work in the theory of computation, noting that it has little obvious relevance to social theory, Giddens allows (in 1979) that parallels between automata theory and social theory might become important. The major point of connection between biological and social theory, says Giddens, involves “recursive or self-reproducing systems” [85, p. 75].

Formal recursion does not, however, seem to be part of Archer’s conceptual universe. Consider the following element in Archer’s methodological critique of Giddens:

[I]nstitutional analysis brackets strategic action and treats structural properties as ‘chronically reproduced features of social systems’. This image of recursiveness figures prominently, but many would deny that these features necessarily are ‘chronic’ ... [6, p. 87]

Archer seems to link recursiveness and reproduction, yet the formal concept of recursion has no intrinsic association with either reproduction or transformation. This seemingly one-sided understanding of recursion casts suspicion on Archer’s critique of structuration theory.

Although Archer and Giddens both claim at least partial allegiance to realist philosophy of (social) science, substantive sociological differences separate them. According to Archer, structuration theory entails shorter, while realist social theory requires longer, time intervals during which patterns “emerge” to structure subsequent interaction. I model this theoretical dispute over the role of time in the mutual constitution of structure and agency as follows.

To the extent that the ideas and techniques of structuration theory and realist social theory can be represented formally, E-state structuralism provides a vehicle for integrating the two. Fararo expressly interprets Giddens’ notion of duality of structure in E-state structuralist terms [65] and, more recently, Fararo and Butts drew upon both Giddens’ idea of the duality of structure and Bourdieu’s notion of *habitus* in constructing a model expressing “the multi-level dynamics of structured agency” [67]. In contrast with Giddens and Bourdieu, the E-state structuralist approach to integration suggests the possibility of detailed (and perhaps sophisticated) accounts of mechanisms of stasis and change.

3.6 CONCLUSION

Despite my indebtedness to Fararo, there are some noteworthy differences. Like him [64], I view each person as a (inherently complex) process [198]. Perhaps most importantly, although I deploy E-state structuralism to synthesize *patterns* that emerge as a result of social interaction, this study is not one of general theoretical sociology as understood by Fararo. For him, the task of the general theoretical sociologist is to identify the *conditions* under which social *structures* (rather than *patterns*) emerge (or change) as a result of social interaction. Secondly, whereas Fararo views ethnography as a diversion from the aims of general theoretical sociology, I attempt to encapsulate the internal, especially cognitive, complexity of actors in order to approximate an ethnographic model of how actors interpret certain situations.⁴ Finally, much of the simulation work done by Fararo is based on discrete-event simulation (as described below) [106], whereas I, like Hummon in later work [105], rely on real-time simulation.

Like Hummon, I conduct real-time, versus discrete-event, simulation. In discrete-event simulation, the occurrence of events are scheduled in advance and a simulation (versus ordinary) clock is advanced from the scheduled occurrence of one event to the next. In effect, the time between events is collapsed to zero. By contrast, in real-time simulation, there is no simulation clock distinct from an ordinary clock and events are not scheduled in advance: they simply occur and the time of their occurrence in real-time is recorded. I choose real-time simulation because I intend to eventually use the simulator to model more realistic interactions.

Although my approach to simulation is derived from the object-oriented approach of Hummon, there are some differences [105, 106]. Whereas Hummon models each actor as a passive object and constructs a network to support interaction, I model each actor as an active object and formalize the social network as a system of communicating (sequential) processes [101, 58, 156]. The essence of an active object is nicely captured in the following: “Both its data and algorithms are private. The outside world can neither see that data nor execute those algorithms. Each process is alive, executing its own algorithms on its own data.” [196, Description of a CSProcess object]. By contrast, neither the data nor the algorithms of a passive object are private: they are available to

⁴Fararo has most recently increased the internal complexity of actors by representing each as a finite-state machine [67].

any other program with sufficient access privileges. In short, active objects are better suited to representing humans as (at least, semi-) autonomous beings.

I formulate a model along E-state structuralist lines. Recall that an E-state is an abstraction of an expectation state. In E-state structuralism, a social relation is constituted by the E-states of the two agents involved. The status of E-states as real, but unobserved, objects is established by the ability of the theorist to predict social behaviors on the basis of assumptions that posit causal links between social behaviors and E-states. When simulated, the behavior of the model is differentiated into social realist and structurationist versions by varying the the amount of (simulated) time required for a social behavior to generate a new social relation and, thus, a new set of E-states.

When simulated, the behavior of the model is differentiated into social realist and structurationist versions by varying the the amount of (simulated) time required for a social behavior to generate a new social relation and, thus, a new set of E-states. The outcomes generated by each simulation are then used to assess the potential practical impact of different assumption about time on a particular social-educational practice. It is plausible to frame the dispute over time in these terms, given both Archer's concession that structure and agency are mutually constitutive and Fararo's explicit interpretation of duality of structure in E-state structuralist terms. The setup and analysis of the two models are described more fully in Chapter 11.

By modeling persons as active computational objects, I implement the fundamental realist proposition that "generative mechanisms are . . . nothing other than the ways of acting of things" [27, p. 14], in the case where human beings are considered as special sorts of things [8, 120]. It is necessary, however, to justify the use of simulation in a way that shows it to be both consistent with realist ontology and necessitated by the real nature of the objects under consideration. After considering the perennial debate over quantitative versus qualitative methods, I will claim that simulation as mixed-method of simulation is both theoretically and practically superior to each pure method.

4.0 METHODOLOGY

4.1 AIMS OF THIS CHAPTER

In this chapter, I sketch an approach by which qualitative and quantitative methods might be integrated via simulation. I do so by formulating two mechanism sketches, one based on a qualitative study, the other based on a quantitative study, and then integrate them. The account I provide does not describe how to integrate the qualitative and quantitative components of the empirical part of the study, but rather suggests that such an integration is plausible.

4.2 INTRODUCTION

The idea of the mutual constitution of structure and agency is a concept central to both structuration theory and realist social theory. Realist social theory developed in response to structuration theory and is based on the idea of ontological emergence. Simulation is an ideal methodology for the exploration of emergence [88]. It has been claimed that social system simulation provides a vehicle for integrating qualitative and quantitative methods [47]. The possibility of modeling educational actions on the basis of the actions of persons makes social system simulation as a mixed method superior to either quantitative-only or qualitative-only methods.¹

The history of antagonism between quantitative-only and qualitative-only researchers is long, punctuated by (generally one-sided) attempts to bridge the gap. It was recently suggested that both of the following equations are flawed: quantitative = scientific; qualitative = non-scientific. Yet, the author writes as if the nature of science were entirely unproblematic and gives little evidence

¹Yet, a recent treatment of mixed-method approaches that presents various realist methodological arguments does not examine simulation [178].

of familiarity with the turmoil that has marked the philosophy of science and social science over the last three decades [125]. A more radical critique sinks the distinction between quantitative and qualitative research within a consideration of the competing values and commitments that characterize competing traditions within social science [150].

I begin by briefly characterizing mechanism sketches, and then describe two studies of classroom communication. These studies are methodologically disjoint and, in some respects, exemplary: the first is a qualitative study by McDermott; the second is a quantitative study by Ben-Ari. I then describe, and construct a mechanism [121] for, each study. I then construct a mechanism that integrates the quantitative and qualitative mechanisms. Finally, I discuss various arguments that have been, or might be, advanced in opposition to the use of simulation.

4.3 MECHANISM SKETCHES

Mechanism sketches are (surprisingly) based on mechanisms, which Machamer and colleagues define as “entities and activities organized such that they are productive of regular changes from start or set-up to finish or termination conditions” [121, p. 3]. Mechanism description is the linguistic basis for mechanism-based explanation.

There are three types of increasingly detailed mechanism description: showing *how possibly* things work; showing *how plausibly* things work; and showing *how actually* things work [121, p. 21]. Since almost anything is in some sense possible, it is possible that inequality in the U.S. is the result of interference by aliens from another time-space dimension. One could say that the alien interference mechanism description shows “how possibly” inequality arises in the United States. Another candidate explanation might be the inequality is due to the genetic inferiority of those at the bottom of the socio-economic hierarchy. Since poverty is often generational, there is some evidence for such a claim, rendering the genetic mechanism description as showing “how plausibly” inequality is generated. Of course, until there is evidence of particular relationships between genetic material and behavior, one would be hard pressed to say that genetic differences show “how actually” how social inequality works. These types of mechanism description allow for mechanism-based explanations of different strength. I use these distinctions between mechanism descriptions to characterize the arguments of McDermott and Ben-Ari.

In order to emphasize the integrative possibilities afforded by simulation, I draw on the following graphical formalism developed by Machamer and colleagues:

If a mechanism is represented schematically by $A \rightarrow B \rightarrow C$ [where A , B , and C are entities] then the [productive] continuity lies in the arrows and their explication is in terms of the activities that the arrows represent. [121, p. 3]

This graphical representation is intended to show that the activities of A produce the entity B and the activities of B produce the entity C . In using this graphical template to reconstruct the arguments of Ben-Ari and McDermott, I will assign a specific meaning to each of A , B , C , and the activities represented by arrows.

Each arrow relates a producer entity to a produced entity. In terms of mechanism-based explanation, I take the task of simulation to be that of providing a computational “unpacking” of the arrows in a mechanism sketch. Put otherwise, simulation involves tracing the sequence of operations by which terminal objects are generated from initial objects. In the next two sections, I describe two different kinds of studies and try to interpret them in terms of mechanism sketches.

4.4 A QUALITATIVE STUDY OF CLASSROOM INTERACTION

In the United States, social movements during the 1960s and 1970s and accommodation to them resulted in intensified interest in reducing racial, ethnic, class, and gender-based inequalities. As a key institution in industrialized societies, the school was identified as a key site for insuring what has recently been termed the “durability of inequality” [182]. A number of investigators examined how, and under what circumstances, formal schooling played a socially reproductive rather than transformative role.

Provocative investigations at the level of the society and the economy were both illuminating and concealing. The correspondence thesis, which posited a structural isomorphism between social relations in the school and those of the workplace [33], and suggested that schooling promoted a *lack* of mobility, was criticized as too mechanical and too deterministic. Some researchers, both quantitative and qualitative, worked to “open up” the “black box” of formal schooling. One such study was produced by Rist, who departed from the use of large-scale sociological research methods by employing extensive fieldwork.

Rist's study in the late 1960s has been described as "the first major attempt by a sociologist to explore self-fulfilling prophecies in the classroom" [107, p. 173]. Following earlier work on expectations [157], Rist claimed that teachers formed student ability groupings on the basis of their differential, even conscious, class-related expectations for students' academic success. Moreover, initial ability groupings were relatively permanent.

From the day that the [kindergarten] class was assigned permanent seats, the activities in the classroom were perceivably different from previously. The fundamental division of the class into those expected to learn and those not expected to [learn] permeated the teacher's orientation to the class. [153, p. 423]

Rist observed sharply different patterns of interaction between teachers and students in the three ability groups. Students in lower-ability groups received both less instruction and fewer opportunities to demonstrate their knowledge. According to Hurn,

... there is in the findings [of Rist] the strong implication that ability grouping is a major *mechanism* by which teachers' expectations become self-fulfilling prophecies. [107, p. 174, emphasis added]

... [Because of its importance] ... almost all [recent] research [on primary schools] is in one way or another concerned with exploring how teacher expectations for student performance tend to help produce that expected performance. [107, pp. 170-71]

Rist makes the implicit claim that the mechanism of ability grouping produces regular changes: namely, changes in classroom social structure and the behavior of students and teachers.²

Although my analysis focuses on McDermott, it is important to distinguish between McDermott and Rist, especially since the findings of both have been taken up by those concerned about teacher and student expectations. I claim that Rist provides a mechanism-description that shows *how possibly*, and perhaps *how plausibly*, but not *how actually* classroom stratification is produced. Quantitative-only researchers might grant *how possibly* standing to Rist's mechanism description but would probably withhold *how plausibly* status on the ground that his study findings have not been replicated in either small- or large-scale research. Some qualitative-only researchers might assert *how plausibly* status for Rist's mechanism description. Other qualitative-only researchers might, ignoring contradiction, hold to its "essential" incompleteness, asking "What assurance is there that other teachers, even the majority of them, do not 'have' rather different 'expectations' from those 'possessed' by the teachers in Rist's study?" To the extent that the rationality of science

²A more recent quantitative research study confirmed the importance of ability grouping by suggesting the superior power of contextual, versus individual, variables in "explaining" variation in student attention [60]. Much of the research on teacher and student expectation, however, has been qualitative.

is “socially constructed” [150, p. 7] within communities of practice, the above criticisms suggest that Rist has at best shown *how possibly* classroom stratification is produced.³

Although subsequent qualitative research tended to confirm much of what Rist observed, the interpretations varied. In a 1974 paper reviewing the ethnographic literature on what he termed “black classrooms”, McDermott asserted that the high rate of reading disability and illiteracy among African-Americans is due, not to racism or biologically damaged brains, but to a miscommunication between teachers and students that arises out of cultural conflict. School failure amongst African-American elementary school students is, for McDermott, an “achievement” co-produced by students and their teachers.⁴

McDermott, in effect, explains the mechanism of ability grouping in terms of the lower-level mechanism of teacher-student communication. Whereas McDermott highlights the relational content of teacher-student communication, Rist highlighted the instructional content. In the mechanism-language of Machamer and colleagues, instructional communication and relational communication are among the (not necessarily separate) activities in which the entities (human beings) engage. The mechanism of teacher-student communication, in this view, produces regular changes in the social structure of the classroom.

For McDermott, explanations of classroom stratification in terms of teacher expectation alone are insufficient. According to earlier researchers into the “self-fulfilling prophecy”, says McDermott, “white teachers expect black children to fail and subtly induce their expectations into the children who indeed do fail” [127, p. 104]. McDermott explicitly distances himself from the term “expectation” and the teacher blaming associated with the work of Rist.

How does the mechanism of teacher-student communication explain the mechanism of ability grouping? McDermott claims that communication acquires its sense by virtue of its rootedness in the cultural and socio-cultural systems of the sender and receiver. Cultural systems involve

³To say that the rationality of science is socially constructed has very different meanings depending on whether endorses the multiple-realities or realist versions of social construction [36].

⁴I have taken McDermott’s 1974 paper as an exemplary qualitative study: McDermott does not share that evaluation [129]. Although McDermott sees the 1974 paper as a move in right direction, it is one accompanied by a number of theoretical and political missteps. For example, whereas I regard the reliance on neuro-psychology in the early work as a positive (if worrisome) feature, McDermott joins early reviewers in largely dismissing it. From my perspective, however, the latter work is riddled by an *excessive* utopianism borne out of an anthropological version of sociological labeling theory. Hence, from the realist premises which inform my thought, it is McDermott’s later paper which is, despite the admirable analytical work it contains, inferior to the earlier work.

more than simply abstract entities. When students and teachers initially encounter each other in a kindergarten classroom, each neurologically embodies a (possibly divergent) cultural system.⁵ The significance of such culturally-based, neurologically-encoded, differences depends in part, says McDermott, on whether such differences are viewed more as pedagogical resources or as constraints.

Drawing on a model of human communication [12, 195], McDermott claims that the timing of communication, the protocols involved, and the message content all affect the establishment of the kind(s) of teachers-student connections that facilitate (or inhibit) learning. McDermott (1977) asserts that “all communication between people conveys not only its obvious content but also implicit or explicit messages attempting to define the nature of the participants *relationship*” (quoted in [138, p. 223]). A message that raises claims concerning the nature of the student-teacher relationship (as, for example, asserting dominance or intellectual/cultural superiority) may be rejected, resulting in the rejection of the instructional content of the message.

McDermott suggests that classroom miscommunication is generated, in part, by differences in the cognitive taxonomies [75] employed by members of diverse cultural groups. An entity or relationship accorded great importance in one taxonomy may not even have existential status in another. Once it is granted that perception and conception are only analytically separable, it follows that “perception” as well as “conception” are products generated - in an ontologically limited sense [30, pp. 31-44] - by processes of social construction.⁶ McDermott illustrates the importance of such culturally-based, taxonomy-generated, miscommunication through the example of “whimperatives”.

Consider the following expression: “Roy, would you please close the door?” Syntactically, it is a question, yet in the context of a kindergarten classroom it is more likely to be a command. A poor or working-class child may fail to understand such a “whimperative” or, understanding it, refuse to accept the symbolic significance that compliance with it might entail [201]. A failure to understand, or comply with, a whimperative may be interpreted as defiance or inattention. Quantitative analysis indicates that the conduct grades mediate the statistical effect of *IQ* and gender on academic marks

⁵McDermott asserts that “to study the brain is to study social organization, and vice-versa.” As McDermott acknowledged, he was “heavily influenced” by neuro-psychologist Karl Pribram and cognitive anthropologist Charles Frake.

⁶Here, “social construction” is understood in terms of a single objective reality that is implicitly referenced by multiple interpretations or perspectives [36, pp. 67-68]

[63].

Other researchers (e.g., [89, 130]) conclude that the broader organizational contexts within which the classroom is embedded influence the timing, protocols, and content of classroom communication and, in turn, the learning of African-American and other groups. For example, an over-emphasis on standardized tests may so structure both the formal and the hidden curriculum that the relational considerations [128] essential to the achievement of a communicative connection between teacher and student fade into the background. Hence, the evaluation and response of teachers to neurologically-encoded cultural differences has sources outside the immediate context of classroom communication.

One might object that the existence of initial differences in cultural coding is insufficient to explain the continued, and increasing, performance gap between poor, working-class, African-American students and their counterparts. Recall that, in the communication model assumed by McDermott, both sender and receiver code and decode messages according to their own cultural and socio-cultural cognitive taxonomic system. Code-switching (see [54, 25]), the ability to move from one linguistic form to another, presupposes the ability to encode an alternative cognitive taxonomy within one's own. When such interpretive capability has not yet been developed, the communicative "self" may render less important or even "invisible" those entities and relationships that are of greater significance to the communicative "other".

The effect of sustained miscommunication is, says McDermott, "selective attention" on the part of poor, working-class, African-American students.⁷ Although the phrase "selective attention" suggests a significant element of volition on the part of students, McDermott emphasizes that the traces of such miscommunication are laid down neurologically. The process of social construction leaves neurological traces: as one researcher puts it, "the body keeps the score" [191]. The social process of schooling renders some differences insignificant while magnifying others, thus explaining how the perceived performance gap between African-American underclass children becomes increasingly pronounced over time.⁸

What advantages does McDermott's analysis offer? For some, social scientific progress con-

⁷Of course, the reality is much more complex: see, for example, work on the difference it makes being a member of a voluntary versus involuntary immigrant group [84, 73].

⁸Again, a more complete account would take account of how school careers are shaped by the distribution of economic, social, and cultural capital [32].

sists in the construction of sequences of progressively more powerful mechanism-based explanations [27]. I claim that McDermott, in effect, offers a mechanism-based explanation for the mechanism of ability grouping advanced by Rist. To see why McDermott's explanation is stronger than that of Rist I rely upon the distinction between different kinds of mechanism-based explanation.

I claim that McDermott provides a mechanism-description that shows *how plausibly* classroom stratification is produced. What assurances are there that cultural differences noted by McDermott are more than local effects? Or perhaps these differences only matter in certain context or to different people in a given place? Might some teachers view their communication with students as not substantially altered by cultural differences?⁹ These questions suggest that McDermott does *not* show *how plausibly* classroom stratification is produced.

Yet, other sources of support may be available. Among the material bases of McDermott's work is the prior knowledge systematically articulated in human communication theory.¹⁰ It is a mechanism description rooted in communication theory that allows McDermott to show *how plausibly* ability grouping (and with it, classroom stratification) is produced. It is because McDermott explains the mechanism of ability grouping in terms of the mechanism of communication that his explanation of classroom stratification is stronger than an explanation based on ability grouping alone.

Does McDermott show *how actually* ability grouping is produced in classrooms? To do so, he must show that teacher-student communication produces

regular changes from start or set-up to finish or termination conditions . . . where . . . [M]echanisms are regular in that they work always or for the most part in the same way under the same conditions [121, p. 3, emphasis added].

To say that *X* produces regular changes in *Y* is to say that *X* always (or for the most part) affects *Y* under certain conditions.

If we are to assume that McDermott's account is more than idiosyncratic, it implies that teacher-student communication produces regular changes in the initial social structure of a classroom by inducing the formation of ability groups.¹¹ But McDermott does not provide evidence

⁹These questions implicitly raise the issue of how mechanisms and specific cultural content are related. The definition of mechanisms as "entities and activities organized such that they are productive of regular changes from start or set-up to finish or termination conditions" is quite general. Specific cultural content, whether embodied in books or minds, can in principle be regarded as an entity.

¹⁰The production of knowledge presupposes a material basis in the form of prior knowledge [28].

¹¹Of course, other factors are also involved, but these are not within the scope of McDermott's mechanism-

Primary entities (Positions): $A' = \text{Teacher}$, $B' = \text{Student}$

Secondary entities (Measurements): $C'' = \text{CognitiveScore}$

$A' \longrightarrow B' \longrightarrow C''$

Figure 4.1: A reconstruction of McDermott's account

of regularity: his claim about the relationship between teacher-student communication and ability grouping relies on ethnographic studies and findings from human communication theory. Lacking evidence of regularity, he cannot show *how actually* ability grouping and social stratification are produced in classrooms.

For the purpose of inscribing McDermott's account in a mechanism, I have taken some (at least terminological) liberty. It is the occupant of the Teacher position that is the chief, but not sole, agent in the mechanism of teacher-student miscommunication. In response, occupants of the Student position develop selective inattention, which ultimately results in lower achievement scores.

For the sake of the exposition, I have constructed the simplified mechanism shown in Figure 4.1. It is not necessary that A and B belong to the same ontological category: through their activities, for example, human beings produce entities quite unlike themselves. Here, a *Teacher* entity produces a *Student* entity and a *Student* entity produces a *CognitiveScore* entity. Although it is odd to say that a *Teacher* "produces" a *Student*, it is less so if we think of *Teacher* and *Student* as Positions and assume that (other things being equal) whoever occupies the *Teacher* position often exercises greater power in relation to the occupant of the *Student* position (a similar metaphor is used in [118]). This mechanism highlights Positions rather than Behaviors.

4.5 A QUANTITATIVE STUDY OF CLASSROOM INTERACTION

Most educational research, including research on the self-fulfilling prophecy, presupposes teacher-centered instruction. This is quite natural: Most classrooms in the United States, and perhaps

description.

throughout the world, remain teacher-centered, despite forays into other modes of instruction [52]. Yet, in taking the teacher as sociometric star educational research helps naturalize the practice of formal schooling as a centralized banking system of deposits (via instruction) and withdrawals (via examination) [78] administered by those with privileged access to the repository of highly valued cultural capital [32] or official knowledge [5].

Recent quantitative research suggests the importance of de-emphasizing the teacher as the center of instructional communication. Researchers associated with the Center for Complex Instruction at Stanford University, based on work by Elizabeth Cohen in the 1970s, have applied expectation states theory to the study of instruction in heterogeneous classrooms. Roughly put, expectation states theory concerns the effect of performance expectations for self and other on the future performances of each. Concerns about teacher and student expectations raised by the work of Rist and others have found their way into the expectation states theory research program via quantitative work [63]. While much of the research on Complex Instruction has focused on the effect of status differences between children on learning, a study by Ben-Ari concerns the negative effects of the status difference between a teacher and their students on learning and how, using Complex Instruction, these effects can be ameliorated.¹²

Ben-Ari asserts that learning requires social interaction, citing Vygotsky, Piaget, and Bandura. “Interaction supports multiple perspectives, reveals differences, raises conflict, and forces children to confront complex situations” [16, p. 197]. It is the encounter with such differences that spurs cognitive gains in students. According to Ben-Ari, children act differently in the presence of adults, so that adult authority may (albeit unintentionally) delay, limit, or prevent the kinds of encounters between students (and perhaps between a student and a text) necessary to cognitive development.

The dampening effect of adult presence on cognitive growth can be explained by expectation states theory. According to it, group members with relatively low status (in this case, the students) are likely to receive fewer opportunities to interact and to take or make use of such opportunities, deferring instead to group members with relatively high-status (in this case, the teacher). If cognitive growth requires interaction, interaction requires autonomy, and adult authority reduces both autonomy and interaction, then those who wish to promote cognitive growth ought to consider

¹²Complex Instruction emphasizes collaborative work in heterogenous groupings and the use of expectation training to reduce the negative effects of status differences.

restructuring classroom interaction.

According to Ben-Ari, “the goal [of Complex Instruction] is to maximize interaction among students in small groups and minimize direct instruction by the teacher” [16, p. 198]. Complex Instruction, then, creates the “necessary conditions for the cognitive development of students: social interaction and autonomy of the learner” [16, p. 200]. In Ben-Ari’s evaluation study of Complex Instruction it was predicted (in a specific setting) that, first, “a positive relationship between the level of student interaction and the progress [or gain] on [a] . . . test” [of cognitive abilities] [16, p. 201]. Second, it was predicted that the effect of teacher behavior on student cognitive gain would be *mediated* by student interaction: “the more the teacher’s behaviors increase the level of student interaction, the stronger the gains of the students” [16, p. 201]. Ben-Ari claims that a statistical path model (solved using LISREL [137]) based on measures of teacher behavior, student interaction and cognitive gain yields results consistent with the above predictions.

Teacher and Student behaviors were observed and counted, yielding values for the following six variables: **TSupervises**, **TDevelops**, **SInteractsVB**, **SInteractsNV**, **SInteractsNo**, and **SCognGain**. The variable **TSupervises** records the number of Teacher supervisory behaviors observed and **TDevelops** records the number of Teacher behaviors characterized as intended to develop thinking. Student behaviors were classified as verbal interaction with another student (**SInteractsVB**), non-verbal interaction with another student (**SInteractsNV**), and no interaction with another student (**SInteractsNo**). Changes in student scores were recorded by **SCognGain**. The exogenous variables are **TSupervises** and **TDevelops**. The endogenous variables are **SInteractsVB**, **SInteractsNV**, **SInteractsNo**, and **SCognGain**.

These six variables were measured at the individual level ($n = 1017$ student participants) and then aggregated to form ($n = 36$) classroom-level measures. In the LISREL model, the Student and Teacher behavior variables are computed as classroom total or averages. Since both McDermott and Ben-Ari address the impact of teacher-student communication on classrooms of students, it seems reasonable to use average behavior within a classroom as the unit of analysis.

The study satisfies a rule of thumb that the sample size be at least five times the number of variables [137, p. 26]. Since path analysis requires that relationships between variables be linear and without interaction, it is technically impossible to consider whether the children of different class, race, and gender respond similarly [97, p. 147]. In addition, the model must be

(and is) over-identified [97, p. 163]: that is, the number of data points exceeds the number of parameters to be estimated. Unfortunately, Ben-Ari's description of the study does not provide any details concerning the context, how the sample was selected, the observational methods used, or significance levels.

Figure 4.2 presents the LISREL model described by Ben-Ari. Where one variable is to the left

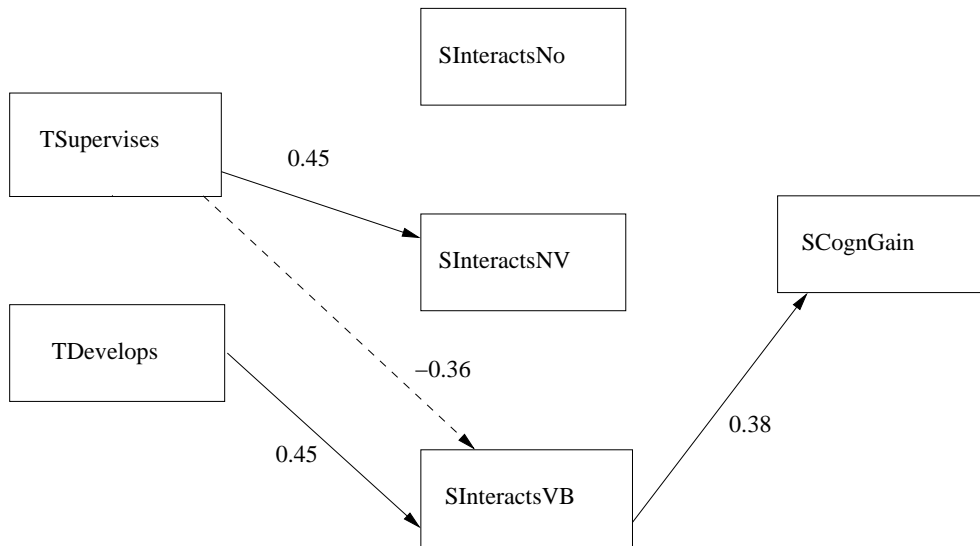


Figure 4.2: Ben-Ari's model

of another, this suggests the *possibility* that the left variable may exert a causal effect on the right variable. Taking two such variables at a time there are eleven *possible* causal paths.¹³ The absence of a line between two variables, such as **TSupervises** and **SCognGain**, indicates that the direct causal effect between the two variables is not statistically significant. A solid line indicates that the causal effect is statistically significant and positive: for example, the path from **TSupervises** to **SInteractsNV**. A dotted line indicates that the causal effect represented by the path is statistically significant and negative: for example, the path from **TSupervises** to **SInteractsVB**. Thus, four of the eleven causal paths were statistically significant.

Higher levels of supervisory behavior by teachers (**TSupervises**) were associated with both higher levels of non-verbal interaction amongst students (**SInteractsNV**) and lower levels of verbal

¹³Although it is a statistical truism that correlation is not causation, there are grounds for making causal inferences on the basis of correlations together with other information [147].

interaction amongst students (**SInteractsVB**). Supervisory behavior by teachers, however, had no significant direct effect on student cognitive gain (**SCognGain**). This last finding is at odds with widespread belief, although consistent with Ben-Ari's predictions.

Higher levels of teacher behavior intended to develop thinking (**TDevelops**) were associated with higher levels of verbal interaction among students (**SInteractsVB**), which in turn were associated with higher levels of cognitive gain by students (**SCognGain**). The direct effect of teacher behavior intended to develop thinking on cognitive gain was not, however, statistically significant. The only variable to exert a positive effect on the cognitive growth of students was teacher behavior intended to develop thinking (**TDevelops**), and this effect was indirect (via **SInteractsVB**) rather than direct.

Recall that two predictions were made. First, that a positive relationship existed between the level of student interaction and student cognitive gain. Second, that the effect of teacher behavior on student cognitive gain would be *mediated* by student interaction. Although both predicted outcomes were observed, the study (or the reporting of it) may be technically flawed.¹⁴ As omissions, the technical deficiencies of the study are not difficult to remove. Assuming that these deficiencies *were* repaired and the indicated inferences upheld, how would the model contribute to the explanatory adequacy of the theory of Complex Instruction that grounds it?

A theory is more-or-less adequate, on critical realist grounds, to the extent that it specifies a set of mechanisms that generate the phenomena, the observed events. The task, then, is to assess whether and in what way Ben-Ari specifies the mechanisms that generate the events that are statistically analyzed via the LISREL model. For Bhaskar, “mechanisms must be *analyzed* as the ways of acting of things” [27, p. 184, emphasis added].

Ben-Ari distinguishes between the conditions required for a mechanism to be triggered and the mechanism itself.

Under such conditions [of autonomy and interaction], children are *able to* pay attention to the arguments of their peers, act in collaboration, and play roles that further problem-solving. [16, p. 198, emphasis added]

¹⁴Analysis of Figure 4.2 from first principles [97] suggests that five degrees of freedom ought to be associated with the initial, full, LISREL model. Ben-Ari associates three degrees of freedom, but does not indicate the assumptions (such as fixing, rather than estimating, the covariance of **TSupervises** and **TDevelops** variables) made in determining the appropriate degrees of freedom. Nor can these assumptions be deduced by repeatedly running the LISREL model with the data provided since the variance of the **SCognGain** variable is not reported. Finally, since correlations are reported, rather than covariances, it is impossible to deduce the variance of **SCognGain** from the data provided.

Paying attention, acting collaboratively, and role-playing are the mechanisms that explain cognitive growth. Assuming the validity of Ben-Ari's interpretation of Vygotsky, Piaget, and Bandura, children tend to act in these ways (*ceteris paribus*) unless they are delayed or prevented from doing so by supervisory teacher behaviors.

If supervisory teacher behaviors inhibit the tendency of students to act in ways that promote cognitive gain, as suggested by the LISREL model, this must be explained.¹⁵ The level of interaction amongst students is tied to teacher behavior by expectation states theory, which posits that lower status members (in this case, students) of a small, task-oriented, group tend to defer to, and participate less, than high status members (in this case, the teacher) [168].¹⁶ Since expectation states theory has been shown to hold in experimental, more closed, situations, it is reasonable (on critical realist grounds) to assume that the mechanisms involved are active, though not necessarily determinative, in open systems. Hence, the negative, but mediated, effect of **TSupervises** on **SCognGain** is, in principle, explained by the operation of a mechanism identified by expectation states theory: that is, the status organizing process [21].

Recapitulating, we have a set of mechanisms that are hypothesized to generate socio-cognitive events, some of which are registered in classroom observation and standardized testing. If the predictions offered by Ben-Ari are or were confirmed, this would seem to provide (indirect) confirmation of the theory of Complex Instruction (and the mechanisms it specifies, as described above). Yet, the LISREL model does not itself explicitly represent these mechanisms. Rather, it represents the causal effects expected if the hypothesized mechanisms are active and if their operations are not canceled out by the simultaneous operation of other mechanisms.

Ben-Ari has a mechanism-based special theory of Complex Instruction and a statistical model that seems to be based on that theory. Even though the statistical model presupposes a set of mechanisms and is, therefore, stronger than one which lacks such a basis, it is insufficient in an explanatory sense. A statistical model consists of variables and statistical associations between them and so does not explicitly represent mechanisms, at least not in any of the senses of mechanism indicated by Machamer and colleagues.¹⁷ The model offered by Ben-Ari inadequately realizes the

¹⁵Of course, this is a first approximation: student behavior perceived to be unproductive may cause teacher supervisory behavior. This would require a more complex model based on more sophisticated coding scheme.

¹⁶Although the teacher is in several senses an outsider with respect to a small group of students, from the standpoint of expectation states theory, the teacher and the students together constitute a small, task-oriented, group.

¹⁷For Pearl [147], each mechanism is specified as a single functional relationship and a causal model consists of a

special theory of Complex Construction that it presupposes.

What does it mean for a model M to realize a theory T ? If T involves objects and relations among them, M is more-or-less adequate to the extent that model objects [65] map to theoretical objects and model relations map in some explicit way to theoretical relations. Although it is not necessary that the relation between theory and model be one of identity, thereby allowing for abstraction, it is essential that a model M explicitly represent key theoretical objects and some subset of the theoretical relations among them. To the extent that a model M does not do so, the connection between M and theory T is arbitrary, so that M inadequately realizes the explanatory potential of T .

Put otherwise, a statistical model does not itself tell a causal story. Variables record events and make it possible to estimate causal effects. Events cannot explain the mechanisms that generate them, although the occurrence of a given event is only consistent with a restricted set of mechanisms. At best, events lead to the creation of *data* that can be woven into a causal story based on a theorized set of mechanisms [119].¹⁸

As with McDermott, I have constructed the simplified mechanism shown in Figure 4.3. Here the activities involved are Behaviors, where teacher Behavior produces student Behavior, student Behavior produces a CognitiveScore, again with the teacher as the chief agent. These Behaviors jointly produce path coefficients. This mechanism highlights Behaviors rather than Positions and assumes that all causal effects are captured in path coefficients.

4.6 A QUALITATIVE-QUANTITATIVE MECHANISM

Ben-Ari's quantitative study highlights Behavior; McDermott's qualitative study highlights Positions. Figure 4.4 incorporates the mechanisms shown in Figures 4.1 and 4.3, distinguishing

set of probabilistic (or deterministic) equations and a directed graph. With the restriction that each variable appears on the left-hand side of only one equation, and further restrictions derived from the graph, each such equation is designated by Pearl as a mechanism. The relationship between mechanisms as understood by Pearl and Machamer and colleagues requires additional study.

¹⁸This raises the question, "Can variables *ever* record (or represent more directly) the processes that generate the events the variables record?" It seems that the distinction between variables and mechanisms is fundamental: put philosophically, variables are epistemic entities, whereas mechanisms are ontological entities. It seems that processes are either mechanisms or ensembles of mechanisms, which implies that variables cannot explain the processes which, assuming the premise offered in the question, generate the events that the variables record.

Primary entities (Behaviors): $A'' = TBehavior$, $B'' = SBehavior$

Secondary entities (Measurements):

$C'' = CognitiveScore$

$P_{A''B''} =$ path coefficient linking A'' and B''

$P_{B''C''} =$ path coefficient linking B'' and C''

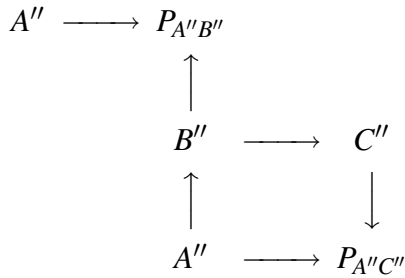


Figure 4.3: A reconstruction of Ben-Ari's account

between: Persons; the Positions they occupy; the Behaviors in which Persons engage when occupying a Position; and Measurements made on the basis of the Behavior of Persons when occupying a Position. I now identify Figures 4.1 and 4.3 within Figure 4.4.

Recall that the (McDermott) mechanism depicted in Figure 4.1 emphasizes activities that produce entities of type Position, namely Student, that tend to “bring off” their performances through certain kinds of Behavior [118]. It is incorporated by means of the path from $A' \rightarrow B' \rightarrow B'' \rightarrow C''$, thereby including a Behavior element missing from the McDermott mechanism. The (Ben-Ari) mechanism depicted in Figure 4.3 emphasizes that one type of Behavior (TBehavior) produces another type of Behavior (SBehavior), which in turn produces a Measurement. It also appears in Figure 4.4.

In Figure 4.4, however, Behaviors are produced by Persons who occupy Positions. Moreover, the kind of Behavior produced by an occupant of the Student Position is strongly shaped by the kind of Behavior produced by an occupant of the Teacher Position. Hence, by incorporating Persons and Positions, it becomes possible to account for both terminal and intermediate Behaviors in terms of social mechanisms.

Figure 4.4 is meant to depict the mechanism by which the Behavior of interest to quantitative-only researchers is produced by the intentional and unintentional [87] Behaviors of Persons by

Primary entities (Persons): A = Person, B = Person

Secondary entities (Positions): A' = Teacher, B' = Student

Tertiary entities (Behaviors): A'' = TBehavior, B'' = SBehavior

Quaternary entities (Measurements):

C'' = CognitiveScore

$P_{A''B''}$ = path coefficient linking A'' and B''

$P_{B''C''}$ = path coefficient linking B'' and C''

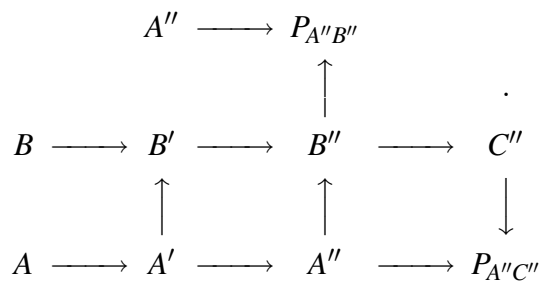


Figure 4.4: An integrative mechanism

virtue of their occupancy of a Position. It is in their capacity as occupants of Positions that Persons generate Behaviors which can be correlated with various properties. Though this mechanism is still much too simple and unidirectional, it does suggest a series of activities that could in principle be simulated to show how one type of entity relevant to the effects of classroom communication produces another.

4.7 WHAT IS SIMULATION?

According to the New Oxford American Dictionary (2001), to simulate is “to imitate the appearance or character of”. By this definition, a weather prediction might be taken as an imitation of the character of upcoming weather. Another way to think of simulation is in terms of the sort of problem to which it may offer a solution.

Although it is may be inappropriate to describe every problem in terms of inputs, outputs, and the models that transform inputs to outputs, it is helpful to use such language to distinguish

problems involving simulation from those involving optimization and system identification. When inputs and outputs are known, but the model connecting them is not, we have a system identification problem. In optimization problems, the (desired) outputs and the model are known, but the inputs needed to obtain the outputs are unknown. In simulation problems, the inputs and model are known: the task is to compute the outputs that correspond to the inputs.[61, p. 9].

In this study, the inputs are based on: (1) a set of parameters that govern the behavior of the model; (2) a dataset previously collected by others, and (3) a range of status distributions. The model, which is based on the status and task participation model developed by Skvoretz and Fararo [168], is specified using a computer program that produces outputs from inputs. The outputs of primary interest represent collective decisions made by Family Support Teams, each composed of five persons belonging to distinct educational professions, who meet to deliberate regarding the truth of a proposition $A(c)$ that pertains to a particular child c .

4.8 A JUSTIFICATION FOR SIMULATION

Those who do simulations and write about simulation seldom offer a justification for its use. Those who do, generally justify simulation on pragmatic grounds: it makes artificial experiments possible in situations where actual experiments cannot, or should not, be carried out. Simulation is then, in this view, simply another tool for conducting (albeit artificial) empirical research. Such authors understandably focus on “the practical and methodological issues of how to do simulation” and leave the philosophizing to others.

Some social system simulators have gone so far as to claim that social system simulation offers the possibility of research free from presuppositions, since simulation requires that many presuppositions be made explicit [57]. Although simulation does provide a linguistic and computational vehicle for the formulation and development of sociological theory, the idea that simulation offers the possibility of a kind of empirical rock-bottom upon which to develop theory seems quite naive and redolent of the unfulfilled (and indeed unsatisfiable) aims of logical positivism. Simulation offers social and educational theoreticians and researchers the ability to express their views in a formal language perhaps better suited to tracing the consequences of the essential recursiveness of social life [86, 69].

For a critical realist, to explain a phenomena is to specify the mechanisms that generate it. Although, to those in the qualitative-only camp, simulation modeling and statistical modeling are two peas from the same positivist pod, finer distinctions are possible.

We would expect a simulation model to include explicit representations of the processes which are thought to be at work in the social world. In contrast, a statistical model will reproduce the pattern of correlations among measured variables, but rarely will it be modeling the mechanisms which underlie these relationships. [88, p. 17]

This distinction between statistical modeling and simulation modeling turns, then, on the concept of mechanism.¹⁹ Because computational simulation affords the possibility of layered models, where each layer corresponds to a layer of reality, simulation offers the possibility of modeling such mechanisms.²⁰

4.9 CONCLUSION

Simulation can be used on the basis of empiricist as well as social realist ontology. As conceived here, simulation is a mixed-method approach in that it provides a framework for integrating quantitative and qualitative methods and results. This synthesis is possible on the basis of an ontological distinction between Persons, Positions, and Behaviors derived from the Realist Social Theory of Archer. I now consider the first of two analytical components of what Archer terms the Socio-Cultural system: namely, the Cultural System.

¹⁹One sociologist complains that most researchers have confused statistical models with theory [173].

²⁰Hierarchical linear models represent a different, but similar, approach to representing multi-level causation.[34]

5.0 CULTURAL SYSTEMS

5.1 AIMS OF THIS CHAPTER

The social flux in which we live and act is termed by Archer the Socio-Cultural System (*SC*) [6]. My objective in this chapter is to describe one of the analytical components of the *SC*: namely, the Cultural System (*CS*). The other component, the Social System (*SS*), and the *SC* are themselves the focus of the following two chapters. I regard professional knowledge as a species of belief that professionals can draw upon and add to in the course of inter-professional competition.

5.2 CONCEPTS OF CULTURE

According to Archer, a *SC* is to be understood in terms of the history of interaction between a *SS* (of positions) and a *CS* (of propositions). In order to take the reporting behavior of professionals as expressions of beliefs that are (often) constitutive of their professional cultures, I focus on the records generated by such professionals. In order to analyze the role of such records, I introduce something like the Archive of Foucault as an intermediary between an *CS* and an *SC* as shown in Figure 5.1.

Popper distinguishes what he terms three worlds: the (physical) world of physical events; the (“subjective”) world of mental events such as beliefs; and the (“objective”) world of logical propositions and their relations [151]. Although the subjective world presupposes the physical world, mental events belong to a different ontological order than physical events. Logical propositions may refer to mental or physical events, but logical propositions are deemed by Popper to belong to a different ontological order than the events to which they (sometimes) refer since only two or

more propositions can in the strict sense be said to be logically consistent or inconsistent.¹

Archer the sociologist appropriates the broader distinctions made by Popper, tailoring them for a realist social theory to contend with structuration theory. What is the the subjective world for the philosopher becomes the Socio-Cultural System for the social theorist. What Popper terms the objective world, Archer terms the Cultural System. Having no need to take account of the physical world, Archer focuses instead on the Social System.

Archer agrees with Popper that belief is an element in the subjective world: that is, it consists of “a state of mind or of consciousness or a disposition to behave or react” [151, p. 108]. The *content* of a belief is, for Archer, a proposition. Propositions are, in this view, the objective content of thought. For Archer, the Cultural System contains, among other entities, those propositions that are presupposed by the books of libraries (or perhaps WWW archives).

5.2.1 Analyzing cultural systems

Conceptual analysis, it is said, yields “an ontology for a possible world - a catalog of everything that makes up that world, how it’s put together, and how it works” [174, p. 294]. One method for extracting the ontology that supports the cultural system under study is componential analysis of a set of terms, a technique first popularized by cognitive anthropologists [75, 189]. The resulting network of descriptions is intended to enable an ethnographer to classify a relatively indeterminate object or event as it would be classified by a ‘native’ user of the cultural system under study [135, 140]. It is a commonplace of cultural anthropology that the same terms often have different meaning in different cultural systems.

The Australian anthropologist Keesing takes culture to be each individual’s

... theory about what his[her] fellows know, believe, and mean. Culture is then an idealized body of competence differentially distributed in a population, yet partially realized in the minds of individuals, [110, p. 58]

an “ideational subsystem” within a system that is at once biological, social, and symbolic [110, p. 63]. Keesing’s concept of culture detaches culture from practice and artifact, instead viewing it as the *organization* of those practices and artifacts.

I assume, contrary to fact, that professionals of a given type have a the following theory about

¹Habermas partially roots his Theory of Communicative Action in Popper’s tripartite ontology.

what his/her fellow professionals know, believe, and mean: “they know, believe, and mean what I know, believe, and mean.” Based on their professional socialization, each actor a of a given occupational type (e.g., Teacher, Principal, Nurse, Social Worker, Counselor) has the same knowledge, the same beliefs, and the same meanings as their fellows when entertaining a proposition that falls within the scope of their professional interests and activities. Cognitively speaking, professional birds of a feather flock together.²

5.2.2 Beliefs

Another simplification is to regard knowledge as a kind of belief and to take the meaning of an expression of belief as the propositional content of that belief. Suppose that $A(c)$ symbolizes the following proposition: The child described by case c may have been physically abused by one of its natural parents. Then, ignoring the difficulties of translating ordinary language into logical form, $\neg A(c)$ symbolizes the following proposition: The child described by case c was not physically abused by one of its natural parents.

Suppose actor a believes that $A(c)$ and actor d believes that $\neg A(c)$: these beliefs can (ignoring time) be symbolized, respectively, by $B_a(c) = 1$ and $B_d(c) = 0$. $B_a(c)$ and $B_d(c)$, also termed propositional attitudes, are events of the subjective world and thus reside (at least analytically) in the Socio-Cultural System. The propositional content of $B_a(c)$ is $A(c)$ and the propositional content of $B_d(c)$ is $\neg A(c)$.

In considering the relationships between $B_a(c) = 1$ and $B_d(c) = 0$, one might ask: (1) what caused the occurrence of each, and (2) what is the logical relationship between $A(c)$ and $\neg A(c)$? Competing causal explanations of $B_a(c) = 1$ and $B_d(c) = 0$, in their status as subjective events, may be grounded in differing social, economic, psychological, communicative, or other histories. It is a matter of supreme epistemic importance to construct such explanations, yet, whatever causal explanations are advanced for $B_a(c) = 1$ and $B_d(c) = 0$, a fundamental distinction between them

²The reason for this over-simplification is one of necessity. The model that provides the capstone of this dissertation pertains to a set of $N = 111$ distinct collective decisions made by five education professionals deliberating in a Family Support Team meeting regarding the truth of the proposition $A(c)$. The very small-scale ethnographic study described in Chapter 8 required over 100 hours of observation and several hundred more hours of analysis and writing. Even if it were feasible to construct an ethnographic decision model for each type of educational professional, individualizing such models would probably not be.

remains: each belief presupposes the logically inconsistent propositions $A(c)$ and $\neg A(c)$.³ Even if, in the course of social-cultural interaction, actors a and d reverse position, so that $B_a(c) = 0$ and $B_d(c) = 1$, the propositional contents of those beliefs remain inconsistent.⁴

Suppose, more generally, that $0 \leq B_a(c) \leq 1$, reflecting the fact that our beliefs regarding a proposition often lack the element of subjective certainty. In this case, one can be regarded as either leaning toward $A(c)$ or $\neg A(c)$ or neutral regarding $A(c)$ (and, therefore, $\neg A(c)$). In either case, the propositional content of $B_a(c)$ ($B_d(c)$) remains $A(c)$ ($\neg A(c)$), so that the analysis in the previous paragraph is applicable.

5.2.3 Statements

Archer's analysis does not distinguish between propositions and the texts or other forms of expression that presuppose them. To distinguish between the objective, propositional, content of belief and the linguistic or other vehicles by which belief is expressed I invoke *something like* what Foucault terms the Archive. For Foucault, statements are what can be stated (verbally or in writing) in a given society at a given time and are thus distinct from propositions [74]. The Archive that I imagine consists of utterances and texts, the latter more or less permanently recording the occurrence and consequences of particular kinds of subjective events: namely, beliefs. Since beliefs presuppose propositional contents, so too do the statements of the Archive.

The Archive contains, among other things, the records generated in bureaucracies such as schools. The Archive is conceived as a finite, but indefinite and growing, store of texts. Individuals and groups may draw upon the Archive, and add to it, as they attempt in Socio-Cultural System interaction to advance or protect their ideal and material interests.⁵ Of course, their ability to do so depends on their position within the Social System.

Since belief presupposes a propositional content, the Cultural System both enables and constrains the expression of belief. I assume that in deliberative settings relatively free from strategic interaction [92, 76], a belief is more likely to be expressed if it has as its content a proposition re-

³Two propositions P and Q are logically inconsistent if both cannot be true and both cannot be false.

⁴In Chapter 10, I represent belief as a graded phenomena: that is, $0 \leq B_a(c) \leq 1$.

⁵For Archer, ideal interests are those beliefs that provide justification for the acquisition or retention of material interests.

garded as true than if that proposition is regarded as false.⁶ Since texts are statements that more or less permanently record the occurrence and consequences of belief, the Cultural System likewise constrains and enables the creation of statements. Thus, statements exert a causal effect insofar as they constrain and enable belief, and, with it, social action.

A statement may function, as Archer suggests in regards to propositions, like the Rosetta stone: the meanings associated with it may increase or decrease over time. In the case of a bureaucracy, such as a school, a statement such as a student permanent record may record the beliefs of a variety of actors. Of course, a statement is subject to interpretation which is, for some, a process of imaginatively reconstructing the relevant beliefs of the actor(s) that authored the statement.

Since a belief without propositional content is not a belief, reconstructing a belief means accessing the propositional content of that belief. The existence of a statement presupposes some set of beliefs of the form $B_a(c) = 1$, where $A(c)$ is the propositional content of $B_a(c)$. If that statement (such as the United States Constitution or The Communist Manifesto) conditions SC interaction, then so too does the propositional content of the belief.

As noted earlier, individuals in the Social System draw upon the Archive (and, thereby, the Cultural System) to advance their ideal and material interests. Individuals occupying positions of higher rank in the Social System have a relatively greater chance of having their statements enter the Archive. Individuals who subsequently have permission to read the Archive thereby acquire the potential to access the propositional content of the statements in it. Entering a statement in the Archive bestows upon its propositional content the relatively autonomous (Popperian, even Durkheimian) existence [6] by virtue of which it can logically constrain and logically enable the thought and action of those who subsequently access that propositional content.

I do not address the general question of when and how statements enter the Archive. Rather, it is restricted to considering the relationship between: (1) a particular statement ($dossier(c)$) that records information concerning a child c which is considered relevant to the determination of $A(c)$ and; (2) the collective decision of a group of school professionals regarding $A(c)$. Based on the collective decision regarding $A(c)$, $dossier(c)$ is then updated. Having taken culture as a belief system, I now consider the ideological character of culture.

⁶One test of this assumption can be put in form of an assertion: It is possible to believe a proposition that one takes to be false.

5.3 CULTURE AS IDEOLOGY

5.3.1 The ruling ideas

For Marx,

[t]he individuals composing the ruling class possess among other things consciousness, and therefore think. Insofar, therefore, as they rule as a class, it is self-evident that they . . . rule as thinkers, as producers of ideas, and regulate the production and distribution of the ideas of their age [62, p. 302]

Although the economic power formerly wielded by individual capitalist owners is now exercised by corporate entities, it still seems clear that, for good or ill,

insofar as they rule as a class and . . . [help] regulate the production and distribution of the ideas of their age, their ideas are [major components of] the ruling ideas of the epoch. [62, p. 302]

Ruling ideas are those beliefs that articulate the interests of the ruling class in the language of classless universality [62, p. 302]. Who articulates the ruling ideas? For Marx, this is done by

the thinkers of this [ruling] class (its active, conceptive, ideologists), who make the formation of the illusions of the class about itself *their chief source of livelihood*. [62, p. 302, emphasis added]

In the language of Habermas, Marx lived during a period of “liberal capitalism” in contrast with the “advanced capitalism” more characteristic of the present, at least in the United States. Members of the ruling class were largely bourgeois; bourgeois intellectuals functioned as the thinkers of the ruling class.

In the modern era of corporate capitalism, when the rulers are corporate entities rather than individual persons, the legitimation services formerly rendered by intellectuals are now provided by a particular species of intellectual: namely, the professional. It is, of course, no accident that, in the modern era, corporations, government bureaucracies, and professions have co-evolved [17, 48, 200]. The results of this organizational and intellectual differentiation can be seen in, among other places, large-scale public education systems. As a consequence, schools are often sites at which professionals, as thinkers of the ruling classes, express competing, and sometimes ruling, ideas.⁷

⁷ A more nuanced exposition would consider the ideas of Gramsci regarding the role of professionals in the achievement of hegemony.

5.3.2 Professionals

In order to earn the rewards of service, professionalized or professionalizing coalitions of workers must compete for the opportunities of service. Whether or not such coalitions of workers constitute a class depends a good deal on how classes are defined. Although Marx delineated but three classes, he acknowledged the contradictory class status of the middle-class professions.

Exploitation is the concept most characteristic of Marxist social theory [126, pp. 58-84]. Wright adopts Roemer's reformulation of exploitation and defines a typology of class locations that reflects the distribution of assets in the means of production [126, p. 138]. Wright distinguishes, first, between owners and non-owners of the means of production, mirroring the class locations identified by Marx. Wright further distinguishes non-owners by the amount of skill/credential assets and organizational assets that they control by virtue of occupying a particular class position [126, p. 139].

As shown in Table 5.1 (where the symbols *E*, *S*, and *U* designate, respectively, expert, semi-skilled or semi-credentialed, and un-skilled or un-credentialed workers), this cross-classification generates a typology with nine distinct class locations that, Wright acknowledges, looks neo-Weberian but is Marxist by virtue of its basis in the concept of exploitation. This typology helps us to analyze intra-professional competition because it suggests the differential distribution of skill/credential and organizational assets that enable and constrain the actors that occupy positions within each class-location. For Wright, "class consciousness refers to all class-pertinent beliefs, *regardless* of how these correspond to class interests" [126, p. 149, emphasis added].

5.3.3 Ideology

I assume that beliefs formed in an occupational setting concerning a matter of occupational relevance are class-pertinent. This assumption opens the way for a consideration of the ideological character of culture, specifically belief, in relation to the class-locations identified by Wright. Ideology critique, of course, is nothing new, and perhaps has its most trenchant form in the *The Eighteenth Brumaire* of Marx.

Mannheim subsequently sought to subject Marxism itself to ideology critique based not on class location but on social groupings. For him, the sociology of knowledge is the study of how

“social structures come to express themselves in the structure of assertions, and in what sense the former concretely determine the latter” [122, p. 239]. Unfortunately, a lack of specificity regarding the phrases ‘social structures’ and ‘structure of assertions’ prevented Mannheim from describing mechanisms to account for *how* social structures determine the structure of assertions. In a double irony, Mannheim’s sociology of knowledge implies that all belief systems are ideological, including (as acknowledged by Mannheim) the sociology of knowledge itself.

The neo-Weberian Abbott describes the system of the professions as an evolving system of competing occupations. In the typology of Wright, we might term the system of the professions as an evolving system of competing middle-class locations. For Abbott, the professions compete for jurisdiction on the basis of “different exclusionary schemes in diagnosis, inference, and treatment” [1]. Such exclusionary schemes express the propositional content of professional belief systems.

While rejecting the group as a sufficient basis for ideological analysis, I accept as a premise for this study that all belief systems are ideological the sense that they constrain and enable cognition and, thereby, social action. In particular, the exclusionary schemes of the professions both constrain and enable their members. Of course, social theorists have argued bitterly over the degree to which ideologies constrain social action. For example, the dominant ideology thesis highlights the coercive aspect of ideology. According to its critics, the dominant ideology thesis is that ideology “does successfully incorporate subordinate classes by the process of disguising their real condition or by misleading them” [2, pp. 187-190]. Unfortunately, ideology analyses often reify social processes rather than identify the potential mechanisms that might animate such processes. This study attempts to identify the potential mechanisms by which inter-professional variation in belief is associated with variation in social outcomes.

5.4 CONCLUSION

Since professionals can draw upon and add to what I term the Archive in the course of inter-professional competition, I focus on the Archive of statements rather than the propositions of the Cultural System that these statements presuppose. I next consider the second analytical component of the Socio-Cultural System: what Archer terms the Social System.

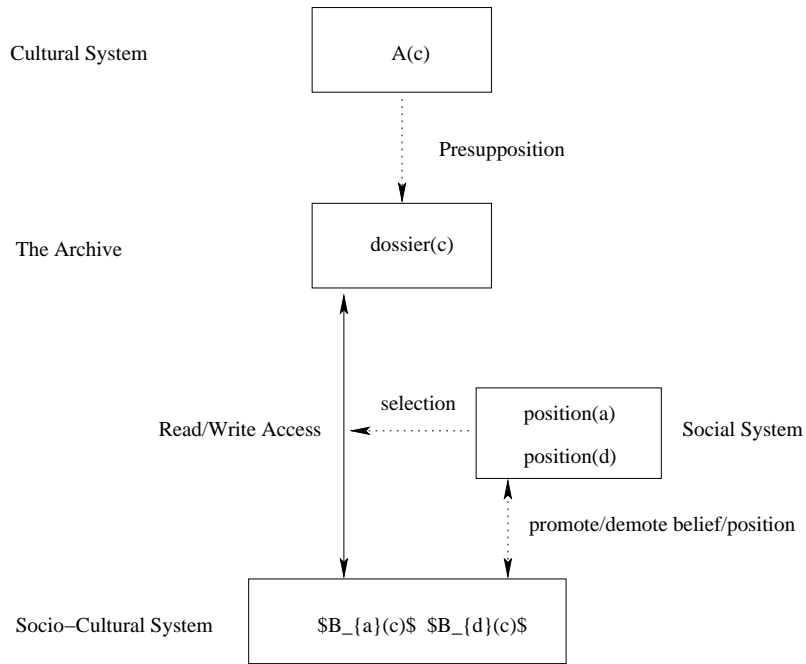


Figure 5.1: Relations involving a CS, SS, SC and Archive

Table 5.1: A class-based typology of assets

Occupation	Skill/Credential			Organizational
	+	> 0	-	
Manager	E	S	U	H
Supervisor	E	S	U	M
Worker	E	S	U	L

6.0 SOCIAL SYSTEMS

6.1 AIMS OF THIS CHAPTER

The objective of this chapter is to show that, by thinking of an expectation in terms of an expectation state, and social structure (properly understood) in terms of networks of social relations it is possible to model the interplay of agency and structure. By so interpreting agency and structure, it will be possible to embed a particular theoretical disagreement between Archer and Giddens in the model of status and task participation. Such a model can be used to determine whether, in a simulated world, the theoretical disagreement yields outcomes that systematically differ.

6.2 INTRODUCTION

Rist and other qualitative researchers have ascribed causal efficacy to expectations without spelling out the theoretical nature of expectation [63]. Expectation states theory (hereafter designated as *EST*) is a theory, it is said, by virtue of its abstract, logical, structure [40]. *EST* provides a formal, abstract, definition of expectation and other concepts. Using these concepts, it expresses certain axioms from which other propositions are derivable as consequences. I believe it is possible to model the interplay of agency and structure along the lines shown in Figure 6.1.

As suggested by Figure 6.1, the task-relevant communicative acts of persons are constrained and enabled by expectations states which, in turn, are constrained and enabled by the social structure of the task group.¹

¹As discussed below, performance expectations are formed in two ways: on the basis of task-external status (if salient) or on the basis of behaviors. A link from Communicative Acts to Expectation States is not shown because the formation of one or more ties involving the interactants depends on a system parameter (π) that is itself not dependent on expectation states.

Category	Structure		Agency
Epistemic Status	Unobservable Inferred	Unobservable Inferred	Observable
Elements	Social Pattern	→ Expectation States	→ Communicative Acts
		↙ ↘	
		←	

Figure 6.1: The mediated interplay of agency and structure

A cautionary note is in order. The arrows shown in Figure 6.1 can be said to be “productive” in the sense that, *as modeled*, social patterns generate expectation states, which generate communicative acts, which generate social relations (and, therefore, social patterns) and so on. To say that the arrows are “causal” would, however, require a discussion of causality that is beyond the scope of this dissertation.

Although Figure 6.1 does not explicitly represent the social relations in which the actors participate outside the task-oriented group, such relations are partly taken into account via expectation states. In addition, although social relations might be established on the basis of acts which are not intended as communicative, such acts are not considered since it is assumed that the acts of primary importance in a task-oriented group are those involving task-relevant communication.

6.3 EXPECTATION STATES THEORY

EST is an axiomatic theory, with both primitive (that is, undefined) and defined terms. *EST* assumes a set of actors who share a preferred task outcome, a standard for evaluating whether a behavior will lead to task success, and a commitment to the completion of the group task [19, 20]. Although *EST* pertains only to situations that meet these conditions, it is intended to apply to the ordinary sense of expectation as subjective feeling [40].²

²As noted in Chapter 4, research on Complex Instruction suggests that expectation-as-state does indeed shed light on expectation-as-feeling.

My description of *EST* draws heavily on a particular prior exposition [131] for two reasons. First, Meeker’s discussion is more accessible, being addressed to undergraduates, than the mathematically complex and formal expositions of *EST* given by Fararo, Skvoretz, and other mathematical sociologists [168]. Second, the link between expectation and belief made by Meeker is suppressed in the work of Fararo and Skvoretz. Because this study relies heavily on both belief and expectation, I attempt to highlight the earlier link between expectation and belief.

It is assumed that group members share “beliefs about the existence and characteristics of physical and social objects” and “about the nature of cause and effect” [131]. Clearly, this assumption may or may not hold, or hold to a greater or lesser degree, in any specific situation. The existence of a set of shared beliefs thus constitutes a scope condition for expectation states theory that limits the number of situations to which it is applicable, and thus subject to possible disconfirmation.

In addition, members of a social group often act consistently with particular sets of “statements about what is desirable [i.e., goals] and how to evaluate what is happening [i.e., values]” [131, p. 99]. Consider, for example, a discussion group or committee focused on a complex topic such as a human relations: it is sometimes the case that

these groups have a set of beliefs about ‘human nature’ and the organization of work and family that allow the participants to interpret the ‘facts’ in the human relations case. [131, p. 99]

Of course, not all such groups exhibit consensus regarding goals and values: *EST* is not *applicable* to these groups.

It seems reasonable to suppose that if group members share a goal, then they are more likely to agree on what constitutes task success and failure. It also seems reasonable, though hardly universal, that group members regulate their behavior in order to achieve success. Shared goals and beliefs concerning cause and effect, even if contrary to fact, generate “valued behavior standards, . . . the standards by which group members assess how likely an act is to lead to success” [131, p. 100].

6.3.1 Basic Concepts

The basic concepts of *EST* designate the primitive elements of the theory. These are: “actor” (who, in this context, is a group member); “task” (something actors work on that can have future states identified with “success” or “failure”); actor “behavior” (of which “communicative act” is

a special case); and “valued behavior standard”. *EST* involves additional concepts that refer to behaviors (which are regarded as observable), outcomes of behavior, and most importantly, mental states (which are regarded as unobservable) [131, p. 102].

6.3.1.1 Behaviors. The following three concepts refer to behaviors: “action opportunities”, “performance outputs”, and “positive/negative reactions”. An action opportunity is “any chance to perform granted by one group member to another, including verbal acts . . . and nonverbal acts such as questioning looks and momentary silences”.³ Any task-relevant behavior that can be regarded as an attempt to contribute to task success is a performance output. Positive/negative reactions are expressions of approval or disapproval in response to performance outputs, presumably according to valued behavior standards. Consider the following example.

Suppose, first, that a task-group (termed a Family Support Team) consisting of a Counselor, a Teacher, a Principal, a school Social Worker, and a school Nurse are meeting to address the behavioral problems of a particular student. Suppose that at time t_1 , the Counselor contributes a performance output (perhaps by attributing the source of the problem to the child’s will) and at time t_2 the Social Worker also contributes a performance output (perhaps by attributing the problem to possible physical abuse). At least on the face of it, these performance outputs conflict, so it is natural to describe their relation as one of disagreement. If this disagreement is resolved by the Counselor accepting the judgment of the Social Worker at time t_3 , in the absence of any intervening performance outputs by other members, then the latter is said to have influenced, but not controlled, the former.

6.3.1.2 Mental states. The two concepts that refer to unobservable (or, at least, infrequently observed) mental states are “performance expectation” and “performance expectation state”. The former is a mental state that, if it exists, links one actor to a task outcome. It says nothing about the relative performance of the actors in the group. The latter is a mental state that, if it exists, relates two actors on the basis of their respective performance expectations. Performance expectations are the building blocks that compose performance expectation states.

³Whether granting is an act that is voluntary or involuntary requires a consideration of the nature of influence, control, and power that is beyond the scope of this study, but one that has been studied by sociologists such as Goffman.

A performance expectation is a prediction about the *quality* of a future performance output by a member of the group, which can be self as well as other.⁴ If it is predicted that the behavior will lead to task success, then the performance expectation is designated as *HI*; if it is predicted that the behavior will lead to task failure, then the performance expectation is designated as *LO*; if no prediction is made, then the performance expectation is undefined.

A performance expectation *state* is a relation between two performance expectations. If *a* “believes” (consciously or otherwise) that his/her performance output will lead to task success and *d*’s performance output will lead to task failure, then *a*’s performance expectation state with respect to *d* is denoted [*HI,LO*]. If *a* “believes” that his/her performance output will lead to task failure and *d*’s performance output will lead to task success, then *a*’s performance expectation state with respect to *d* is [*LO,HI*]. In this study it is assumed that if *a* is in performance expectation state [*HI,LO*] with respect to actor *d*, then actor *d* is in performance expectation state [*LO,HI*] with respect to actor *a*. Although the assumption of symmetric performance expectation states is not required by *EST*, I assume symmetry.⁵ The assumption of symmetric performance expectation states implies that any pair of actors agree about the relative quality (as discretized via the values *HI* and *LO*) of their expected performance outputs.

Field studies [199] and analytical studies [102] have documented the seemingly inevitable emergence of a power and prestige order in groups of initial status equals. Some actors initiate more action for the group, exert more influence, and make decisions that are binding for the group.⁶ The key mechanism involved such emergence is what *EST* theorists term a “full fundamental sequence of interaction . . . composed of” [131, p. 104]:

action opportunity → performance output → reaction.

Since performance expectation states are based upon predictions about the quality (or effectiveness) of future performance outputs, performance expectation states must exist (if at all) prior to relevant performance outputs. I illustrate the full fundamental sequence of interaction in the

⁴A performance expectation is a *primitive* concept: whether or not a performance expectation takes into account the possible contingency of a future performance output upon the behavior of others is not addressed.

⁵The chief reasons for assuming complementarity are: (1) it simplifies the analysis and exposition, and; (2) it is better than the assumption of asymmetry for explaining behaviors of deference and dominance that appear to be routinized.

⁶Although it is important to consider what kinds of actors do more work, both before and after group meetings, *EST* has not addressed this aspect of inequality.

following example, where the group considered is simply a dyad.

Note that the following analysis is actor-centric: it depicts a sequence from the point of view of one actor a . Suppose that School Principal a views school Social Worker d as less adept at “correctly” categorizing parental behavior as an instance of either physical abuse or corporal punishment, so that the expectation state of a with respect to a Social Worker d is $[HI,LO]$. By symmetry, the expectation state of d with respect to a is $[LO,HI]$. As depicted in Figure 6.2, suppose also that a takes an action opportunity to address d (as denoted by aAd). A second unobservable mental state, called a unit evaluation (as denoted by ue), now enters the picture: namely, the d 's evaluation of the quality (+ or –) of a 's performance output immediately after it has occurred. It is assumed that d 's unobservable positive unit evaluation of a 's performance output is followed by d 's observable + reaction; likewise, an unobservable negative unit evaluation is assumed to produce a – reaction.⁷ In turn, the expectation state of the actor who receives a unit evaluation may change depending on whether the actor accepts or rejects the influence of the evaluator. In this example, if d receives a negative unit evaluation and negative reaction to a 's performance output, a may change his/her unit evaluation of self from positive to negative. If a 's initial self unit evaluation is positive and that unit evaluation changes to negative in response to d 's negative reaction, then a is said to have accepted d 's influence. As a result, actor a moves from the initial performance expectation state $[HI,LO]$ to $[LO,LO]$ in relation to actor d . In short, an actor's expectation state can change. The fundamental sequence of interaction is assumed to be cyclic: a reaction may produce a change in expectation state, which in turn affects action opportunities, performance outputs, and unit evaluations. The fundamental sequence of interaction (adapted from [131, p. 104]) has some advantages and disadvantages as an expository vehicle. Simplicity and faithfulness to intuition is certainly an initial advantage. On the other hand, the sequence does not itself offer a mechanism that describes why one actor accepts or rejects the influence of another. This disadvantage is addressed via more complex models constructed on the basis of E-state structuralism, itself an extension of *EST*, described below.

⁷Personality research is bedeviled by the fact that individual attitudes are very weak predictors of behavior. One explanation for this phenomena is that attitudes are general. In this instance, however, it is assumed that outputs are assessed in terms of a shared valued behavior standard which is, by hypothesis, task-specific.

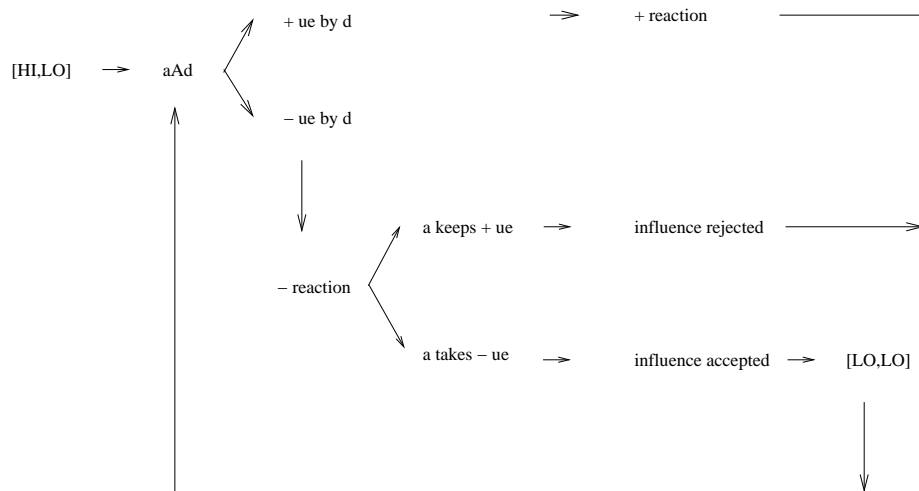


Figure 6.2: The fundamental sequence of interaction

6.3.2 Scope conditions

Maxwell’s theory of electromagnetism would not (one hopes) be considered falsified if it were used to predict economic behavior and the predicted behaviors were not (even approximately) observed. This is because each theory has, at least implicitly, a set of scope conditions that limit the circumstances for which it is applicable, let alone predictive. *EST* is applicable to groups that satisfy the following four scope conditions: (1) the group is small enough for face-to-face interaction; (2) the group convenes in order to accomplish a shared goal; (3) there are shared standards for task success and failure, and (4) group members must “consider it both necessary and proper to take each other’s contributions into account” [10, p. 123].⁸ These conditions restrict the applicability, and hence the falsifiability, of *EST*.

The simulation component of this study focuses on decisions made by Family Support Teams. Typically, a Family Support Team (*FST*), consists of five education professionals who jointly decide whether an elementary school student has been potentially physically abused by a parent. Since the *FST* members meet face-to-face, an *FST* meeting satisfies the first scope condition

⁸The reader may wonder whether a contribution by an actor whose expectation state is *[LO,HI]* would be taken into account. The fundamental sequence of interaction claims only that if the actor takes the action opportunity to address another actor, that performance output will be met by a positive or negative reaction. The fundamental sequence does not indicate which kind of reaction it will be.

noted in the previous paragraph. It is assumed that the team meets to determine whether to report a possible instance of physical abuse, so the second condition is satisfied.⁹ I assume that group members share the following minimal definition of task success. *FST* decisions are not followed by either: (1) the death or obvious physical injury of the student or (2) parental retaliation against any member of the Team. Finally, the ideology of inter-professional cooperation [1] suggests that *FST* meetings satisfy the fourth scope condition.

What are the implications of a *FST* meeting not satisfying one or more of the scope conditions of Balkwell? That is a question which, to my knowledge, *EST* researchers have not addressed. These researchers concede that the scope conditions are not precise: a fair amount of experimental work has been done to make them more precise. In the main, *EST* theorists have focused on identifying conditions which, in their view, allows them to design social-psychological experiments that satisfy the scope conditions and thus make it possible to explain the results obtained.

It is useful to distinguish between whether a condition is completely satisfied, approximately satisfied, or completely unsatisfied. Complete satisfaction and complete dissatisfaction are taken as logical opposites. In this scheme, to say that that a condition is approximately satisfied is to mean that the condition is neither completely satisfied nor completely unsatisfied.

Suppose that at least one of the scope conditions of *EST* is completely unsatisfied. My analysis of *FST* is built upon a theory which requires for its applicability that the scope conditions are at least approximately satisfied: if this is not the case, then the results obtained from the analysis are ungrounded theoretically and at best coincidentally relevant. Suppose now that at all of the scope conditions are approximately satisfied. In order to assess the consequences of having only approximately satisfied the scope conditions, one would need to formulate a new set of scope conditions that “real” *FST* meetings *would* satisfy, either completely or approximately. One would then face anew the question concerning the theoretical and pragmatic consequences of assuming that a “real” *FST* meeting completely satisfy the new set of scope conditions. This line of argument, of course, leads to regress. At some point, one must either: (1) give up or (2) assume that the scope conditions of *EST* are at least approximately satisfied, use a model based on *EST* to derive consequences, and assess the consistency of experimental or empirical observation with the outcomes of the analysis.

Since it is dubious whether the scope conditions of *EST* can be anything but approximately sat-

⁹This way of formulating the goal suppresses the importance of differing priorities.

isfied by any “real” *FST* meeting, what are the pragmatic consequences of using analytical results based on the assumption of complete satisfaction to formulate policy regarding the formation or operation of such teams? This questions invites the construction of an even more complex model in which degrees of approximate satisfaction are linked by policy-making processes to school practices that affect school professionals, school children and their families. In the absence of such a model, one must advocate further efforts to refine the scope conditions and determine when they are approximately satisfied. In short, any act of modeling, whether it be of simulation or ethnography, runs the risk of “doing violence” to that which is being modeled.

6.4 STATUS CHARACTERISTICS THEORY

The previous *discussion* of *EST* tacitly assumed that the actors are essentially status equals. *EST* itself, however, makes no such assumption. In this section, I draw on Balkwell’s analysis to describe how Status Characteristics Theory, a branch of *EST*, handles status differences, thus laying the groundwork for the more formal exposition required for E-state structuralism.

6.4.1 Representing the definition of the situation

Status Characteristics Theory (hereafter *SCT*) assumes that task-external status information and task-internal performance information affect the formation of social relations, and hierarchy, within groups. A status characteristic is “any attribute possessed by members of a group whose culturally specified meaning is such as to make it potentially relevant to performance at [or, on] the group’s task” [10, p. 124]. Status characteristics can be diffuse or specific.

Age, gender, race, and ethnicity are designated as *diffuse* status characteristics because in many societies, most people believe (or act as if they believe) them to be associated with differential levels (and, perhaps, types) of performance across a *broad* range of tasks. On the other hand, the ability to perform mathematical calculations is a *specific* status characteristic because it is believed in many societies to have few (if any) implications for performance on non-mathematical tasks, such as writing haiku poetry. Finally, the beliefs considered by *SCT* need not be true: it is assumed that if persons believe something to be true, they act as if it is true, which increases the likelihood

that it will become true [180].

Recall that Meeker defines an expectation as “a prediction about the quality [*LO* or *HI*] of a performance output produced by a group member”, so that an expectation state is “a set of performance expectations for two (or more) persons *relative to each other*” [131, p. 103, emphasis added]. This means that an actor may have a *HI* performance expectation for self, yet also have a *LO* performance expectation in relation to another actor. Although representing expectation states as a pair is helpful for exposition, it also means that expectation states of the actors in a group must be enumerated and managed.

In a two-person group, there are four possible (defined) expectation states for each actor with respect to the other actor: [*LO,LO*], [*LO,HI*], [*HI,LO*], and [*HI,HI*]. For two actors *a* and *d*, there are two sets of expectation states: the first is associated with *a*'s view of *d* and the second is associated *d*'s view of *a*. Hence, in a two-person group, there are a total of $2 \times 1 \times 4 = 8$ possible expectation states.

In a three-person group, there are three sets of expectations states: one set for each actor *a* with respect to each of the other two actors. This implies that one of $2 \times 4 = 8$ expectation states are possible for each actor *a*. Since there are three actors, there are a total of $3 \times 8 = 24$ expectation states. In general, for a group of *n* actors there are a total of $n \times (n - 1) \times 4$ possible expectation states. For example: with $n = 5$, the total number of possible expectation states is $5 \times 4 \times 4 = 80$; with $n = 6$, the total number of possible expectation states is $6 \times 5 \times 4 = 120$.

The definition of an expectation state can be generalized. The expectation state associated with *x*, denoted $e(x)$, is now represented as a continuous, signed, quantity.¹⁰ A positively valued $e(a)$ indicates that the actor is connected, in a social-psychological sense, to task success. A negatively valued $e(x)$ indicates that actor *x* is connected to task failure. Task success is denoted by $T(+)$ and task failure by $T(-)$: these are simply states, not signed quantities. The magnitude of $e(x)$ indicates how strongly *x* is connected to one of $T(+)$ or $T(-)$.¹¹ We can account for the possibility that some group members have positive, while others have negative, expectations for *x*, by adding positive and negative expectation states to yield the *aggregate* expectation state, denoted $ae(x)$ associated with *x*.

¹⁰A variable is: continuous, if it can take on every value in some interval; signed, if it is negative, zero, or positive.

¹¹The calculation of expectation states as continuous, signed, quantities is described below.

6.4.2 Postulates of the theory

SCT is based on *four* postulates concerning how status processes operate in small, task-oriented, groups. *First*, the salience postulate asserts that any status characteristic which discriminates among the members of a task group will tend to become a salient element in group interaction, unless there is a *cultural* belief that the attribute is irrelevant to the particular task.¹² *Second*, the burden of proof postulate says that actors tend to structure a task-situation by linking salient characteristics to the task outcomes, even if the characteristic is not initially linked, unless it is expressly demonstrated that the characteristic is inapplicable to task outcomes. The notion of structuring a task situation is described in detail below. *Third*, each actor in the group will process all salient characteristics of every member in the group, generating an aggregate performance expectation state for each group member. *Finally*, if $e(a) > e(d)$, then $r(a) > r(d)$, where $r(a)$ and $r(d)$ are the expected (or long-run average) rates at which performance outputs (or behaviors) are generated by a and d .¹³

Over three dozen specific hypotheses based on these four postulates have been experimentally tested. The findings suggest that "... [task-]external status differences among members of a task group determine the distribution of power and prestige within the group" [18, p. 43]. Higher rates of participation have been shown to be positively correlated with social influence [10]. In order to analyze the impact of status differences, *SCT* uses a graphical model that depicts the definition of the situation in a small, task-oriented, group.

6.4.3 A graphical model

Suppose that, given a task T , participants share the presumption that some ability IA is necessary to attaining $T(+)$, thus rendering it an *instrumental* ability. For example, recall of multiplication facts is an ability that can be presumed instrumental to the mathematical task of completely factoring a "large" positive integer. Given the presumption that IA is necessary to attaining $T(+)$, it is assumed that the actors associate the possession of a high level of IA , denoted $IA(+)$, with $T(+)$,

¹²Although *SCT* does not distinguish between culture-in-the-large and culture-in-the-small, it might be possible to extend it to cover an "idiocultural" case where, for example, all members of the group share the belief that status characteristics should never be considered relevant. [70]

¹³The fourth postulate expresses the intuition that if a and d expect a to perform better than d , a will be given or take more opportunities to produce performance outputs.

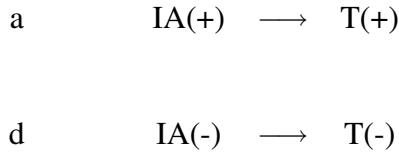


Figure 6.3: Definition of the situation showing a specific status characteristic

while associating $IA(-)$ with $T(-)$. How actors a and d each define their situation is diagrammed in Figure 6.3.

Several items are noteworthy. First, both a and d differentiate between $IA(+)$ and $IA(-)$. Second, each views $IA(+)$ as relevant to $T(+)$ and $IA(-)$ as relevant to $T(-)$. Third, neither a nor d associate themselves with $IA(+)$ or $IA(-)$ nor with $T(+)$ or $T(-)$.

This is a *minimal* definition of the situation. It consists of only: an awareness of task outcomes; the presumption that a particular level or kind of ability is relevant to each task outcome, and; an awareness of self and other as otherwise undifferentiated actors. This may correspond to the case where, although a and d associate $IA(+)$ with task success, and $IA(-)$ with task failure, neither have identified whether they, or the other, possess $IA(+)$ or $IA(-)$.¹⁴ A graphical representation of a definition of the situation makes possible certain kinds of analysis.

Path length is determined by the number of lines and arrows in the path, so that in Figure 6.3 there is a path of length 1 from $IA(-)$ to $T(-)$ and a path of length 1 from $IA(+)$ to $T(+)$. According to *SCT*, the initial definition of the situation is sequentially transformed until each actor is connected to the task outcomes. So, although Figure 6.3 shows only two paths, the complete definition of the situation will show multiple paths from actors to outcomes.

Suppose that a and d are also aware of their own gender: even very young children are aware of gender and other diffuse status characteristics [37]. This element of the definition of the situation is modeled by D , a diffuse status characteristic with states $D(+)$ and $D(-)$: the fact that maleness is the high level of D , signified by $D(+)$, reflects the higher status generally accorded to males in the United States. Suppose that a is male and d is female. If a is linked to $D(+)$ and d to $D(-)$, the (fuller) definition of the situation is shown in Figure 6.4. This definition of the situation takes into

¹⁴Although actors may enter a group having beliefs concerning their relative superiority or inferiority to other with respect to some ability, these beliefs must be *activated* in order to structure interaction. Further on, this possibility is taken into account.

$$a \longrightarrow D(+) \quad IA(+) \longrightarrow T(+)$$

$$d \longrightarrow D(-) \quad IA(-) \longrightarrow T(-)$$

Figure 6.4: Definition of the situation showing a diffuse status characteristic

$$a \longrightarrow D(+) \longrightarrow G(+) \quad IA(+) \longrightarrow T(+)$$

$$d \longrightarrow D(-) \longrightarrow G(-) \quad IA(-) \longrightarrow T(-)$$

Figure 6.5: Definition of the situation showing a generalized expectation

account not only each actor's beliefs concerning IA and T , but also whether they possess $D(+)$ or $D(-)$. While this definition of the situation is more complete than that shown in Figure 6.3, it does not yet produce a complete path from each actor to the task outcomes.

In *SCT*, a prediction about the quality of actor's future performance on *any* characteristic presumed to be task-related is termed a generalized expectation. Although one might question the applicability of such an (unobservable) expectation to a task-oriented group, it plays a key explanatory role in *SCT*. In the context of this example, G is a prediction about each actor's future performance on the specific status characteristic IA . Behaviors predicted based on the activation of generalized expectations and their association with specific status characteristics have been observed in experimental settings [20].

By the burden of proof postulate, *any* characteristic that differentiates group members is taken as task-relevant unless the relevance is explicitly precluded (when possible). Actors associate diffuse status characteristics with differential levels of performance across a broad range of tasks. Hence, actors associate the possession of a diffuse characteristic D with a generalized expectation G so that individuals possessing $D(+)$ are associated with the $G(+)$ generalized expectation and individuals possessing $D(-)$ are associated with the $G(-)$ generalized expectation. Note that although the new definition of the situation as depicted by Figure 6.5 is more structured than Figure 6.4, neither actor is yet connected to the task outcomes.

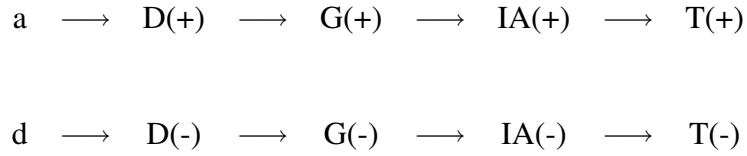


Figure 6.6: Definition of the situation showing the association of G and IA

Since a 's level of generalized expectation is HI (namely, $G(+)$), he is likely to assume, in the absence of contrary information, that he also possesses a HI level of $IA(+)$. Similarly, actor d is likely to assume that she possesses $IA(-)$. Hence, $G(+)$ ($G(-)$) becomes associated with the specific status characteristic $IA(+)$ ($IA(-)$) as shown in Figure 6.6. In Figure 6.6, a and d are now each connected to a task outcome by a single path of length 4. Note that the definition of the situation does *not* take behavior into account nor does it represent any relation between a and d .

6.4.4 Computing expectation states from the graphical model

Graphical models of the definition of the situation represent how, given the assumptions of SCT , actors define the task situation. They also make it possible to compute the expectation state associated with each actor. To do so, however, some additional elements must be introduced.

The sign of a path from an actor to a task outcome is determined by multiplying the sign of all lines along the path and the sign of the outcome. Unless otherwise indicated all lines and arrows are positively signed. The path from a to $T(+)$ in Figure 6.6 is a positive path because each of the four arrows that appear are positive and the task outcome is positive, i. e., $T(+)$. The path from d to $T(-)$ is a negative path: Each of the four arrows that appear are positive and the task outcome is negative, i.e., $T(-)$. Multiplying four positive and one negative signs yields a negative sign. In SCT , a positive path between actor a and $T(+)$ provides a basis to expect a positive performance output by a ; a negative path between actor d and $T(-)$ provides a basis to expect a negative performance output by d .¹⁵

With respect to Figure 6.6, actor a “expects” a positive performance output from himself and actor d “expects” a negative performance output from herself. Note, however, that neither actor

¹⁵As shown below, it is possible to have a negative path to a positive outcome.

path of length 4 from a to $T(+)$, there is now also a positive path of length 5 from a to $T(-)$. The second path is positive because: the lines from a to $D(+)$, $D(-)$ to $G(-)$, $G(-)$ to $IA(-)$, and $IA(-)$ to $T(-)$ are all positive; the line from $D(+)$ to $D(-)$ is negative; the outcome T is negative; and the product of two negative signs is a positive sign. This means that, on the basis of Figure 6.7, a is connected to task failure *and* task success, but less strongly to failure than to success. In addition to the negative path of length 4 from d to $T(-)$, there is now also a negative path of length 5 from d to $T(+)$. The second path is negative because: the lines from d to $D(-)$, $D(+)$ to $G(+)$, $G(+)$ to $IA(+)$, and $IA(+)$ to $T(+)$ are all positive; the line from $D(-)$ to $D(+)$ is negative; the outcome T is positive; and the product of a negative sign and a positive sign is a negative sign. This means that d is connected to task failure more strongly than to task success.

SCT makes assumptions about how multiple paths and path lengths affect expectation states. If there is a path of length p_1 and a path of length p_2 that each connect a specified actor to a task outcome, as in Figure 6.7, then the combination of the paths is denoted by $p_1 \cup p_2$. More generally, if there are n paths p_1, \dots, p_n connecting an actor to $T(+)$ or $T(-)$, the combination of these paths is denoted by $p_1 \cup \dots \cup p_n$. The idea is that actors process all salient status information, so that if an actor is connected to a task outcome by multiple paths, the strength of the connection between the actor and the task outcome must take into account all such paths.

The strength of the connection between an actor to a task outcome via the combination $p_1 \cup \dots \cup p_n$ is given by

$$f(p_1 \cup \dots \cup p_n) = 1 - [(1 - f(p_1)) \times \dots \times (1 - f(p_n))] \quad (6.1)$$

Using the values $f(4) = 0.1358$ and $f(5) = 0.0542$ (derived in [72]), it follows that $(1 - f(4)) \times (1 - f(5)) = 0.8642 \times 0.9458 = 0.81736$. It is assumed that *every* pair of paths with one path of length 4 and the other of length 5 has a strength of (positive or negative) 0.81736. This assumption has led to behavior predictions that have been confirmed across a variety of actors and tasks.

In terms of Figure 6.7, then,

$$\begin{aligned} e(a) &= 1 - 0.81763 = 0.18264 \\ e(d) &= -[1 - 0.81763] = -0.18264 \end{aligned}$$

Table 6.1: An example of precedence relations

Actor taking precedence	Actor granting precedence	Symbolized
Counselor (w)	Social Worker (d)	wPd
Principal (a)	Social Worker (d)	aPd
Social Worker (d)	Teacher (z)	dPz

by a or d . Since expectation states are computed based on a graphical model, Figures 6.7 and 6.8 associate exactly the same expectation states to actors a and d .

Since, based on the hypothesized definition of the situation in either Figure 6.7 or 6.8, actors a and d expect the future performance outputs of actor a (d) to lead to $T(+)$ ($T(-)$), it would seem rationally necessary, *ceteris paribus*, for actor a to tend to take precedence in future task-related action and for actor d to tend to grant it. If such a tendency becomes stable, it is said that a social relation of precedence exists involving the two actors. This state is symbolized as aPd and represented graphically by $a \longrightarrow d$. Hence, a dimensionality tie between actors a and d may generate a social relation whereby actor a has precedence over actor d in future task-related activities.

A number of precedence relations may form between the members of a group. For example, suppose the group task is that of a Family Support Team: to identify whether a student is participating in a “physically abusive” social relation with a primary care-giver to the student. Suppose w represents a Counselor, a represents a Principal, d represents a School Social Worker, and z represents a Teacher. Suppose, for whatever reason that the relation of precedence indicated in Table 6.1 has formed. From Table 6.1, then, we can construct the precedence graph shown in Figure 6.9. Although a precedence graph contains no more information than a list of precedence relations, it does provide a compact representation.

6.4.6 Aggregate expectation states

Thus far, I have discussed only expectation states. In *SCT*, the expectation states associated with an actor x are summed over all positive paths (denoted ae_{x+}) and all negative paths (denoted ae_{x-})

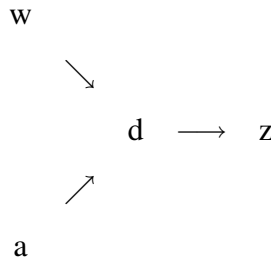


Figure 6.9: Initial precedence graph

yielding the *aggregate* expectation state associated with x , denoted by ae_x , where $ae_x = ae_{x+} + ae_{x-}$. If $ae_x < 0$, then a negative performance output by x is expected: that is, one believed to lead to $T(-)$. If $ae_x > 0$, then a positive performance output is expected.

What if additional precedence relations form so that Figure 6.10 represents the precedence relations between w , a , d , and z that exist at some time t_2 ? It has been observed in a number of social situations that when one actor w takes precedence over d and d takes precedence over z , it often occurs that w comes to take precedence over z . In this case, as shown in Appendix C, the fact that w and a have precedence with respect to z will result in a stronger expectation that a future performance output by either will lead to $T(+)$ and a stronger expectation that a future performance output by z will lead to $T(-)$. The aggregate expectation state of d is unchanged. So, changes in the precedence graph (social structure as *pattern*) may generate changes in the aggregate expectation states associated with certain actors.

The aggregate expectation state associated with actor a at time t_1 shapes the decision of actor a concerning which actor to address at time $t_2 > t_1$. In turn, such interactions provide the basis for the

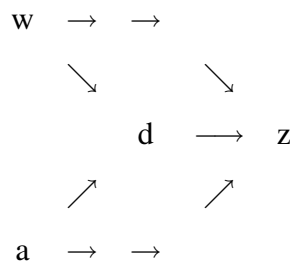


Figure 6.10: Successor precedence graph

formation of new precedence relations at time t_3 . Hence, structure (in the form of precedence relations) affects agency (in the form of communicative action) and agency affects structure. Whereas communicative actions are observable, and precedence relations inferable on the basis of observable behavior, the effect of each is mediated by unobserved/unobservable aggregate expectation states.

SCT and *EST*, as described here, ignore several obvious, and important, complexities of social settings. First, most situations involve multiple status characteristics. Although both have been extended to cover multiple status characteristics, as a first approximation, this study considers only a single status characteristic. Second, although *SCT* and *EST* acknowledge that performance outputs influence performance expectations, the emergence of a power and prestige order, and thus the task outcome, they do not provide a *dynamic* account of how this occurs. E-state structuralism makes it possible to do so.

6.5 E-STATE STRUCTURALISM

As discussed in Chapter 3, E-state structuralism integrates social network theory and *EST*. A social network is a collection of persons connected by (relatively strong or weak) ties (of affection, communication, dominance, etc.). In E-state structuralism, the expectation state $[HI,LO]$ is interpreted as a social relation between two actors. The collection of such relations over the group is represented as a precedence graph (or, equivalently, a network).

An E-state structuralist model is most precisely stated in axiomatic form. An axiomatic formulation encourages the systematic exposition, elaboration, and refinement, of the theory. The axioms describe how actors “decide” whom to address and how to respond when addressed by other actors. The meaning of each axiom is summarized below. Readers interested in the precise formulation of these axioms should consult [168].

Axiom 1. (Initial state) Each task is relatively unique, so there is no initial task-internal status ordering. Although this assumption can be relaxed to allow for initial task-internal status differences, I do not do so in order to simplify the study.

Axiom 2. (Relational stability). If the precedence relation aPd forms between a and d , it persists. This axiom is illustrated by advice sometimes offered to new teachers to establish order

by “cracking down” on students at the beginning of the school year [194]. Recall that precedence relations are not necessarily consistent with task-external status relations: certain behaviors by a member with low task-external status can lead to that member having precedence over others who may have *HI* task-external status.¹⁷

Axiom 3. (Interaction). If a addresses d , the probability that the precedence relation aPd forms depends on several factors. First, if a and d are status equals, then aPd can only form on the basis of behavior: such a tie is formed with probability π . Second, if a and d differ on task-external status, the probability that aPd forms depends on which is the higher status actor. If d is the higher status actor, the tie aPd can form, but only on the basis of behavior and does so with a lower probability: namely, $(1 - \eta) \cdot \pi$. If a is the higher status actor, then aPd can form on the basis of status or behavior: such a tie forms with a probability that is the sum of η and $(1 - \eta) \cdot \pi$. This formulation allows an actor a who is lower in task-external status than actor d to acquire a higher ranking on task-internal status than d .

Axiom 4. (Observation of interaction). If any bystander z observes a address d , one or more of the following four precedence relations may form: aPz , zPa , zPd , dPz . According to this axiom, interaction provides information to not only to the interactants, but also to the observers of the interaction. As this axiom depends upon whether a tie already exists between a and d and the status ordering of either z and a or z and d , the interested reader should consult [168, p. 1379] for a complete explanation. The point is that, under certain conditions, ties can form between bystanders and interactants via observation.

Axiom 5. (Behavior). *Each actor uses aggregate expectation states to select an actor to address.* The probability that a addresses d can be calculated at any time t since its value depends on the aggregate expectation states of the actors at time t [168].

A small, task-oriented, group begins with no task-related social structure (Axiom 1). As result, all actors have the same aggregate expectation state and by chance a particular actor a addresses another actor d (Axiom 5). A precedence relation between two interactants *may* form on the basis of differential task-external status *or* task-internal performance outputs (Axiom 3). If a precedence relation does form between any two actors, it endures for the lifetime of the task group (Axiom

¹⁷The relational stability axiom has been weakened in various ways, but I do not do so here in the interest of simplicity.

2). Not only do precedence relations form between interactants, but between observers and interactants (Axiom 4). Once at least one precedence relation has emerged, the selection of the next communication dyad is determined on the basis of the newly updated aggregate expectation states of the actors (Axiom 5).

Using E-state structuralist terms, the interplay of structure and agency can be described as follows. Agency (represented via task-related behavior) affects structure (represented via a network of social relations) and structure affects agency via aggregate expectation states. Thus, the cycle depicted in Figure 6.1 is complete.

6.6 STATUS AND TASK PARTICIPATION

A number of mathematical models have succeeded in reproducing the long-observed outcome in task-oriented discussion groups that status and participation rates are positively correlated. Few mathematical models of small group behavior have been able to explain the fact that low status individuals sometimes have higher rates of participation than high status members. The status and task participation model developed by Skvoretz and Fararo does so [168].¹⁸

Skvoretz and Fararo specify the E-state structuralist axioms listed above in terms of three system control parameters: η , π and θ (for a description, see [168]). The $\eta(\pi)$ parameter represents the probability that task-external status(task-internal behavior) is salient in the status organizing process. The θ parameter represents the probability that a tie forms between each bystander and one or both of the interactants. Via discrete-event simulation, they examine how the distribution of participation varies with η , π and θ . As described in Chapter 11, I use the same axioms as Skvoretz and Fararo, but only a small subset of the range of the parameters η , π and θ examined by them. Hence, this study has a narrower scope.

¹⁸Skvoretz and Fararo propose an auxiliary, sixth, axiom.

6.7 CONCLUSION

I have described the foundations of the status and task participation model of Skvoretz and Fararo which makes it possible to simulate the emergence of social order in a small, task-oriented, group. A small task-oriented group composed of ideal-typical educational professionals are likely, in the course of a collective deliberation, to draw on professional beliefs. The next task is to show how what Archer terms the Socio-Cultural system can be simulated on the basis of the status and task participation model presented here and on a model of belief.

7.0 SOCIO-CULTURAL SYSTEMS

7.1 AIMS OF THIS CHAPTER

The purpose of this chapter is to describe a process model of social influence, based on E-state structuralism, that relates a Cultural System and a Social System. In particular, I describe how individual belief and individual influence jointly determine the outcome of a collective decision process. The process model of social influence makes it possible to analyze outcomes in a simulated Socio-Cultural System in terms of its analytical components: namely, a Cultural System and a Social System.

7.2 INTRODUCTION

For Archer, the lived reality of the Socio-Cultural System (*SC*) is analyzable as the interaction of the Cultural System (*CS*) and the Social System (*SS*). I locate belief in the *SC*, but see it as grounded in what I call the Archive, which functions as a passive intermediary between the *CS* and the *SC*. The ability of actors to read and write the Archive depends upon their position in the *SS*, which is reflected in part by their task-external status.

This study concerns the collective decision of a Family Support Team concerning $A(c)$. The outcome depends on the beliefs of the actors and the influence they exert in the course of collective deliberation. Although the process by which each outcome is determined takes place in the lived world of a *SC*, it is analyzable via elements of a *SC*, what I have elsewhere termed the Archive and a *SS*.

Although they presuppose elements of the objective world, beliefs are elements of the sub-

jective world. Beliefs animate action and experience. For each case c , I assign to each actor a an initial belief, denoted $B_{i,a}(c)$, regarding $A(c)$: that assignment is based on an analysis of the previous experience of actors of the same type, as described in Appendix A. I locate beliefs in a SC and assume that, other things being equal, actors engage in communicative acts designed to bring about collective decisions consistent with their individual beliefs.

Assume one knows the values of $B_{i,a}(c)$ for each actor a participating in the Family Support Team deliberating on $A(c)$. One might simply assume that, since $B_{i,a}(c) \leq 0.5$ signifies a rejection of $A(c)$, one can determine the collective outcome democratically: that is, if the average belief in $A(c) \leq 0.5$, then the group also rejects $A(c)$. I term this the static model of belief because it assumes that actors cannot influence one another, so that the outcome is determined entirely by the beliefs of the actors, not by any interactions that occur during the Family Support Team Meeting.

In contrast to the static model of influence, one can allow one actor to influence another so that the beliefs of the target of influence move toward those of the source of influence. Although the model of status and task participation described in Chapter 6 does not itself represent the influence of each actor, it does provide information about the evolving task-internal status of actors that can be used to model interpersonal influence in a dynamic way.

7.3 A PROCESS MODEL OF INFLUENCE

Change of belief can be accounted for in terms of social influence in dyads [9]. In what follows, I describe the change in belief of an actor b after having been addressed by an actor a . In the language of Balkwell, b is the focal actor who is influenced by a . I further assume that the purpose of a addressing b is to influence b to change his mind in the direction of a 's belief regarding $A(c)$.

Let e represent the expectation differential between a and b , as described in Chapter 6 and in greater detail in Appendix B. e is computed as the difference in the aggregate expectation states of a and b : that is, e is a quantitative representation of the difference of how strongly a and b are connected to task success and task failure. If $e > 0$, then a has an expectation advantage with respect to b ; if $0 > e$, then b has an expectation advantage with respect to a . The probability that b maintains his belief at its current level is, using equation (7) from [9], is denoted by $p(S)$ and

Table 7.1: Updating belief: Examples

$B_{i,a}(c)$	$B_{i,b}(c)$	$p(S)$	$B_{u,b}(c)$
0.353	0.642	0.83	0.593
0.320	0.152	0.48	0.240
0.400	0.400	0.59	0.400

computed as follows:

$$num = \exp(0.472 + 0.632 \cdot e) \quad (7.1)$$

$$p(S) = num / (num + 1) \quad (7.2)$$

Hence, the probability that actor b changes her mind is given by the probability $[1 - p(S)]$ ¹

The value of $p(S)$ can be used to compute the degree to which the focal actor b changes her mind regarding $A(c)$ after being addressed by actor a :

$$B_{u,b}(c) = p(S) \cdot B_{i,b}(c) + [1 - p(S)] \cdot B_{i,a}(c). \quad (7.3)$$

In this equation, $B_{u,b}(c)$ represents the new belief of actor b regarding $A(c)$. Hence, the updated belief of b is a weighted average of the prior belief of b and the current belief of a .

It follows from this equation that if $B_{i,a}(c) = B_{i,b}(c)$, then $B_{u,b}(c) = B_{i,b}(c)$. If a has an expectation advantage with respect to b , then $p(S)$ will be relatively low, so that b will make a relatively large change his belief in the direction of a . So, assuming a and b disagree regarding $A(c)$ and $modelInfluence = T$, then actor b is always influenced by a , but the amount of influence depends on who holds the expectation advantage. Several examples of the computation are shown in Table 7.1.

Hence, under the process model, the *influence* of each actor depends upon both the task-external status distribution over the actors and the task-internal status of the actors. As interaction with the group unfolds, the beliefs of actors change. At the end of each simulated Family Support

¹The coefficients in the first, exponentiated logistic, equation are taken from Table 1 in [9].

Team meeting, a collection decision is made according to the following rule, where $B_{f,a}(c)$ denotes the final belief of actor a :

$$O_f(c) = \begin{cases} 0 & \text{if } \sum_{a=1}^5 B_{f,a}(c)/5 \leq 0.5 \\ 1 & \text{otherwise} \end{cases}$$

7.4 CONCLUSION

I propose to explain outcomes (in a *SC*) by reference to: (1) the initial beliefs (in a *SC*) which actors form (based on statements in the Archive) regarding propositions $A(c)$ and (2) changes in belief due to the task-external status (in a *SS*) or the task-internal status (in a *SC*) of each actor in a communication dyad. The simulation model by which the values of *influence* are obtained has also not been shown. These are the elements that are described in detail in the last part of the dissertation. Before describing the simulation model inputs, outputs, and outcomes, it is important to provide a larger, if less easily modeled, context.

8.0 CONTEXT: SOCIAL WORKERS AND REPORTING

8.1 AIMS OF THIS CHAPTER

This chapter is intended to provide background concerning the professional culture of school social workers and (indirectly) teachers. It is claimed that, during the period and in the place examined, school social work as a profession was de-professionalized. This suggests that school social workers might well enter the collective task of reporting child maltreatment with a task-external status lower than in previous times.

8.2 INTRODUCTION

In the 1970s, school teachers were added to the list of those professionals required to report suspected child maltreatment and are today the major source of such reporting [163]. Among all school-based reporting sources, cross-sectional data obtained during the Third National Incidence Study on Child Abuse and Neglect (NIS-3) suggest that educators were most likely to report the suspected abuse of elementary school children [163]. Moreover, reports from educators were much more likely to satisfy the technical definitions of maltreatment given in the NIS-3 than is indicated by the rate at which such reports were substantiated in Pennsylvania.

According to the National Child Abuse and Neglect Data System (NCANDS), Pennsylvania in 1995 reported approximately 8.29 children per 1,000 [103]. Using 1993 NIS-3 data and the conservative assumption that all children already injured or in danger of injury had been reported, one would expect 41.9 children per 1,000 to have been reported in Pennsylvania [163, p. 3-17]. Many states that, like Pennsylvania, provide child-based (rather than incident-based) statistics had report-

ing rates at least twice and in several cases seven times larger than Pennsylvania (NCANDS). This difference might have been principally due to a lower rate of child maltreatment in Pennsylvania or to factors depressing the reporting rate.

It has been a matter of dispute whether the enlistment of teacher in these crusades has been for better or worse. One analyst implies that schools report too many inappropriate cases [26]. On the other hand, one researcher suggests that schools address the “social problem” of child maltreatment in ways that “marginalize” it [184]. One way to prepare to operationalize the sociological concept of marginalization is to consider it from a historical perspective.

During the period from 1970 to 1984 child abuse reporting mandates were imposed upon educators in Pennsylvania. I here examine the issue of marginalization in that period as it was addressed by the Pittsburgh Public Schools (hereafter *PPS*), in particular the elementary schools. I employ the following primary source materials: Pittsburgh Public Schools, Records, 1870 – 1980 [hereafter referred to as *PPS-MSS*], found in the Historical Society of Western Pennsylvania; materials categorized under “school.discipline” in the Carnegie Public Library, main branch; and Annual Child Abuse Reports from the Pennsylvania Department of Public Welfare. Secondary sources include the *Pittsburgh Post-Gazette* (*PG*) and *Pittsburgh Press* (*PP*) newspapers.

I claim that, during the period in question, the *PPS* did indeed marginalize the reporting of child abuse. This was the result of de-professionalizing school social work and redefining the functions of school social workers. By 1984, building principals, rather than school social workers, were the locus of expertise and decision-making concerning the recognition, reporting, and response to child abuse.

I begin this chapter with an overview of the role of schools in the reporting of child maltreatment in Pennsylvania, describe that portion of the *PPS-MSS* that was examined, and note the initial findings. Next, I consider how the initial findings might be interpreted. In the third part, I resolve the conflicting interpretations noted by looking at other materials within the *PPS-MSS* and in other sources.

8.3 BACKGROUND

The first “Child Abuse Law” in Pennsylvania, known as Act 91, was signed in 1967 and took effect in 1968. The purpose of the act was to require reports of suspected child abuse so that protective services could be made available to prevent children from further injury or neglect and to preserve family life whenever possible [14, p. 5]. Pennsylvania Act 91 did not include teachers and school nurses among the persons required to report suspected child maltreatment, it was amended in 1970 to include both.

In the Spring of 1973, the Women’s Auxiliary of the Berks County Medical Society held a symposium on child abuse attended by Pennsylvania State Senator O’Pake of Reading. In January, 1974, the federal Child Abuse Prevention and Treatment Act was passed, 100 years after the first case of child maltreatment was brought to the attention of the New York Society for the Prevention of Cruelty to Animals [186, p. 13]. “After two-and a half years of intensive effort” [14, p. 5], during which Republican Governor Shapp vetoed the earlier Senate Bill 1166, Democratic State Senator O’Pake introduced Senate Bill 25 early in the legislative session of January 1975. “Senate Bill 25 underwent five legislative drafts before reaching its final form. Those various drafts also incorporated changes proposed by a number of concerned interest groups” [143]. The bill was passed unanimously by the Senate, overwhelmingly by the House, and signed into law on November 26, 1975, becoming Pennsylvania Act 124.

Between 1983, when Pennsylvania began keeping statistics on reporting sources, and 1999, school personnel have contributed an increasing proportion of the total number of reports filed. Perhaps in part reflecting difficulties in the investigative process, a very low and declining percentage of reports made by school personnel were substantiated upon investigation. Although school personnel who fail to report suspected maltreatment are subject to legal penalties, it is unlikely that these penalties were ever levied during the period in question.¹

¹An attorney familiar with such matters noted that he was unaware of any case in Pennsylvania involving prosecution for failure to report suspected child abuse. He also observed that even a search of legal records for such cases would not necessarily be conclusive.

8.4 PROVING A NEGATIVE?

Hoping to see how public schools in Pennsylvania anticipated and responded to Act 124, I examined a portion of the PPS-MS manuscript collection. It consists of 183 boxes (measuring 108 linear feet) of materials that were, at least officially, reviewed prior to their release. After scanning the fifty page archivist's index, I decided to focus on Series III: Assistant Superintendent Offices (1900 – 1982); Subseries 2: Elementary Schools Assistant Superintendent.

Of particular interest were the correspondence files for 1974 to 1979 since they covered the introduction of Act 124.² Using the index, I searched four boxes for relevant materials: Much of the examined material dealt with school closings, desegregation, collective bargaining, the impacts of federal funding under Title 1. With two exceptions, there are no explicit, direct, references to child maltreatment.

In 1974, an elementary teacher at Arsenal school was accused of exposing himself to several girls, all previously identified as “socially and emotionally disturbed”. Beginning as a few scribbled notes on a telephone message form, a running discussion among educators and students ensued, with the documentation becoming increasingly formal until the girls recanted. The relevant PPS-MSS materials include the full names of the children involved in the incident: Because of the Eastern European heritage of many Pittsburgh residents, several last names are unique and locatable in the 1998 telephone directory.³ It seems likely that systematic review of the materials by the PPS prior to their release would have resulted in the deletion of these and other sensitive data, such as personnel information. This suggests that PPS personnel did not “sanitize” the small part of the collection that I examined. Therefore, it seems reasonable to use (that part of) the PPS-MSS which I examined to make inferences about the level of PPS commitment to child abuse reporting.

The sole document using the phrase “child abuse” is a copy of the 1975 Pennsylvania Act 124. It is possible to interpret this scarcity of materials in two very different ways. First, it might be argued that unexamined portions of the collection could contain documents related to the reporting of child maltreatment. Indeed, anything is possible, but incidence data suggest that most reporting

²As an aside, the Assistant Superintendent of Elementary Schools during that period was future Superintendent Brennan.

³To reduce the likelihood of (additional?) breach of confidentiality of these persons, I do not cite the location of the materials related to the incident.

by educators involves elementary school children. While the absence of materials in this small portion of the collection does not prove system-wide “marginalization” of child abuse, neither does it provide evidence of commitment. This interpretation, which I call the guilt-by-omission interpretation, a lack of materials on child abuse reporting indicates marginalization. Second, the absence of materials may simply indicate the unproblematic nature of the requirement: as suggested by the presence of a copy of Act 124, educators may simply have followed the law by reporting child abuse when they suspected it. Under this interpretation, the presence of a copy of the legislation demonstrates, not a lack of concern, but a determination to abide by the law. Under this (the unseen compliance) interpretation, a lack of materials on child abuse reporting proves nothing vis-a-vis marginalization. I do not see how, on the basis of the documents examined, one can choose between these two interpretations of the sparse number of occurrences of the phrase “child abuse”.

The outline of contract negotiation priorities in 1978, developed by the Pittsburgh Federation of Teachers, included the following provision.

The Board agrees to assign school social workers . . . full-time at schools having higher than normal concentrations of pupils with social, personal, attendance, and educational problems. The Board further agrees to examine its present policy of assigning school social workers to schools in order that it may provide lower than normal “students per social worker” ratios at schools having higher than normal concentrations of pupils with social, personal, attendance, and educational problems. (PPS-MSS, Box 141, folder 5)

This suggests that the district was in fact allocating social work resources to schools where one might expect, for whatever reason, to find cases of child abuse. Nevertheless, I claim that, during the period in question, PPS marginalized the reporting of child abuse.

8.5 DE-PROFESSIONALIZING SCHOOL SOCIAL WORK

In May, 1975, the president of the Pittsburgh Federation of Teachers (hereafter denoted PFT) commented on the recent publication of Metropolitan Achievement Test results. After noting that the PFT did not oppose the publication of system-wide test scores, President Al Fondy said the results “indicate that there are significant learning problems in the schools . . . something . . . that teachers and the PFT have been saying for a very long time” (PPS-MSS, box 141, folder 7). Moreover, said

Fondy,

there is no doubt that there is a direct correlation between unacceptable disciplinary conditions in schools and unsatisfactory student achievement. This fact has been stressed for years by the PFT and must now be dealt with realistically and firmly by the School Board. (PPS-MSS, box 141, folder 7)

Fondy indirectly refers to the long-standing support by the PFT for reinstating the availability of corporal punishment in city schools, banned since 1968. To understand the PFT position on corporal punishment it is useful to examine a bit of the historical context out of which it emerged.

In 1970, having previously organized a “successful” strike to be recognized as a bargaining agent, the PFT proposed what the PG termed “school for agitators”. Noting that, under the then current system, “troublemakers” were simply transferred to other schools, PFT representatives called for one high school and seven elementary schools at a cost “in excess of \$1 million when the program hits full-stride” (PG, 3/24/70). The American Federation of Teachers (AFT), national counterpart of the PFT, offered a grant to the University of Pittsburgh to establish a program to train teachers to work at the special schools (PG, 3/18/70). Not surprisingly, this proposal drew strong opposition from local psychologists and others (PG, 3/20/70).

The associate Director of School Social Services termed the PFT plan a kind of segregation. School problems have several sources, according to Clara Colteryhahn: first, “the average child ... is confused because the discipline used by parents is inconsistent with that inflicted in the schools” (PP, 3/29/70); second, “we are grossly understaffed in terms of the load we carry. For one reason or another, our services are not recognized as being top priority”. In 1970, Colteryhahn supervised a staff of 69 school social workers, including five supervisors, with a ratio of 1 social worker to 1,000 students in the elementary schools.

By 1976 (the first year of implementation of Act 124) school social service priorities were changing in dramatic ways. The PPS-MSS shows two versions of a memo having “budget narrative” as its subject. Both versions, dated late July, 1976, proposed under the heading of “innovations” that the ratio of elementary school social workers to students would drop from 1 : 1,100 in 1975 to 1 : 1,300 in 1976, thus reducing the cost of social worker salaries and benefits. Might school officials, perhaps aware of the increased (state and federal) funding available for treating abused children [14, p. 7], have been “externalizing” PPS costs relative to the *treatment* of child abuse? With less need to *directly* treat the consequences of child abuse, the reasoning might be,

fewer social workers were needed.

The first version of the memo proposed the following functions for the department of social services:

1. To provide an integrated service approach to understanding and helping all children who have difficulty in school.
2. To provide casework and group work services to the family for the purpose of increasing understanding of child development and encouraging constructive participation in the educational process.
3. To participate in case consultation, to establish plans for the modification of the pupil's behavior and to offer appropriate exchange of professional assessment of each pupil's situation.
4. To assist parents in the use of school and community resources. (PPS-MSS, box 136, folder 1).

Function 2 is especially important for several reasons. First, it articulates the “method” that, in historical terms, has given social work its identity as a (semi-)profession: namely, casework. Second, it expresses the view of some professionals that child abuse often stems from a failure to understand what, on average, children can and cannot do at a given stage of development. Thus, function 2 pertains directly to the role of school social workers in the prevention, recognition, reporting and treatment of child abuse.

The second version of the memo categorizes school social workers as “regular” or ESEA , the latter being paid through Federal Title 1, ESEA (Elementary and Secondary Education Act), funding. The casework and group work function in function 2 noted above is replaced by the requirement “To enforce the compulsory attendance laws and encourage regular attendance” (PPS-MSS, box 136, folder 1). Hence, casework, a key element of the semi-profession was no longer an official part of the functions to be performed by school social workers.

With Pennsylvania Child Protective Service units mandated to provide “protective and preventive social counseling ... emergency caretaker services, shelter care, and medical services” [14, pp. 10-11], budget-constrained school administrators could perhaps reasonably argue that there was less need to have child abuse related functions performed by school social workers. The control of child abuse matters could, if not already so organized, be detached from the social work function and assigned to building principals.

Consider, by contrast, the management of school psychologists. A memorandum dated April 9, 1979 indicates that psychologists were rated by the Director of Special Education, but social workers were rated by the principal of their assigned base school with input from other principals (PPS-MSS, box 141, folder 5). This suggests that the position of associate Director of School

Social Services, to which school social workers reported in 1970, no longer existed. At precisely the time that one might expect school social workers to act as gateways to Pennsylvania Child Protective Services units, their professional standing within schools became less certain.

As already noted, the ratio of school social workers to students appears to have declined between 1970 and 1976. In discussing the 1984 budget, Superintendent Richard Wallace distinguished between mandated and non-mandated programs for students, noting that while curriculum is mandated, funding for SED (socially and emotionally disturbed) students came from separate, state, funding. Counseling and social work services were among the non-mandated programs for students (1984 PPS annual report, pp. 16-17). It appears that financial factors shaped the priority accorded to school social workers.

8.6 CONCLUSION

Among the direct consequences of a reduced social worker to student ratio would be a smaller number of potentially trained detectors and reporters of suspected child maltreatment, leading to a lower rate of reporting.⁴ The indirect, but perhaps more significant, consequences are threefold. First, the de-professionalization of school social work put greater demands on teachers to detect and respond to possible child abuse. Second, and related to the first consequence, if in-service training (presumably conducted by social workers) became more difficult to obtain, teachers were less likely to feel adequate to the task of recognition and reporting. Thus, child abuse was indeed marginalized in Pittsburgh Public (elementary) Schools during the period in question. Moreover, to the extent that social workers were seen as tied to the social problem of child abuse and its reporting, it is plausible child abuse reporting was perceived by others to be of minor importance in comparison with other objectives.⁵

⁴Further research is needed to determine what kind of training was provided for principals and teachers. No evidence of such training was found in the documents reviewed.

⁵Of course, this raises several questions that cannot be addressed here. How did social work staffing vary as a function of overall school budget? If social work was indeed reorganized, what were the consequences for the reporting of child maltreatment? Was it reduced? Or increased? What were the implications of this reorganization for elementary teachers? What were the motives and beliefs of the reorganizers and the reactions of those reorganized? What was the broader cultural context in which questions about child abuse and corporal punishment were entertained? These questions, while worthy of investigation, are beyond the scope of this dissertation.

9.0 CONTEXT: EDUCATOR REPORTING

9.1 AIMS OF THIS CHAPTER

The purpose of this chapter is to provide background on the professional cultures of educators as it relates to the reporting of potential child abuse. This chapter is based on a short-term ethnographic study. In particular, I interpret the helping behavior of educators in terms of a variety of material, social, and ideological constraints, suggesting that in the setting examined these constraints would have reduced the likelihood of an individual decision of report potential child maltreatment.¹

9.2 INTRODUCTION

The ethnographic fieldwork reported here was conducted during the 1997-1998 school year. After a brief exposition of the theoretical perspectives informing the research reported here, I describe the methods involved. I then describe how educators at the site understood child maltreatment in a practical way and conceptualized it. I then turn to a consideration of the material, social, and ideological factors that help explain why educators at the site reported as they did. In the conclusion, I offer some methodological suggestions aimed focused on the integration of cultural elements in the development of a theory adequate to the phenomenon of child abuse reporting by educators. When using material taken from field-notes, I will rely on the present tense.

¹An earlier version of this text was presented at the 1999 annual conference of the American Educational Studies Association.

9.3 THEORETICAL PERSPECTIVES

I propose to explain educator recognition and reporting of suspected child abuse from the perspectives of “psychological social psychology” and “sociological psychology” [35, p. ix]. According to the “bystander effect” model, if an intervention typically involves low reward and high cost, psychologically or otherwise, bystanders tend - often in an “unconscious” way - to redefine “emergency” situations so that intervention is not required [114]. The bystander effect is assumed to be a universal principle of human psychology in social life.

What places this study in the theoretical genre of “sociological psychology” is a consideration of the particular material and social factors that structure the cost to educators of reporting child maltreatment, and thereby affect their capacity to recognize (and, therefore, report) potential child maltreatment. Further, I suggest, educators draw upon certain widespread cultural beliefs, or theoretical ideologies, in interpreting ambiguous and/or contradictory situations [23]. Out of the raw material provided by theoretical ideologies, educators construct practical ideologies that help them account for what happens in concrete situations [166]. In effect, these material, social, and ideological factors provide values for the parameters that govern the operation of the bystander effect in specific contexts.

9.4 SETTING

Lincoln Elementary School (a pseudonym) is located in a Pennsylvania town that has experienced, among other troubles, substantial de-industrialization over the last several decades. The per capita income of school district residents is \$8,000, in sharp contrast to a nearby district for which the per capita income is \$32,000. The average salary of district teachers during 1993-1994 was approximately \$48,000. State assessment scores at Lincoln were among the best of the several elementary schools in the district, but the district as a whole was ranked among the lowest in the state.

Within a block of Lincoln Elementary stand several burnt-out, but not condemned, houses replete with gang graffiti. According to information provided by a school educator, early in the school year a group of gang members pulled up in front of the school with loaded weapons [202, 02/19/98, par. 7]. Perhaps related to the fear expressed by many European-American educators at

the school, the nearby Patella Funeral Home had donated to school a supply of wooden 12 inch rulers with its address and phone number printed on each [202, 02/19/98, par. 21]. A block further away, a modern brick building initially suggests business resolve or renaissance, but is seen up close to be empty, windows broken or boarded up, its walls inscribed with graffiti.

A predominantly African-American student body of approximately 450 contrasted with 41 largely European-American educators and staff. In the 1996-1997 school year, over 80 percent of Lincoln Elementary students were considered by the Pennsylvania Department of Education to be from 'low-income' families. By comparison, 75 percent of students in the district and 32 percent in the state met that same criteria.

9.5 METHODS

I conducted critical ethnographic fieldwork [36], [192, pp. 127-130] during the 1997-1998 academic year. I was at the site for approximately one hundred hours on nineteen different days. In addition to analyzing various administrative documents, I played the role of observer-as-participant [55] in and around the school building, on a field trip, and in classrooms. I interviewed approximately fifteen teachers at least once or twice for ten to twenty minutes during their daily planning period of thirty minutes.²

In employing the standard practice of using pseudonyms, I have drawn many from the pool of television characters over the last forty years, while others come from my experiences as a K-12 student. In some instances, my assignment of pseudonym is based on the occupational role of the person. In other cases, I have selected the pseudonym based on an retrospectively imagined similarity of appearance between the real person and the associated character/person. Finally, I sometimes choose a pseudonym simply as an aid to recalling a particular interaction. Because of the small number of educators involved, the views they offered, or the way in which they are portrayed by me or others, I have made special effort to obscure the identities of persons who would otherwise be more readily inferred.

²A similar district is described, with a different but related purpose, in [181].

9.6 FINDINGS

The findings reported in this study should be approached with caution. This chapter is largely based on rough field-notes written at the site or a short time later. As a result, I have opted mostly for paraphrasing and some quotations may not be exact. In order to correct errors of fact and interpretation, I provided to educators at the site several copies of a draft of a paper similar to this chapter and requested written comments. When none were forthcoming, I followed up with a telephone call and a message, but no reply was given. Email a year or two later with several educators who had retired made it clear that, not only did many of the educators at Lincoln disagree with my interpretations of what I observed and the meanings I associated with what was stated by educators in the interviews. No one contacted, however, questioned the accuracy of the descriptions given.

It appears that the readers accepted the factual aspects of the paper, but rejected its principal conclusion: namely, that educators at Lincoln were disposed to not see, and thus not report, potential child maltreatment. My interpretation of this reaction is that it is entirely consistent with the (largely understandable, if not necessarily acceptable) tendency of the educators at Lincoln to deny the occurrence of child abuse. In short, my paper presented them with possibilities about which they were understandably uncomfortable.

All adults at Lincoln Elementary took child maltreatment and its reporting seriously. Although many distinguished linguistically as well as conceptually between abuse and neglect, the term “abuse” was often used synonymously with “maltreatment”. Every teacher asked said that teachers ought to be required to report abuse. For example, Ms. Ursinas said “I would be moved to notify somebody if I saw a child being abused” [202, 11/21/97, par. 12]. Ms. Neal said “I don’t have kids, but . . . [I would report] if I saw it [abuse]” [202, 11/21/97, par. 110].³ The school nurse, other administrative personnel, and several community workers all voiced similar commitment to reporting child abuse.

Most teachers interviewed said they saw very little abuse among the children at Lincoln Elementary. Ms. Ursinas [202, 11/21/97, par. 7], Ms. Potts [202, 02/05/98, par. 37], Mr. Arnold [202,

³Seven years later, my interpretation is that in using the word “saw”, educators meant it in a literal sense, although my interpretation is based on a more global view of how educators viewed child maltreatment.

10/24/97, par. 8] and Mr. Preston [202, 11/12/97, par. 25] all indicated that they didn't see much abuse. Yet, several teachers acknowledged that abuse, or something like it, occurred. Mr. Lelania observed "the kids will flinch if you make any sudden moves, so that tells you that they're being hit at home" [202, 10/24/97, par. 8]. Although hitting does not entail physical abuse, physical abuse does entail hitting.

The educators interviewed seem to think of abuse primarily in terms of physical, rather than emotional, or sexual, abuse. Ms. Connor said, "I think many kids are abused or least neglected", adding that there was probably more neglect than abuse among Lincoln Elementary students [202, 12/12/97, par. 5]. This suggests that some educators are aware of the theoretical distinction between abuse and neglect.

Neglect poses several, related, practical problems for the educators working at Lincoln Elementary. While observing a reading session, I heard a child repeatedly complain of stomach pain in an easily audible, but restrained, way. After fifteen minutes or so, during which Ms. Seville did not respond, another child offered an explanation: "You're hungry" [202, 12/05/97, par. 45]. The comment seemed to settle the matter: the allegedly hungry child did not complain again and Ms. Seville remained silent. On other occasions, Ms. Potts said, "Well, we do see a lot of neglect, but if you start with that ..." [202, 02/05/98, par. 37] and Ms. Brooks indicated that neglect would be easier to detect in well-off communities because the affected children would stand out [202, 11/21/97, par. 136]. If one teaches poor children and one reports physical neglect, where does one *start/stop?*

Although some teachers seemed to think of neglect primarily in physical rather than emotional terms, others clearly, if implicitly, acknowledged the distinction. For example, Mr. Arnold commented that "little kids hang on me" and that they say "I wish you were my Daddy" and "I want to go home with you". As a result, he said, he "can tell they're not getting much affection at home" [202, 10/24/97, par. 8]. Although teachers, as part of their pre-service and on-the-job socialization, may have - like medical professionals - learned to manage the emotions that these interactions occasion [171], this was not without residue.

When asked how they responded if a child said to them "I wish you were my Daddy", several teachers seemed uncomfortable. In part this may have been because of the feelings generated by the particular type of student statement. Mr. Arnold replied "I say 'No you don't' or I ignore it"

[202, 10/24/97, par. 11.]. Mr. Preston noted “They don’t have a father here, so it is not surprising” [202, 11/12/97, par. 28]. When asked about his response to “I want to go home with you”, Mr. Preston said “They just want to go home with you - I don’t interpret this” [202, 11/12/97, par. 28]. Ms. Connor said she made a joke when kids asked if they could go home with her. Asked what she thought the question meant, she replied, “It varies, but some kids are just manipulative” [202, 12/12/97, par. 5]. It appears that although teachers may have a theoretical concept of emotional neglect, and appear to recognize instances of neglect among the students they teach, they generally do not view it as reportable [183].

Non-teaching educators seem to have more specific concepts of neglect. For Ms. Bloom, frequent failure by a parent to dispense medication to a child is a clear instance of physical neglect [202, 12/19/97, par. 38]. Non-teaching educators understand child maltreatment using concepts rooted in their professional training.

The so-called signs of child maltreatment are many and often ambiguous, as aptly captured by Mr. Preston and several others who seemed to use the expression “something’s going on” to refer to situations of potential child maltreatment. Despite the ambiguity, some signs are perhaps more trustworthy as bases for suspicion than others. The “probable signs of maltreatment” range in specificity from “low” to “moderate” to “specific” to “high specificity”: signs that are “specific” or of “high specificity” are associated with a high rate of “correct” identification [109].

Displays of aggression, or ‘aggressive acting out’, are considered moderately specific signs of physical abuse. On the assumption that the student is not acting in self-defense, most definitions of aggression probably include using an object to attack or threaten a teacher. Consider the following episode involving Danton, whose behavior, while less combative than it could have been, seems aptly characterized as “aggressive acting out”.

When we arrive at the classroom, Mr. Preston is holding the boy’s arms straight behind his back in order to subdue Danton. When released, Danton grabs a yardstick and makes threatening gestures towards Mr. Preston. I attempt to restrain him by wrapping my arms around him. After telling me to stop restraining Danton, Ms. Wayans picks him up by his clothes like a sack of potatoes, takes him into the boy’s bathroom, asking him all the while what is wrong. Danton says a little bit here and there, but mostly keeps struggling against her. Finally, she puts him over the sink, runs cold water on her hand and rubs it on his face, telling him at the same time to breathe deep. Later, Ms. Wayans asks him if it is necessary to call his mother; he says no. [202, 01/14/98, par. 81]

Danton’s threat can be viewed as a response to having his arms held behind his back. It seems

likely that this restraining tactic was a response by Mr. Preston to prior aggression from Danton or perhaps the result of in-service training. As a tactic designed to ensure the safety of the target, the tactic used by Mr. Preston was similar to mine; it seems that the tactics differ, however, in the intentional use of pain.

According to Ms. Arthur, “he [Danton] was hell when he was in kindergarten and 1st grade” [202, 11/14/97, par. 12]. Although noted for fighting with kids, challenging adults, and receiving numerous suspensions, Danton seemed to be generally liked by many educators at Lincoln. Yet, his behavior was judged to be of sufficient severity that, at the end of my fieldwork, plans were afoot to place him in a special state-run school for severely socially and emotionally disturbed children. I never heard anyone ask whether “something’s going on” or whether Child Protective Services (CPS) ought to be called.

It is not uncommon to believe that socially undesirable events occur someplace other than where one is located. In the view of Ms. Bloom, for example, who visited several district elementary schools in addition to Lincoln, the typical maltreatment case at Lincoln involved neglect, while the typical case at a nearby school involved abuse [202, 10/24/97, par. 67]. A Lincoln Elementary volunteer seemed to think it entirely natural that the district in which Lincoln was located would have a relatively high incidence of child maltreatment. When asked about her experiences in reporting child abuse, she replied that she had encountered only one suspicious case in her former, thirty-year, teaching career in a different, suburban, district. When asked if CPS had been called in, she indicated that school personnel had “investigated” and determined that no action was necessary. While this event may have occurred before the legal mandate to report suspected abuse, she seemed unaware that educators are “supposed” to report, not investigate, suspicions [123].

A verbal account is another “specific” sign of physical abuse [109]. The following two examples might involve “specific” signs of physical abuse. First, during a reading session conducted by Ms. Seville, a kindergarten or first grade child used the following sentence fragments: “sometimes my mommy smacks me. It’s not nice to smack somebody, but it happens” [202, 12/05/97, par. 45]. Second, Ms. Ursinas noted that children sometimes “spontaneously” tell her that they have been hit with some object by parents; in one instance, she additionally observed marks on a child that appeared to be from the zipper of a handbag [202, 01/08/98, par. 46].

While marks and a verbal account might not be evidence of maltreatment, they might well

constitute grounds for suspicion of abuse. Some researchers assert that mandated training is needed to insure that professionals, including teachers, know when and how to report suspected child maltreatment [152]. Asked if a school in-service on child maltreatment would be helpful, Ms. Ursinas stated that no more than a half-hour of in-service training would be needed, largely to allow veterans to help newer teachers [152, 02/05/98, par. 11]. On the assumption there was very little abuse at Lincoln Elementary, this is an entirely logical position. When facing what might be problematic behavior, or accounts, by students, physical abuse as a possible explanatory factor did not seem to be available to educators, even though many of them may have assumed that child abuse and neglect were fairly widespread within families sending students to the school.

9.7 EXPLAINING THE FINDINGS

I suggest that educators at Lincoln Elementary reported or did not report suspected child abuse for three reasons. First, because they needed to compensate for shortages brought about by economic scarcity, personnel were too busy to notice probable signs of maltreatment (a *material* factor). Second, they were reluctant to raise suspicions for fear of being seen as over-reacting or as racist (a *social* factor). Third, they accepted the need for corporal punishment and interpreted actual or imagined parental actions as instances of (“legitimate”) corporal punishment (an *ideological* factor). Although these factors are analytically separable, they are likely to operate together.

9.7.1 Material factors

Turn-of-the-century building architecture, especially what was originally something like an internal courtyard, generated constraints on the occupants of Lincoln Elementary. Although walls extending from floor to ceiling were eventually put up to keep students from falling over short railings on the second and third floors, the unintended and unavoidable consequence of this necessary act of enclosure was the creation of an acoustical canyon. Teachers had the option of closing their doors, but many kept them open. The sound emitting from several open doors created a roar in the hallway. Perhaps it is partly for this reason that the School Handbook emphasized a “zero noise” policy.

The age of the building created other difficulties. On my first day at the school, electrical wiring problems seemed to generate telephone and other equipment failures. On another occasion, after a bomb threat was received and classes canceled, it was necessary to notify parents and I was recruited. Since the electrical system supported only several telephone lines, both inbound and outbound calls would likely have faced considerable contention for use of the lines. On another occasion, part of the ceiling fell in a third floor classroom.

Space was a critical resource at Lincoln Elementary. According to Mr. Preston, the Lincoln Elementary school building was “too small” for the student population. Art and music teachers did not have offices; gym teachers shared the nursing office. The speech therapist worked with students in the common area on the first floor where there was generally a relatively high level of traffic, some of it producing considerable noise as unruly students made their way to the main office or the behavior modification room. During the research study, the faculty lounge was most often used as a reading classroom. During the previous school year, hallways had served as classrooms. Part of the hallway space was then given to the storage of supplies as part of the district’s attempt to cut the cost of facilities.

Personnel shortages were particularly vexing. During much of the fieldwork, the main office was without a full-time secretary. Substitutes were sometimes obtained from the district, but educational staff were occasionally directly recruited. Ms. Brooks encouraged me on several occasions to notify anyone that I knew who might be interested in substitute teaching to apply through the district. Some teachers were required to work in the main office.

Staffing shortages would seem to have also affected the process of recognizing and reporting potential child abuse and neglect. Although the district did have a psychologist on staff who visited on what I estimate to have been a biweekly basis, no social worker visited the school. With respect to school social workers, this arrangement may have been the outcome of a downsizing process similar to that which occurred earlier in the Pittsburgh Public Schools (as described in Chapter 8).

The students in classes of absent teachers were often distributed among the classes of those present. On one occasion, when four or more teachers were out, the “All Together Motivated” (ATM) reading block, in which students move to a classroom suited to their reading-level, was suspended. ATM literature indicated that the program involved restructuring the school around reading. Thus, teacher absences sometimes disrupted what might be termed the organizing princi-

ple of the school. The severity of the impact of absences resulted in one non-teaching staff member (but former classroom teacher) spending a considerable part of one year as a teacher.

Personnel shortages affected not only administrative and teaching activities, but also the possibility of teacher training. In one instance, the principal, reading specialist, and kindergarten teachers were forced to consider canceling three classes in order to permit the teachers to attend an out-of-building ATM in-service training session. At least one kindergarten teachers received in-service training by observing the in-building classrooms of ATM teachers in higher grades. This suggests that the provision of training in connection with child abuse and neglect would have been difficult.

In the serving of food, shortages of space and personnel combined. In many elementary schools, the gymnasium doubles as a cafeteria. At Lincoln Elementary, there were actually two gymnasiums, both fairly small but of unequal sizes. Mr. Popish supervised the children who participated in the free breakfast program that started at approximately 7:30 a.m. Children arriving after approximately 8:00 a.m. were turned away without food, or were able to eat only a bite or two, a source of antagonism between Mr. Popish, the affected students, and the food service staff. The pressure to close down the breakfast program at 8:00 a.m. came from two sources. First, the small gym needed to be cleaned in order that it could be used as a reading classroom. Second, and more importantly, Mr. Popish was obligated to perform grounds duty and students could not be left un-supervised.

Ms. Grace and others referred to lunch duty as “hell”: although some teachers worked it on a rotating basis, most declined. Several educators said they did lunch duty in order to give others a break: some indicated that extra pay was also involved. Grade K-2 students filled the smaller gym, and students in grades three to six occupied the larger gym. The younger children were required to sit idly, but quietly, for approximately 15 minutes while the older ones moved through a single serving line slowed by record-keeping in connection with subsidized lunches. On some days, younger students found it especially difficult to observe the “zero noise” policy: as many as 20 violators might be assigned to after lunch or after school detention. During the previous school year, there had been three lunch periods, reducing the length of time children in any one period had to sit, waiting to enter the line. Ms. Grace noted with some disdain that one faculty person vetoed the continuation of that arrangement because it cut faculty lunch time from one hour to 30

minutes. Planning periods had also been reduced from forty minutes to thirty minutes per day.

Between September 1997 and February 1998 one classroom of the fifth graders had three different regular teachers. Recruited to teach the previous year, one non-teaching educator had been considering early retirement. It would seem that providing education at Lincoln Elementary was a stressful affair, perhaps affecting the ability of educators to recognize and report potential child abuse.

A “helping” response is the contingent outcome of a sequence of five cognitive “choices” [114]. The first choice involves noticing that “something is happening”: unless that occurs, help will not occur except by accident. Experimental evidence suggests that preoccupation with other concerns affects whether a situation is noticed [11, p. 356]. Educators at Lincoln Elementary, as noted above, were occupied with both material constraints and their consequences. This constitutes a reason to infer their diminished capacity to notice probable signs of potential child maltreatment.

There was another, more general, reason why educators at Lincoln might have been preoccupied: district faculty had been working without a collective bargaining agreement for three years. Ms. Grace implied substantial resistance, especially from the union, to after-hours faculty meetings on the grounds that these would constitute unpaid work. Knowledge of this resistance, which was tied to systemic problems at least as much to individual personalities, may help account for the following. It was said that, when a community worker proposed a staff in-service on child maltreatment, Ms. Grace allocated three minutes [202, 02/05/98, par. 43]. On the other hand, near the end of the fieldwork, the idea of a maltreatment-related in-service was being given renewed attention. In any event, if educators (and districts) that lack time (and money) to formally consider the issue of child maltreatment, it seems likely that they also have a diminished capacity to notice probable signs of maltreatment.⁴

9.7.2 Social factors

Educators are not alone in their reluctance to intervene in certain situations. Ms. Connor said that, during the 1996-1997 school year, kids told her they visited the home of a classmate who then

⁴Whereas I suggest that labor disputes helped generate in educators at Lincoln a diminished capacity to recognize and report potential child maltreatment, it is strongly suggested in [181] that teacher unions were responsible for the downfall of a district quite similar to that considered here. The authors do not consider the question of, and the proper role of educators in connection to, child maltreatment.

“mounted” them. The situation was “handled” in the sense that the offending girl was not allowed to visit the homes of the visiting girls. No reports of suspected maltreatment were made to Child Protective Services [202, 12/12/97, par. 7].

Does this description of the child’s behavior suggest that sexual abuse occurred or was worthy of investigation? In recounting the case, Ms. Connor said that she thought she had a student who was being, in her words, sexually abused. Recall that individuals in Pennsylvania “who, in the course of their employment, come into contact with children are mandated to report suspected abuse when seeing a child whom they suspect to be abused” [104, p. 5]. While one might justifiably take issue with the division of labor implicit in this formulation, it seems clear that Ms. Connor *had* seen a child who she suspected of being abused and, therefore, ought to have reported or caused a report to be made.

That neither the parents nor the teacher intervened can be explained in terms of the cognitive model of helping behavior mentioned earlier. Once a situation has been noticed, it must be decided whether it amounts to an “emergency”. People are not sure exactly what is going on, and they tend to hold back, waiting for additional information. And the more ambiguous the situation, the less likely it is that help will be offered. “Because people may be reluctant to help in the first place, they are especially attentive to any information that suggests there is no need to be concerned.” [11, p. 358]. People hold back because they are fearful of over-reacting, of being embarrassed or even suffering harm. Thus, would-be helpers are constrained by social factors.

If ambiguity leads to cognitive re-framing, and therefore inaction, in situations more likely to be conceded as bona fide emergencies, how much more likely is this outcome when the perhaps more ambiguous situation of potential child maltreatment is concerned? For example, Ms. Connor evidently waited long enough to determine how the situation had been handled by the parents of the children who conveyed the story to her. The parents defined the situation as requiring isolation of the child rather than intervention. Ms. Connor accepted that definition, overriding her initial suspicions.

Bruises, welts, burns, and marks are probable signs of physical abuse that have high specificity and therefore have a high “correct” identification rate [109]. As noted earlier, Ms. Ursinas said she saw zipper marks on a child and thought perhaps the child was being abused. She acknowledged that she did not regard the treatment as “reportable abuse” [183] but rather as the result of “cultural

differences” concerning corporal punishment [202, 11/21/97, par. 7]. The reporting behavior of Mrs. Ursinas was not what the designers of the child maltreatment surveillance system intended, a finding that would not surprise organizational sociologists [102].

After noticing a situation and interpreting it as serious, the third step toward helping is to assume personal responsibility to act. Experimental evidence suggests that the more potential helpers there are, the less likely it is that any one person will assume responsibility and act [11, p. 353]. This phenomena, known as diffusion of responsibility, has been suggested as a possible explanation of what appear to be very low rates of child maltreatment reporting by Kansas educators [51].

The concept of diffusion of responsibility can be applied as follows. When Danton entered first grade and began to act unacceptably, his teacher was faced with managing his behavior and, therefore, with the question of its causes (and, perhaps reasons). The following year, knowing that the kindergarten teacher had experienced considerable difficulty with Danton, and that there had been substantial involvement by the school counselor and the principal, but that CPS was not called (or did nothing), his first grade teacher might naturally assume that Danton had not experienced “reportable abuse” and would therefore be less inclined to explore the possibility. In second grade, this process would be even more likely to repeat, perhaps less a matter of conformity than situation-specific rational imitation [98].

If helping has a high cost and low reward it is less likely to occur [114]. Ms. Ursinas and Ms. Neal each mentioned an incident for which they reported suspected child maltreatment. In each case, the parent correctly inferred who had reported, became very angry and confronted the teacher. Both teachers admitted to being fearful [202, 11/21/97, par. 12, 110]. Although one teacher said there wasn’t much conversation among teachers about child abuse reporting, shared knowledge of these parent-teacher interactions would raise the perceived costs, and according to the cognitive theory of helping, lower the probability, of intervention in situations involving potential child maltreatment.

9.7.3 Ideological factors

Reporting is often thought to lead to undesirable outcomes for students, parents, and teachers. Whatever they do, teachers are likely to feel guilty: they are caught in what is perceived as a no-win situation. Hence, there is an incentive to re-frame a situation involving potential child maltreatment as one that does not involve maltreatment. This re-framing occurs without conscious awareness [114]. Broad cultural beliefs, which I term ideological factors, may shape the way in which the re-framing occurs and thereby affect the capacity of educators to report suspected child maltreatment.

One possibility for avoiding a no-win situation is to somehow interpret personally objectionable behaviors by students and parents as expressions of African-American or poverty culture. Ms. Ursinas commented that several parents offered to come to school and, in her words, “beat” their children to insure their good behavior [202, 11/21/97, par. 10].⁵ She also suggested that, while she found such behavior personally unacceptable, she thought it did not cross the line of what was acceptable within “the community” and, therefore, was not reportable. Ms. Ursinas in effect exempted the poor, African-American, community in which she worked from the standards she felt applicable to the white, middle-class, community in which she probably lived. By restricting the application of her concept of abuse, Ms. Ursinas may have thus been able to avoid or reduce any moral discomfort from not reporting [112].

Another way to re-frame probable signs of maltreatment is to associate them with corporal punishment (CP). According to one observer, “there also is considerable opposition today [1994] to ending CP in schools ... [with] the nearly unanimous support of ... parents ... and the most vocal advocates being fundamentalist Christians, teachers’ organizations, and school boards” [176, p. 111]. Despite a broad acceptance of CP, there are differences concerning the forms it can legitimately take.

It has been stated that “CP has become a part of black culture in response to slavery and oppression” [4, 149, 176] and, when applicable, to the dangers of ghetto life [13, 15]. In response to the theory that CP increases the likelihood of physical abuse, each of two highly respected African-American social scientists are reported to have said “I was whupped, and I’m OK” [176,

⁵“In lower class language, the term ‘beating’ is often used as a generic term to refer to any form of corporal punishment, starting with a slap; just as in middle class language, the term ‘spanking’ is often used as a generic term to refer to all forms of corporal punishment, not just striking a child on the buttocks” [177].

p. 116]. After emphatically declaring that child abuse should not be tolerated, one community worker seemed to echo the view of the sociologists just quoted, saying “White people don’t know how to discipline their children” [202, 01/08/98, par. 70].

Although some teachers did not explicitly mention either African-American or poverty “culture”, they seemed to allude to one or the other. Mr. Preston seemed to assert the prevalence of single-parent families in the community [202, 11/12/97, par. 35]; Ms. English talked about boyfriends, drugs, etc. as elements of what she termed “the culture” [202, 10/31/97, par. 6]. It is not clear to what extent these comments represented views on race, class, or both.

The public suggestion that an African-American child might be maltreated might open a European-American teacher to a suspicion of racism. The only educator at Lincoln Elementary who spoke of race was Mr. Lelania, who unfavorably compared the academic performance of African-Americans to that of Vietnamese-Americans and said that the African-American parents at Lincoln Elementary did not encourage their children to do well at school [202, 02/19/98, par. 7]. Some research suggests that European-American teachers are disinclined to talk about race [162] or acknowledge institutional racism [169], even among themselves.

There is and has been considerable union support for CP in the schools under the banner of “community standards”. In 1976, the Pennsylvania Department of Education recommended that school districts follow “community standards” concerning the use of CP in schools, perhaps implicitly drawing on the fact that different cultures have different thresholds for what is considered abusive. A perhaps unintended consequence of this policy recommendation may have been to encourage the unintentional cognitive re-framing of signs of potential child maltreatment, especially physical abuse, as something thought by many to neither require nor warrant intervention: namely, corporal punishment.

There is anecdotal evidence that educators within the district do indeed re-frame potential physical abuse as corporal punishment. An African-American community worker related a story about a parent/guardian who used a belt on a child during a meeting with a principal and counselor. Six months later, the worker said, a report was made to Child Protective Services (CPS) concerning this child, which I took to mean that, in the view of the worker, the use of a belt ought to have triggered a call to CPS [202, 02/05/98, par. 40]. That it did not suggests that the principal and counselor involved (not necessarily from Lincoln Elementary) may have interpreted the behavior

in question as a form of CP and thus regarded it as legitimate.

Situations involving potential child maltreatment place educators in a dilemma [22]. Educators feel compelled to report “if they see it”, yet there appear to be definite costs, particularly for European-American teachers, for raising suspicions concerning the potential physical abuse of an African-American child. According to the cognitive model of helping behavior outlined above, the easiest way to avoid the guilt that is associated with reporting/not-reporting is to, somehow, come to view the situation as one that does not require intervention [114].

At Lincoln Elementary, most teachers interviewed having careers spanning fifteen to twenty years indicated that they had made one or two reports of suspected child maltreatment. The principal, nurse, and several teachers estimated that as many as five children had been reported to Child Protective Services during the 1996-1997 academic year [202, 10/24/97, par. 70; 01/08/98, par. 73]. Considering the setting from the perspective of the cognitive model of helping, what can be inferred from Pennsylvania statistics, and the amount of cognitive interference generated by material, social, and ideological factors, it seems likely that the incidence of parental maltreatment of children enrolled there was higher than the number reported.

9.8 CONCLUSION

Several years ago, the National Research Council advocated an “ecological” approach to the study of child maltreatment [50] in which “culture” figured as an element. It is consistent with the ecological approach to note that, like all individuals, educators are both constrained and enabled by the organizational, occupational, social, and cultural realities in which they are embedded [87, 187]. If so, then educator reporting of suspected child maltreatment “is determined not [solely] in terms of its concrete determinations or the subjective intention of the social actors but in terms of the relational constants among the basic constitutive elements” [158, p. 5]. I have presented in linguistic form a theory based on an ethnographic description of how material, social, and ideological conditions control the bystander effect in connection with the recognition and reporting of suspected child maltreatment. I now turn back to the task of specifying a model that, while not capable of generating the phenomena described here, attempts to take into account some aspects of the social and cultural realities in which elementary school educators are embedded.

10.0 INITIAL BELIEFS AND STATUS DISTRIBUTIONS

10.1 AIMS OF THIS CHAPTER

The purpose of this chapter is to describe two types of inputs to the simulation model described in Chapter 11. The first type assigns to each of five types of actor a level of initial belief regarding the proposition $A(c)$: There is reason to suspect that the child described by case c was physically abused by one of its natural parents. Initial belief change in response to social influence is structured, in part, by the distribution of task-external status across the five types of actor who meet, as members of a Family Support Team, to determine the *group* response to $A(c)$. The second type of input concerns that task-external status assigned to each member of the Family Support Team by virtue of their professional affiliation. Thus, this chapter provides the basis for concrete implementations of a Cultural System (based on belief) and a Social System (based on task-external status).

10.2 INTRODUCTION

The initial belief of each occupational type regarding $A(c)$ is modeled based on a set of $N = 111$ individual, actual, affirmative decisions regarding $A(c)$, each rendered by one individual, each one of the following five occupational types: Teacher, Principal/Administrator, Nurse, Social Worker, and Counselor. Although this list does not include all types of educator, it does include the majority. As noted earlier, this quantitative approach is an attempt to approximate, at less cost, results that might be obtained from an extensive ethnographic study of each occupational type working in Family Support Teams.

As suggested by the the ethnographic report given in Chapter 9, it is assumed that education professionals are not necessarily of one mind concerning the boundary between the physical abuse and the physical discipline that elementary school children may experience with parents. Each case is described by a set of features and, consistent with the view that the system of professions is marked by jurisdictional competition between the professions on the basis of “different exclusionary schemes in diagnosis, inference, and treatment” [1], a different set of case features appear to be salient for different occupations. As shown in Appendix A, a correlational analysis of actor beliefs confirms that view that education professionals often behave differently when confronted with cases having the same features.

10.3 DATA SOURCES

The most extensive attempts to gather quantitative *and* qualitative data relevant to the reporting of child abuse and neglect in the United States of America are the National Incidence Studies periodically mandated by the U.S. Congress. The data files associated with the Third National Incidence Study (NIS-3) have been made publicly available (for a small fee) by the National Data Center for Child Abuse and Neglect.¹ This dissertation draws on the so-called “Main Public Use File” of the NIS-3 quantitative dataset.

Each of the 6,486 records in the Main Public Use File corresponds to a child reported by a “sentinel”. Sentinels were defined by the NIS-3 study as persons asked to remain “on the lookout” for child maltreatment cases during the study period. The 5,612 sentinels who participated in the NIS-3 were not specifically trained to “recognize” child abuse and neglect, but were considered capable of recognizing children as “maltreated” [164, p. 1-3]. Each of five types of actor of interest in this study (Teacher, Principal/Administrator, Nurse, Social Worker, and Counselor) are represented in the Main Public Use File. I use data concerning sentinels to construct a behaviorally-based model of the initial belief of each actor of a given occupational type when considering the

¹The case data that formed part of the basis for this study were made available (in part) by the National Data Archive on Child Abuse and Neglect, Cornell University, Ithaca, New York. The data from the Substantiation of Child Abuse and Neglect Reports Project were originally collected by John Doris and John Eckenrode. Funding support for public distribution was provided by a contract (90-CA-1370) between the National Center on Child Abuse and Neglect and Cornell University. Neither the collector of the original data, funding agency, nor the National Data Archive on Child Abuse and Neglect bears any responsibility for the analyses or interpretations presented here.

proposition $A(c)$.

The Main Public Use File is regarded by the NIS-3 as a national sample, used for the purpose of estimating incidence rates. Each case record in Main Public Use File represents 213 different attributes [164, p. 2-15], some of which might not defined for a particular case. For the purposes of this dissertation, however, the NIS-3 Main Public Use File is simply a superset of data from which a subset is extracted. I now describe how the subset of the Main Public Use File used in this study was constructed.

10.4 THE BEHAVIORAL DATA

Given the different purpose for which it was constructed, many of the 213 attributes shown in each record of the Main Public Use File are of no immediate value for this study. The initial subset I constructed is based simply on the values assigned to each of the following seven attributes:

- (1) the family income level (INCOME);
- (2) whether the family received Aid For Dependent Children (AFDC);
- (3) the age of the child at the time of the incident (AGE);
- (4) the sex of the child (SEX);
- (5) the race/ethnicity of the child (ETHNICITY);
- (6) the number of in-home natural parents (INHOME);
- (7) the occupation of the sentinel (OCCUPATION).

The following kinds of records in the NIS-3 Main Public Use File were *excluded* from consideration: (1) those provided by a non-School agency; (2) those associated with children younger than six or older than eleven; (3) those for which the source of “recognition” was other than School; (4) those not associated with the occupations of Principal/Administrator, Social Worker, Nurse, Teacher, or Counselor; (5) those for which the sentinel categorized the possible maltreatment as other than physical assault; (6) those for which neither natural parent resided with the child. By excluding these types of records from consideration, a dataset was obtained for which each relevant attribute was defined. I have capitalized occupational designations, such as Teacher, in order to emphasize that the persons who occupy the positions of Teacher, etc., are represented as types of actors in the simulation.

As noted earlier, each case record in Main Public Use File represents 213 different attributes [164, p. 2-15], some of which might not defined for a particular case. When applied to the Main

Public Use File, the restrictions described in the previous paragraph yielded R , a dataset of $N = 111$ records. Tables 10.1 through 10.7 provide information about each of the attributes in the dissertation dataset.² Ignoring the last row, Table 10.1 suggests that sentinels who reported were most likely to report children from the most economically disadvantaged families, although the absence of correlated family size information makes it impossible to determine the income per family member. Table 10.2 does *not* provide strong evidence for the claim that sentinels who reported were more likely to report children receiving AFDC. Table 10.3 suggests that, other things being equal, sentinels who reported were most likely to report children aged 7, although the distribution is bimodal. Other things being equal, Table 10.4 indicates that sentinels who reported were more likely to report a male child. Other things being equal, Table 10.5 indicates that sentinels who reported were most likely to report White children. Given that most children in the U.S. are White, this is not surprising. Table 10.6 suggests that sentinels who reported were most likely to report children from families with both natural parents in the home. On the (somewhat questionable) assumption that most children in the U.S. live in a house occupied by both parents, this is not surprising. Table 10.7 suggests that sentinels who reported were most likely to be Counselors.

Tables 10.1 through 10.7 are in some sense misleading since they provide a collection of univariate information about R whereas each case is actually multivariate in nature. For this reason, it is important to relate the behavior of each sentinel to those attributes that were *salient* for that type of sentinel when considering a *case*. In effect, then, I am assuming that, each member of a profession acts entirely in accordance with the other members of that profession. Since this dissertation focuses on differences *between* professions rather than differences *within* professions, this radical simplification should be less troubling than it otherwise would be.

10.5 CLASSIFICATION RULES

In order to identify those attributes and their values that are salient for each type of sentinel, I use what is called a *machine learning program*.

²The names of several attributes in the NIS-3 study were changed: from CHSEX to SEX; from ETHNIC to ETHNICITY; and from INHSTATP to INHOME. The tables also provide the numeric codes (NCODE) used in the NIS-3 and the alphabetic code (ACODE) that I used.

Table 10.1: Family income (INCOME)

NCode	Meaning	Count	Percent
1	< 15K	40	36
2	$15K \leq \text{INCOME} < 30K$	27	24.3
3	$30K \leq \text{INCOME} < 45K$	6	5.4
4 or 9	$\geq 45K$ or Unknown	38	34.2

Table 10.2: Aid to families with dependent children (AFDC)

NCode	ACode	Meaning	Count	Percent
1	Y	Yes	29	26.1
2	N	No	26	23.4
9	U	Unknown	56	50.5

Table 10.3: Child's age (AGE)

NCode	Count	Percent
6	16	14.4
7	25	22.5
8	17	15.3
9	12	10.8
10	22	19.8
11	19	17.1

Table 10.4: Child's sex (SEX)

NCode	ACode	Meaning	Count	Percent
1	M	Male	65	58.6
2	F	Female	46	41.4

Table 10.5: Child's ethnicity (ETHNICITY)

NCode	ACode	Meaning	Count	Percent
1	AP	Asian/Pacific	2	1.8
2	NA	Native American	1	0.9
3	BL	Black	22	19.8
4	HI	Hispanic	25	22.5
5	WH	White	61	55

Table 10.6: Natural parents in home (INHOME)

NCode	Count	Percent
1	47	42.3
2	64	57.7

Table 10.7: Sentinel occupation (OCCUPATION)

NCode	ACode	Meaning	Count	Percent
1	SW	Social Worker	26	23.4
2	NU	Nurse	7	6.3
5	TE	Teacher	31	27.9
8	CO	Counselor	44	39.6
9	AD	Principal	3	2.7

A computer program is said to **learn** from experience E with respect to some class of tasks T and performance measure P , if its performance at tasks in T , as measured by P , improves with experience E . [134, p. 2]

The particular machine learning program I use, called RIPPER, employs an information-theoretic approach to produce sets of if-then rules from R . Performance is measured by how well, overall, RIPPER predicts the actual consequent given the actual antecedents. RIPPER was chosen in order to obtain easily interpretable rules and because of its relatively high level of performance [43].

Each rule produced by RIPPER has the form $CONSEQUENT : \neg ANTECEDENT$, in contrast to the usual form $ANTECEDENT$ followed by $CONSEQUENT$. An $ANTECEDENT$ consists of one or more conditions, each specified in the form $(a = v)$ and a $CONSEQUENT$ designates a sentinel occupation. For example, rule (03) is read as “If AGE=6 and SEX=F then OCCUPATION=TE” indicating that if the child in question is aged six years and female, then the sentinel reporting is a Teacher.

Rules that pertain only to small subsets of instances may be retained despite the fact that they have low predictive quality *with respect to that subset*: Although the dataset R contains three records for which the actual sentinel occupation was AD, only one of these records satisfies the $ANTECEDENT$ of rule (20). Using information gain as a criteria for keeping or deleting previously generated rules, RIPPER favors rule sets that minimize predictive error over the entire set of instances.

Rules (1) through (20) suggest that, with the exception of Principal/Administrator, several sets of case features are salient for each type of sentinel. Rule (20) functions as a default, reflecting the

fact already noted that when a sentinel reports, the sentinel is most likely to be a Counselor. The rules are unordered and no two sets of conditions are identical, although many overlap. Since the value of OCCUPATION is already known for each record c in R , the point of constructing rules (1) through (20) cannot be to predict that value.

10.6 INITIAL BELIEF

I distinguish initial belief from final belief, since it is hypothesized that participation in a small, task-oriented group will lead members to change their initial beliefs in response to attempts at influence by other members. As constructed, the initial belief data do not model the reasoning processes of the actors to which they are attributed and, thus, cannot be claimed to play an evidentiary role for the actors themselves. The initial belief data model the behavioral dispositions of actors.

The initial belief model attempts to represent how each sentinel *would have* reacted to each of the *other* 110 cases had they considered them. I use templates (1) through (20) to estimate $B_{i,s}(c)$, the initial belief of sentinel s regarding proposition $A(c)$, where s ranges over the five types of sentinel and c ranges over all $N = 111$ records in dataset R . A model of how each sentinel of a given type *would have* reacted to each case is then used, in Chapter 11, as a proxy for the initial belief each simulated actor of a given type would form regarding $A(c)$.

When considering a case c and a sentinel s , there are two possibilities: either s actually reported c or did not. Suppose s is the sentinel who reported case c to the NIS-3 study: in this instance, $B_{i,s}(c)$ is assigned the value 1.0 to indicate the complete assent of s to $A(c)$. Suppose s is not the sentinel who reported c : in this instance, the value assigned to $B_{i,s}(c)$ depends on the degree to which the features of case c were salient to s . If the features were salient, then $B_{i,s}(c)$ is assigned a value strictly between 0.0 and 1.0, thereby indicating that the response of s to $A(c)$ would be something strictly between complete belief and utter disbelief. If the features of case c were not salient to s , then $B_{i,s}(c)$ is assigned the value 0.0 to indicate utter disbelief.³ By this means, a value of $B_{i,s}(c)$ can be assigned for every case c in dataset R , for each sentinel s .

³One might object that the value assigned should be 0.5 rather than 0.0. On the account of belief I have given, salience of any degree produces some level of initial belief by s regarding $A(c)$, so that complete lack of salience must imply utter disbelief.

$B_{i,s}(c)$ is not a probability, but it is based on a set of probabilities. $P_s(a = v)$ is the probability that, for sentinels of type s , the attribute a takes the value v . For the purpose of differentiating between types of actors, the values of $B_{i,s}(c)$ need not be accurate in an absolute sense: it is sufficient that they be comparable and computable. After describing how the values of $P_s(a = v)$ are computed, I describe the calculation of $B_{i,s}(C)$ when s is other than the sentinel who actually reported the case to the NIS-3 study.

10.6.1 Probabilities

Let D_s denote that subset of R for which the attribute OCCUPATION has the value s . $P_s(a = v)$ is computed based on a subset D_s of R . Let N_s signify the total number of records in D_s and $n(s, a, v)$ denote the number of records in D_s such that attribute a has the value v .

$P_s(a = v)$ is calculated as follows, where $|x|$ denotes the number of elements in the set x (rather than the absolute value of x):

$$N_s = | \{records \in D_s\} | \tag{10.1}$$

$$n(s, a, v) = | \{records \in D_s : a = v\} | \tag{10.2}$$

$$P_s(a = v) = n(s, a, v) / N_s \tag{10.3}$$

$P_s(a = v)$ is an empirical estimate of the probability that, for a sentinel of type s , attribute a has the value v .

To illustrate the use of these formulas, consider sentinels of type $s = AD$. It turns out that, as shown in Appendix A, dataset D_{AD} contains the following three records, each indicating an positive reporting experience:

CASE	INCOME	AFDC	AGE	SEX	ETHNICITY	INHOME
58:	2	N	10	M	BL	1
74:	1	Y	8	M	WH	1
75:	1	Y	7	F	WH	1

Applying equations (10.1) through (10.3), with $a = INCOME$ and $v = 2$, we have:

$$N_{AD} = 3$$

$$n(AD, INCOME, 2) = 1$$

$$P_{AD}(INCOME = 2) = \frac{1}{3}$$

Similarly, we obtain the following probabilities:

$$P_{AD}(INCOME = 2) = \frac{1}{3}, P_{AD}(INCOME = 1) = \frac{2}{3}$$

$$P_{AD}(AFDC = Y) = \frac{2}{3}, P_{AD}(AFDC = N) = \frac{1}{3}$$

$$P_{AD}(AGE = 10) = P_{AD}(AGE = 8) = P_{AD}(AGE = 7) = \frac{1}{3}$$

$$P_{AD}(SEX = M) = \frac{2}{3}, P_{AD}(SEX = F) = \frac{1}{3}$$

$$P_{AD}(ETHNICITY = BL) = \frac{1}{3}, P_{AD}(ETHNICITY = WH) = \frac{2}{3}$$

$$P_{AD}(INHOME = 1) = \frac{3}{3}$$

Note, for example, that the sum of the probabilities given is, for a particular attribute, equal to 1.0.

Likewise, the dataset D_{SW} describes the $N_{SW} = 7$ positive individual reporting experiences of sentinels of type SW.

CASE	INCOME	AFDC	AGE	SEX	ETHNICITY	INHOME
24:	2	U	10	M	BL	1
25:	9	N	7	M	BL	2
26:	2	N	6	M	BL	2
33:	9	U	10	F	WH	1
35:	2	N	7	M	WH	2
39:	9	U	7	F	AP	2
54:	9	U	6	M	BL	1

For sentinels of type SW, we obtain the following probabilities:

$$\begin{aligned}
P_{SW}(INCOME = 2) &= \frac{3}{7}, P_{SW}(INCOME = 9) = \frac{4}{7} \\
P_{SW}(AFDC = Y) &= \frac{0}{7}, P_{SW}(AFDC = N) = \frac{3}{7}, P_{SW}(AFDC = U) = \frac{4}{7} \\
P_{SW}(AGE = 10) &= P_{SW}(AGE = 6) = \frac{2}{7}, P_{SW}(AGE = 7) = \frac{3}{7} \\
P_{SW}(SEX = M) &= \frac{5}{7}, P_{SW}(SEX = F) = \frac{2}{7} \\
P_{SW}(ETHNICITY = BL) &= \frac{4}{7}, P_{SW}(ETHNICITY = WH) = \frac{2}{7} \\
P_{SW}(ETHNICITY = AP) &= \frac{1}{7}, P_{SW}(INHOME = 1) = \frac{3}{7}, P_{SW}(INHOME = 2) = \frac{4}{7}
\end{aligned}$$

After calculating a complete set of probabilities just shown, I calculate the values of $B_{i,s}(c)$ using the method described in Appendix A.

10.6.2 The initial belief of sentinels

$B_{i,s}(c)$ is calculated from the values of $P_s(a = v)$, using the heuristic described in Appendix A. That heuristic may be summarized as follows: Make $B_{i,s}(c)$ a monotonic increasing function of the number of attribute-value pairs shared by the case record and the prior experience of actors of type s .

The initial belief of sentinel s regarding $A(c)$ is denoted by $B_{i,s}(c) \in [0, 1]$. When $B_{i,s}(c) = 0$, this signifies that s denies $A(c)$. When $B_{i,s}(c) = 1$, this signifies that s affirms $A(c)$ and when $B_{i,s}(c) = 0.5$, this signifies that s is epistemically neutral regarding $A(c)$. Although $B_{i,s}(c)$ can take on any value between 0.0 and 1.0 inclusive, its value for each s and c pair is fixed.⁴

Perhaps the most important advantage of representing belief as a real number is that the value to be assigned to $B_{i,s}(c)$ can be computed as a function of a particular c and the positive reporting experience of sentinels of the type s . On the other hand, qualitative information about the nature of individual reporting is lost to the extent that it is not adequately captured by the computed values $B_{i,s}(c)$. In the remainder of this study, I do not distinguish between *sentinels* of occupational type s and *reporters* of occupational type s , and simply identify actors and their occupational types. Hence, in the simulation model, I make the initial assignment $B_{i,a}(c) = B_{i,s}(c)$.

⁴It is possible, however, to individualize the initial beliefs of actors by considering the value of $B_{i,s}(c)$ as a measure of central tendency. As a first approximation, I have opted for the simpler approach just described.

10.7 STATUS DISTRIBUTIONS

Motivated by the approach in [205], I assign to each actor a a task-external status based on the organizational resources that they control. Table 10.8 designates a status (of *H*(igh), *M*(iddle), or *L*(ow)) for each: Principal, Counselor, Teacher, Nurse, and Social Worker based on the organizational assets controlled by each type of education professional, following the analysis of Wright. I do not claim that Table 10.8 best represents the actual distribution of status. I believe the assignment shown is a plausible one for typical elementary schools in the United States. From a *psychological* social psychology viewpoint, it is quite right to consider personality as a potential determiner of *task-internal* status. From the perspective of *sociological* social psychology [115, pp. ix–xiii], however, it is the task-internal behaviors generated by such personality characteristics that are of interest in explaining the emergence of dominance or precedence structures in small, task-oriented, groups. Variations of this baseline status assignment are described in Chapter 11.

10.8 CONCLUSION

Are results that depend on the dataset R also restricted to the dataset R ? Since dataset R was obtained from a national sample of sentinels, it seems the best available (if imperfect) model of sentinel behavior and hence the best source of data for parameterizing an model of initial belief. Results obtained on the basis of these data are best regarded as theoretical in nature, but empirically informed.

It was asserted in Chapter 4 that quantitative-only analyses are necessarily deficient in an explanatory sense. The above analytical approach outlined above is subject to the same criticism. Yet, such a description is not without value since it provides information that can play an evidentiary role in a *bona fide* explanation. The next task is to specify the broader set of inputs to the simulation model, as well as the outputs and outcomes that model generates.

- (01) AD :- AFDC=N, AGE=10, INHOME=1.

- (02) TE :- INCOME=3.
- (03) TE :- AGE=6, SEX=F.
- (04) TE :- INCOME=2, AGE=6.
- (05) TE :- INCOME=2, AGE=7, SEX=F.
- (06) TE :- INCOME=9, SEX=M, ETHNICITY=WH.
- (07) TE :- INCOME=9, AGE=7, INHOME=1.

- (08) NU :- ETHNICITY=AP.
- (09) NU :- AGE=10, ETHNICITY=HI.
- (10) NU :- AGE=11, AFDC=Y, ETHNICITY=HI.
- (11) NU :- INCOME=1, SEX=M, ETHNICITY=HI.
- (12) NU :- INCOME=1, SEX=F, ETHNICITY=WH, INHOME=2.

- (13) SW :- INCOME=9, ETHNICITY=NA.
- (14) SW :- AFDC=N, AGE=6, ETHNICITY=BL.

- (15) CO :- INCOME=2.
- (16) CO :- AGE=9, ETHNICITY=HI.
- (17) CO :- INCOME=1, ETHNICITY=BL.
- (18) CO :- INCOME=9, SEX=M, ETHNICITY=HI.
- (19) CO :- INCOME=1, AFDC=U, SEX=M, INHOME=2.
- (20) CO :- If no previous rule applies to case *c*.

Figure 10.1: Salient features for each sentinel type

Table 10.8: Baseline status assignment

Occupation	Status
Principal	H
Counselor	M
Social Worker	M
Teacher	L
Nurse	M

11.0 THE SIMULATION MODEL: INPUTS, OUTPUTS, AND OUTCOMES

11.1 AIMS OF THIS CHAPTER

The intent of this chapter is twofold. First, I list and describe program inputs, outputs, and the processes by which simulation program inputs are transformed to simulation program outputs. Second, I present a set of statistical analyses of the outcomes of the simulated experiment. The simulation programs are written in Java using the channel-based process communication provided by the *JCSP (Java Communicating Sequential Processes)* library [196]. By doing so, I provisionally complete the task of representing a Socio-Cultural System (a Family Support Team) in terms of its two analytical components: a Social System (based on the distribution of task-external status) and a Cultural System (based on beliefs).

11.2 INTRODUCTION

A number of experimental and observational studies over a half century suggest that the influence of an actor in a small, task-oriented, group is highly correlated with the quantity of their participation.¹ Those who participate most/least in a small, task-oriented, group generally have the most/least influence. One of the purposes of this study is to use simulation to assess whether two different models of influence generate different outcomes in a particular kind of small, task-oriented, group.

¹For a brief review of this literature, see [203, 168].

Table 11.1: Control variables and values

Variable	Value
<i>interactions</i>	375 per meeting
<i>lifeMeetingTime</i>	2,400,000 milliseconds
<i>timeScaleFactor</i>	1,200 milliseconds
<i>timeForSimulation</i>	2,000 milliseconds
<i>lifeThinkTime</i>	6.4 seconds
<i>mockThinkTime</i>	5.33 milliseconds
<i>lifeDelayGiddens</i>	0 seconds
<i>mockDelayGiddens</i>	0 milliseconds
<i>lifeDelayArcher</i>	7.2 minutes
<i>mockDelayArcher</i>	360 milliseconds

11.3 SIMULATION VARIABLES

In order to distinguish between certain simulation variables and what they represent, I prefix some variables with “mock” and what they represent with “life”. The value assigned to *interactions* in Table 11.1 is derived from an empirical study of small, task-oriented, groups [172]. From that study I derived an average interaction rate and used it to calculate the average number of dyadic interactions that might occur amongst five group members meeting for forty minutes. In this study, I use the value of *interactions* in two ways: first, to estimate a “think” time for each actor, and; second, as a stopping criteria for each run of the simulation.

The value of *lifeMeetingTime* is 2,400,000 milliseconds, equivalent to forty minutes. The passage of one millisecond of clock time during a simulation run represents the passage of 1,200 milliseconds in the group meeting that is being simulated by that run: hence, the *timeScaleFactor* is 1200. Hence, to simulate a meeting of 40 minutes in length requires that a simulation run last approximately

$$timeForSimulation = lifeMeetingTime / timeScaleFactor,$$

Table 11.2: Bookkeeping variables

Variable	Description
c	A case number (0 – 110) associated with a decision
$A(c)$	A proposition regarding case c
$runId$	Identifier of a distinct run using a particular set of inputs

which is equal to 2 seconds. To allow for future incorporation of a cognitive component into the actor model, I assume that, after actor b is addressed by actor a , b “thinks” about the content of the communication. Initially, the “thinking” of each actor is simulated via a delay of $2000/375 = 5.33$ milliseconds, so that $mockThinkTime = 5.33$ milliseconds, corresponding to a actual delay of $1200 \cdot 2000/375 = 6400$ milliseconds, or 6.4 seconds.

As discussed in Chapter 2 Archer maintains that, for Giddens, structuration occurs instantaneously, so that

$$lifeDelayGiddens = mockDelayGiddens = 0.$$

Archer does not, however, associate any values with structuration delay. For lack of a better value, I assign to $lifeDelayArcher$ the value 7.2 minutes, which corresponds to $mockDelayArcher = 360$ milliseconds. It is an empirical (simulation) question as to what value, if any, of $mockDelayArcher$ might produce systematic differences in the output variables of interest to this study. Each run of the simulator models a meeting of a Family Support Team. Family Support teams are small groups of school professionals that sometimes meet to decide whether a case, indexed by c , of possible child abuse should be reported to external authorities. As argued in Chapter 6, each meeting of a Family Support Team can be legitimately modeled as a small, task-oriented, group to which the model of status and task participation developed by Skvoretz and Fararo is applicable.

As shown in Table 11.2 the outcome of each simulated Family Support Team meeting is a (simulated) affirmation or negation of an abuse-related proposition $A(c)$. As described below, each the behavior of the simulator is governed by a set of input variables. If the simulator is run an additional time with the same set of input variables, this constitutes a replication of the (simulation) experiment. The values assigned to the variables η , θ and π in Table 11.3 were drawn from those

Table 11.3: Input variables and values

Variable	Value(s)
η	{0.625, 0.75}
π	{0.50}
θ	{0.25}
$B_{i,a}(c)$	Initial belief of a : For each c , a fixed value $\in [0.00, 1.00]$
\overrightarrow{status}	{(H, M, M, L, M), (H, M, M, M, M), (M, M, M, L, M), (H, M, M, H, M)}
$theoryId$	{GiddensTheory, ArcherTheory}

used in the simulation study of Skvoretz and Fararo [168]. The η parameter represents the degree to which task-external status differences are salient in the status organizing process. To assess variation in the weight actors give to status differences, the parameter η is varied. For the sake of simplicity, I assume in this study that ties are: (1) most likely to form on the basis of status difference (η); (2) more likely to form on the basis of behavior (π); least likely to form on the basis of observation (θ). The values assigned to η , π and θ reflect that ordering.

$B_{i,a}(c)$, the initial belief of actor a regarding case c , is a fixed real number between 0.0 and 1.0 inclusive. Values of $B_{i,a}(c)$ less than 0.5 reflect negation regarding case c ; values greater than 0.5 reflect affirmation; and the value of 0.5 reflects epistemic neutrality. The computation of $B_{i,a}(c)$ is described in Appendix As, along with values for each actor a and each case c . In addition, an analysis of the correlation between actor beliefs is presented which is consistent with the assumption that actors from different professions have different (initial) beliefs regarding the physical abuse of elementary school children by parents.

The value of the variable \overrightarrow{status} is one of the four vector elements shown in Table 11.3. Each element represents an assignment of one of the three status values L, H, M to each of five actors. In their study of status and task participation, Skvoretz and Fararo distinguish two levels of status: H and L . As described more fully in Chapter 10, I distinguish between three levels of task-external status based on an adaptation of Wright's typology of middle-class locations. In particular, the values L, M , and H designate the amount of organizational resources controlled by an actor of a

given professional type, which I equate with what Wright terms a middle-class location.

Although there are 243 possible ways to construct a status distribution, I have chosen the the four shown in Table 11.3 because they highlight the ways in which an actor who is a Teacher and an actor who is a Principal can differ on task-external status. Status distribution *HMMLM* reflects the amount of organizational resources currently held by each type of actor [205]. As noted in Chapter 9, there is reason to expect that a Principal (actor 1) and a Teacher (actor 4) have different views regarding physical abuse. The other three status distributions were constructed in order to assess how differences in the task-external status of two focal actors, the Principal and the Teacher, might affect the collective decision process.

One aspect of this study is to use the method of E-state structuralism to assess whether, as modeled here, the theoretical dispute between Archer and Giddens over structuration time systematically affects the variables $O_f(c)$.

$$mockLag2Tie = \begin{cases} mockDelayGiddens & \text{if } theoryId = GiddensTheory \\ mockDelayArcher & \text{if } theoryId = ArcherTheory \end{cases}$$

Once the task-internal status order is complete, no additional ties are formed, so the values assigned to *mockLag2Tie* are irrelevant.

Each run of the simulation generates values for each of the variables listed in Table 11.4. In each such run, *participation(a)*, the *number* of times *a* addressed some other actor is recorded.² The value of *participation(a)* is a random variable generated via pseudo-random number generation controlled by the simulation parameters π , η , and θ .

11.4 HOW THE OUTPUT VARIABLES ARE DETERMINED

11.4.1 Outcomes under the static model

As described in Chapter 7, under the static model of influence, actors cannot change their minds so that the outcome of each simulated collective decision regarding a case *c* is determined by whether

²The abstractness of the simulation model and the rudimentary nature of the simulation engine is such that there is no mechanism for modeling the dependence of *participation(a)* upon *c*.

Table 11.4: Output variables

Variable	Description
$O_i(c)$	Outcome under $\vec{B}_i(c)$: yes = 1; no = 0
$B_{f,a}(c)$	Final belief of actor a regarding $A(c)$
$O_f(c)$	Outcome under $\vec{B}_f(c)$: yes = 1; no = 0
<i>step2equilibrium</i>	Number of interactions from start to structural equilibrium
<i>time2equilibrium</i>	Elapsed clock time from start to structural equilibrium
χ^2	Statistic concerning systematicity of belief change
<i>participation(a)</i>	The number of interactions in which actor a addresses some other actor

the average belief regarding c is closer to the value representing utter disbelief (namely, 0.0) or to utter belief (namely, 1.0).

11.4.2 Final beliefs

In the simulation, change of mind is not a binary affair. The value of $p(S)$ is used to compute the degree to which the focal actor b changes her mind regarding $A(c)$. In each simulation run, actor b updates his belief regarding $A(c)$ according to the following equation:

$$B_{u,b}(c) = p(S) \cdot B_{i,b}(c) + [1 - p(S)] \cdot B_{i,a}(c). \quad (11.1)$$

Hence, the updated belief of b is a weighted average of the prior belief of b and the current belief of a .

Belief updating continues throughout the simulation, but the amount of influence exerted during any single interaction by any one actor on another is variable, depending on the expectation states of the actors, which are themselves in flux. If the pattern reaches structural equilibrium, defined by the existence of a tie between every pair of actors, whenever an actor a addresses an actor b , b 's belief will change, but by a fixed amount. The last value of $B_{u,b}(c)$ is assigned to $B_{f,b}(c)$.

11.4.3 Outcomes under the process model

Under the process model of influence, the outcome of each simulated collective decision regarding a case c is determined by whether the average final belief regarding c is closer to utter disbelief (namely, 0.0) or to utter belief (namely, 1.0).

11.4.4 Variables for checking the simulation and for future analysis

The values of *step2equilibrium*, *time2equilibrium*, and χ^2 were collected in order to check the correctness of the simulation and for future, secondary, analysis. Each of the 3551 simulated social networks reached structural equilibrium after an average of 10.21 dyadic interactions: that is, a set of 20 ties existed amongst the actors. The fact that fewer than twenty dyadic interactions were involved in explained by the bystander effect, in which observers of direct interaction may form ties to one or both of the observed interactants.

11.5 NUMBER OF SIMULATION RUNS

For each case c , two simulation runs were made for each *combination* of values of the input variables. For the six input variables listed in Table 11.4, there are a total of $2 \cdot 1 \cdot 1 \cdot 1 \cdot 4 \cdot 2 = 16$ combinations of six values that can be formed. Hence, each experiment has one replication. A minimal, factorially complete, experiment requires $16 \cdot 111 = 1,776$ distinct runs of the simulator. With one replication, this implies 3552 distinct runs. Because of various delays that are built into the model, each replication of the experiment requires approximately 4 hours of elapsed time. The data summarized below is based on two sets of 1776 simulation runs, with one run missing (due to a boundary condition programming error).

11.6 OUTCOMES

Having described the input and output variables, I now present the outcomes produced by the simulation model. After identifying the features of the outcome data that are salient for this study,

Table 11.5: Outcomes under static versus process influence model

Number of Agreements	Number of Disagreements	Total	Proportion of Agreements
2464	1087	3551	0.694

I use other output data to try to furnish an explanation of the outcomes obtained.

As Table 11.5 indicates that, in most instances, the static influence model and the process influence model operating in the context of the status and task participation model yield identical outcomes. It is perhaps reassuring that the outcomes obtained under the two models of influence are not wildly divergent since the static model does represent a commonsensical, if crude, understanding of group decision-making. On the other hand, sociological common-sense suggests that status matters in group decision-making, so one would expect the simulation model outcomes to reflect that understanding, and they do.³ Attending only to agreement totals can, however, be misleading. It is of practical and theoretical interest to examine how often the models yield discrepant outcomes. Note that the values shown in the first row and column of Table 11.6 are obtained by adding up the values of $O_i(c)$, whereas those shown in the second row and first column are obtained by summing the values of $O_f(c)$. A 2-sided Fisher exact test indicates that the attained statistical significance of the observed difference in proportions, under the null hypothesis of their equality, is $1.517e-09$.⁴ Overall, the process influence model results in more affirmative decisions than the static influence model. Since a democratic decision process is assumed where each actor casts a vote, this suggests that, as expected, some actors exert more/less influence than others and that this is a systematic phenomena.

Given the the two influence models agree more than they disagree, it seems useful to focus on the disagreements, since only these can matter in a practical way. I begin by showing the total number of disagreements between the two models, then refining the analysis by decomposing the total into four components, each corresponding to one of the status distributions under consideration.

³The size of the discrepancy between the observed proportion of agreements and the hypothesized proportion of 0.50 is 0.38, an effect considered at least “small” in every discipline that uses statistical methods (except, perhaps, sociology) [90, p. 303].

⁴The effect size, however, is quite small.

Table 11.6: Comparison of the static and process influence models

Influence model	Number of runs w/ Outcome=1	Number of runs w/ Outcomes=0	Total Number of runs	Proportion of runs w/ Outcomes=1
Static	1760	1791	3551	0.4956
Process	2015	1536	3551	0.5675

As shown in Table 11.7, the static and process influence models can differ in two ways. The static influence model may yield a 0, while the process influence model yields a 1, which occurs in 671 instances: this is termed a (0,1) discrepancy. The static model may yield a 1, while the process model yields a 0, which occurs in 416 instances. It appears that a (0,1) discrepancy is more likely than a (1,0) discrepancy.

A χ^2 goodness of fit test using a 2x1 table with entries 671 and 416 (per [117]) yields a statistic of 59.82, which is highly statistically significant. Thus, we can reject the null hypothesis that a (0,1) discrepancy is equally likely as a (1,0) discrepancy. On that basis, and assuming the existence of status effects, we should expect to find statistically significant differences between the effects of the status distributions on the number of (0,1) discrepancies, an expectation I now examine.

One of the aims of this study is to assess whether systematic differences in task-external status generate systematic differences in collective decision outcomes. For this purpose, I regard each status distribution as a treatment applied to each group. One can then ask whether each such

Table 11.7: Over all status distributions: Static versus process outcomes

	Process = 0	Process = 1	Total Static
Static = 0	1120	671	1791
Static = 1	416	1344	1760
Total Process	1536	2015	3551

Table 11.8: Status HMMLM: Static versus process outcomes

	Process = 0	Process = 1
Static = 0	296	152
Static = 1	100	340

Table 11.9: Status HMMMM: Static versus process outcomes

	Process = 0	Process = 1
Static = 0	256	192
Static = 1	120	320

treatment is more likely to yield a (0,1) or a (1,0) discrepancy between outcomes produced via the process influence model and those produced via the static influence model.

Tables 11.8 through 11.11 provide evidence that differential effects are associated with the status distributions. In each instance, the number of (0,1) discrepancies exceeds the number of (1,0) discrepancies. The statistical significance of the differences between the number of (0,1) discrepancies exceeding the number of (1,0) discrepancies is tested via the same method used for Table 11.7. Table 11.12 lists the results from testing the null hypothesis that (1,0) and (0,1) discrepancies are, under each status distribution, equally likely.

As indicated by the values of χ^2 in Table 11.13, there is, for each status distribution, statistical evidence to reject the null hypothesis of no difference between the static and process models

Table 11.10: Status MMMLM: Static versus process outcomes

	Process = 0	Process = 1
Static = 0	264	183
Static = 1	88	352

Table 11.11: Status HMMHM: Static versus process outcomes

	Process = 0	Process = 1
Static = 0	304	144
Static = 1	108	332

Table 11.12: Statistical significance: Static versus process outcomes

Status distribution	χ^2	p-value
HMLM	10.73	0.0011
HMMMM	16.62	4.558e-05
MMMLM	33.30	7.888e-09
HMMHM	5.14	0.0234

of social influence. Hence, it appears that the process influence model is more likely to generate affirmations of $A(c)$. The proportion of $(0, 1)$ discrepancies for status distributions *MMMLM* and *HMMHM* is, respectively, 0.675 and 0.571. Under the null hypothesis of no difference, the probability of obtaining an absolute difference as large as 0.104 is (as yielded by a two-sided Fisher exact test) 0.0148. None of the other paired comparisons were significant at or below the nominal $\alpha = 0.05$ level. This means that, with respect to changes in outcome under each influence model, one of the pairwise differences in the distribution of task-external status mattered, in accordance with the view that sometimes status differences matter and sometimes not.

As indicated in Table 11.13, each theory of structuration time (Giddens' or Archer's) is associated with a disproportionate number of the runs yielding a $(0, 1)$ versus a $(1, 0)$ discrepancy: that is, there are more $(0, 1)$ than $(1, 0)$ discrepancies than would be expected under a null hypothesis of no difference in $(0, 1)$ versus $(1, 0)$ discrepancies. A Fisher exact test indicates that the *difference* in proportions, however, is not statistically significant, indicating that there is no reason to believe - based on the simulation outcomes - that there are any systematic differences in the proportion of runs with $(0, 1)$ discrepancies generated under the two models of structuration time: namely, 0.700

Table 11.13: Structuration time: Archer versus Giddens

Theory	Number of runs w/ (0,1)	Number of runs w/ (1,0)	Proportion of runs w/ (0,1)	χ^2	p-value
Giddens	344	220	0.700	27.76	1.776e-07
Archer	327	196	0.625	32.81	1.015e-08

versus 0.625.

11.7 EXPLAINING THE OUTCOMES

How is it that a difference in task-external status distributions is associated with a difference in the proportion of discrepancies between the static and process model of influence? In their study of task and task participation, Skvoretz and Fararo (1996) showed that the the number of interactions initiated by an actor varied with the task-external status distribution over the group. As shown in Table 11.14, that finding is replicated in this study. The average participation of *H/L* status actors is greater/less than that of actors of the other two status levels.

Within each task-external status distribution, the values of *participation(a)* are ordinally consistent with the predicted outcomes: participation is positively correlated with task-external status rank. For *HMMLM*, the Principal has *H* status and an average participation of 88.01 whereas the Teacher has *L* status and an average participation of 61.63. *Across* task-external distributions, the value of *participation(a)* for individuals with the same task-external status is not uniform. For *HMMLM*, the Principal has an average participation of 88.01, whereas for *HMMHM*, that value is reduced to 85.75. Hence, the relationships amongst the values for participation are in accord with those noted in [168].

The importance of these differences, both within and across status distributions, in explaining the outcomes described above is that they describe the number of occasions on which the receiver of the communication was influenced by the sender of the communication. Even though a structural

Table 11.14: Average participation by each actor type

Status distribution	Principal	Social Worker	Nurse	Teacher	Counselor
<i>HMMLM</i>	88.01	75.90	75.25	61.63	75.21
<i>HMMMM</i>	87.58	72.94	71.74	71.92	71.83
<i>MMMLM</i>	77.89	79.24	79.43	60.51	78.93
<i>HMMHM</i>	85.75	68.46	69.23	85.08	67.49

equilibrium was attained after an average of 10 dyadic interactions, group members continued to interact.⁵ Although actors with higher task-internal status initiated communication more often than actors with lesser task-internal status, the fact that lower status actors can address higher status actors allows for lower status actors to influence the beliefs of higher status actors. Nevertheless, the fact that $\eta = 0.75$ makes status differences very salient in organizing group interaction.

Given enough interactions, all actors hold essentially the same equilibrium belief regarding $A(c)$. For each of the 3551 simulation runs made in this study, each of the actors ended with final beliefs that agree to three decimal places. Convergence in opinion is consistent with work by Friedkin and Johnsen [77].⁶

The mere existence of differences in task-external status do not alone explain the differences in the outcomes generated under each status distribution. The key issue is the extent to which status differences are salient in the status organizing process. The input parameter η gives the probability that a tie will form between two interactants based on a difference in task-external status. The p-values shown in Table 11.15 suggest that, with respect to each each row, the null hypothesis of no

⁵As part of their study, Skvoretz and Fararo examined a group of six actors, each ranked H or L , with $\eta = 0.75$, $\pi = 0.50$, and $\theta = 0.25$. With these parameters, convergence occurred on average after approximately 20 dyadic interactions. Further investigation is needed to explain why structural equilibrium occurred more quickly in the present study.

⁶Since the simulation produces a sequence of dyadic interactions, it also generates a sequence of belief vectors of length five. $B_{u+1,b}(c)$ is a convex combination of $B_{u,a}(c)$ and $B_{u,b}(c)$, and so approaches $B_{u,a}(c)$. This means the variance of the values in the $(u + 1)$ th belief vector is strictly less than the variance of the values in the u th belief vector. Hence, the simulation defines a non-increasing sequence of real numbers that is bounded below. Since that sequence of real numbers must (by the monotone convergence theorem [93, p. 39]) converge to zero, the associated sequence of belief vectors must itself converge to some constant vector.

Table 11.15: The effect of status salience on discrepancies

eta	Number of runs w/ (0,1)	Number of runs w/ (1,0)	Proportion of runs w/ (0,1)	χ^2	p-value
0.750	323	224	0.591	17.92	2.307e-05
0.625	348	192	0.644	45.07	1.904e-11

difference in the proportion of (0, 1) discrepancies between the static and process influence models ought to be firmly rejected.

Recall that η is the probability that a status difference, if it exists, is salient to the actors in a small, task-oriented, group such as a Family Support Team meeting. Do the two values of η examined in this study generate, via interaction, outcomes that differ in the proportion that are (0, 1) discrepancies? A Fisher exact test based on all four count cells (containing 323, 224, 348, 192) indicates that the *difference* in proportions is moderately statistically significant, yielding a p-value of 0.071, although the effect size is fairly small. The small effect size is perhaps explainable in part by the small difference between the two values of η . In sum, the data in Table 11.15 indicate that the static and process influence models are increasingly discrepant, in favor of affirmations, when task-external status differences are less salient. In more substantive terms, this means that, in cases where the static and process models would disagree, interventions (see [41]) that succeeded in dissociating task-external status from the task of deciding the truth of $A(c)$ would lead to more changes toward the affirmative decision than toward the negative decision.

12.0 SUMMARY AND CONCLUSIONS

12.1 INTRODUCTION

In this chapter I restate the research questions posed in Chapter 1 and the findings of this study with respect to those questions. I then consider the theoretical, methodological, and practical implications. Finally, I assert a number of limitations to the applicability of these findings that should be kept in mind and a set of possible extensions by which those limitations might be addressed.

12.2 RESEARCH QUESTIONS AND ANSWERS

12.2.1 Question One

Do the decision outcomes generated by a process model of social influence (based on the status and task participation model) systematically differ from the decision outcomes obtained from a static model of social influence? As described in Chapter 11, the chief finding of this study is that, as applied to the group task of child abuse reporting, the outcomes obtained from the process model differ systematically from those obtained from the static model of social influence in the sense that the number of collective-decisions on which the two models yield discrepant results is larger than what would be expected by chance.

12.2.2 Question Two

Does the theoretical difference in how time is represented in realist social theory and structuration theory have practical import? As construed by Archer, Giddens' view of structuration is that

social ties form at the same instant as some precipitating action, whereas in the view of Archer, tie formation requires some amount of time. As described in Chapter 11, I take the actual time delay until a tie is formed to be 0 minutes for Giddens and (more or less arbitrarily) 7.2 minutes for Archer. The finding of this study is that, as modeled, the theoretical difference between Archer and Giddens concerning structuration time does not produce a systematic, larger than expected by chance, difference in simulated group decision outcomes. In short, essentially the same outcomes are obtained regardless of whether the time to form a tie is zero or the larger value I have stipulated in this study.

12.3 IMPLICATIONS OF THESE FINDINGS

12.3.1 Theoretical

Although there are a number of models of social influence, some of which attempt to interpret expectation states in terms of social influence [77], this study is the first instance I know of in which a model of social influence is built on top of the model of status and task participation developed by Skvoretz and Fararo. The virtues of this approach to modeling social influence is consistency (with earlier work in expectation states theory and E-state structuralism) and simplicity.

12.3.2 Methodological

This dissertation takes a simulation approach to the study of social influence in small, task-oriented, groups. The simulation is expressly framed to allow a comparison of the social theories of Archer [6] and Giddens [86] on the basis of how they conceptualize one aspect, namely the temporal, of structuration. In addition, by virtue of its comparison of the static and process models of social influence, this study suggests the utility of simulation for tracing socio-cultural processes over the long (or at least longer) term and thereby providing elements for the comparison of social theories.

12.3.3 Practical

Although the static model and process model of social influence agree in most instances regarding the set of cases described, the number of discrepancies are not small and, in human terms, may well represent a considerable cost to the children, families, and education professionals involved in child abuse reporting. As asserted by some, misguided interventions by educators are destructive to children, families, and schools. On the the other hand, educators who fail to intervene when appropriate condemn the affected children to continued harm and precondition the society to the longer term affects of child maltreatment. To the extent that the detailed findings of this study suggest conditions under which more/less educator reporting might occur, it may serve as fodder to those policy analysts who have argued that child abuse in the United States is over/under-reported [26, 42, 71].

12.4 LIMITATIONS

As noted earlier, a limited number of experimental conditions were examined via simulation. There is no question that the scope and precision of the findings would be increased by the consideration of additional experimental conditions and replications. In future work, I expect to cover the entire set of experimental conditions, whether by simulation alone or simulation plus mathematical/statistical analysis.

Another limitation of the study is that I have represented the theoretical dispute between Archer and Giddens concerning the temporality of structuration by reducing it to a parameter: namely, the time required for a structural link to form. It may be the the negative finding of this study with respect to Question 2 simply reflects a poor choice of values or it may be that the simulation mechanism does not properly represent structuration delay. Based on the assumption made in this study that the task-related social relations pertinent to small, task-oriented, groups form within the duration of a single meeting, it may be that it takes longer than than 7.2 minutes for a social relation to form. I expect, in conjunction with the additional simulation work, to consider both of these possibilities.

My initial plan was to construct an ethnographic decision model [24, p. 371-385] for each

actor. As I discovered in the ethnographic research leading to Chapter 9, the time demands for this would be extreme. Moreover, having concluded in Chapter 4 that such a qualitative study could not provide evidence of regularity, I decided to base the belief models on quantitative, rather than qualitative, data. Those interested in collective decision-making as it concerns educators and child abuse ought to invest in the construction of ethnographic decision-models [24], as they promise a relatively more adequate representation of the beliefs and intentions of actors from different educational professions.

12.5 POSSIBLE EXTENSIONS

In addition to remedying the deficiencies and pursuing certain remedies noted above, I foresee several extensions to this dissertation. First, it is important to extend the dynamic model by drawing on sociolinguistic accounts of the relationship between social distinction and linguistic behavior: In particular, it is important to augment the bare notion that actor *a* addresses *b* with a representation of socio-linguistic, especially argumentative, behavior. Second, and related to the previous extension, it is important to endow belief-as-modeled with the power to constrain social action as modeled: currently, belief plays no such constraining role in the unfolding interaction. Work in these areas would go far to making the simulations and their results more believable and, thus, of greater import to social theory and action as it pertains to educational theory and practice.

APPENDIX A

INITIAL BELIEF

A.1 AIMS OF THIS APPENDIX

The purpose of this Appendix is to show how, for each case c , the initial beliefs of each type of actor regarding $A(c)$ are calculated. Although it would be preferable to construct a probabilistic belief model derived entirely from the axioms of probability, I was unable to do so. Instead, I settled for a heuristic that can be described, roughly, as follows. $B_{i,a}(c)$ measures the similarity between the features of case c and a classification rule for actor a shown in Chapter 10: The more similar they are, the closer to 1.0 will be $B_{i,a}(c)$. Although psychological fidelity is important, in this study the focus is on deriving consequences from assumptions that are merely plausible rather than establishing how actors of each type form initial beliefs regarding cases.

A.2 INTRODUCTION

As noted in Chapter 10, each case c is represented by seven features: family *INCOME* and *AFDC* status (namely, whether the family receives Aid For Dependent Children); the child's *AGE*, *SEX*, and *ETHNICITY*; *INHOME*, whether a parent lives in the home of the child, and; *OCCUPATION*, the occupation of the school professional that affirmed $A(c)$. Each feature can also be thought of as an attribute a that takes on some value v , so that the case record for c can be equivalently represented as a collection of attribute-value pairs, hereafter referred to as $R(c)$. Each

of the twenty classification rules listed in Chapter 10 can be equivalently represented as a set of objects of the form $(a = v)$.

A.3 RULE ANALYSIS

It seems reasonable to suppose that if a rule T and $R(c)$ have attribute-value pairs in common, then T is *qualitatively* relevant to sentinels of type s in forming $B_{i,s}(c)$. If T and $R(c)$ have no attribute-value pairs in common, then T is *qualitatively* irrelevant to sentinels of type s when forming $B_{i,s}(c)$. If this is true for every T in T_s , the set of rules for s , then I assign to $B_{i,s}(c)$ the value 0.0. In other words, if no rule is relevant to sentinels of type s , then they have no basis for affirming $A(c)$ and thus reject it. Assume therefore that T and $R(c)$ do have attribute-value pairs in common and let $N(T, R(c))$ be the number of such pairs. As $N(T, R(c))$ increases, the *qualitatively* relevance of T to a sentinel of type s when considering $A(c)$.

Let $S_s(c) = \{T \in T_s : N(T, R(c)) > 0\}$. We can enumerate the elements of $T \in S_s(c)$ and identify those that maximize $N(T, R(c))$. Let $MAXREL(T, R(c))$ designate the set of $T \in T_s$ that maximize $N(T, R(c))$. The algorithm for calculating $B_{i,s}(c)$ uses the *first* rule encountered, designated T_{best} , for which $T \in MAXREL(T, R(c))$. $B_{i,s}(c)$ is calculated according to the following equation:

$$B_{i,s}(c) = \begin{cases} 0.95 & \text{if } (num_1 - num_2) = (den_1 - den_2), \\ num_1 - num_2 / den_1 - den_2 & \text{otherwise, where} \end{cases}$$

$$num_1 = \sum_{(a=v) \in T_{best} \cap R(c)} P_s(a = v)$$

$$den_1 = \sum_{(a=v) \in T_{best}} P_s(a = v)$$

$$num_2 = \prod_{(a=v) \in T_{best} \cap R(c)} P_s(a = v)$$

$$den_2 = \prod_{(a=v) \in T_{best}} P_s(a = v)$$

Several comments are in order concerning this calculation. First, a value of 0.95 is assigned to $B_{i,s}(c)$ to rule out the possibility of assigning the value 1.0 to a sentinel other than the one that

actually reported case c to NIS-3 study personnel. Second, the expression $num1 - num2$ is intended to approximate the probability measure of a set union, which would ordinarily be computed by adding the probability masses associated with the union and subtracting the probability mass associated with the intersection. Third, the expression $den1 - den2$ is intended to approximate the probability measure of a set intersection, which would ordinarily be computed as the product of the probability masses of the intersection sets. Fourth, the index sets associated with $num1$ and $num2$ are subsets of the index sets associated with $den1$ and $den2$, so that sums (products) over the former will be less than or equal to sums (products) over the latter.

Because of the approximation involved, none of the four variables just mentioned is itself, as noted in Chapter 10, a probability, although each such value does lie between 0 and 1 inclusive. As shown below, $B_{i,s}(c) \leq 1.0$.

$num_1 \leq den_1$	differences in scope of summations
$num_1 - num_2 \leq den_1 - num_2$	subtraction
$den_2 \leq num_2$	multiplication of terms
$-num_2 \leq -den_2$	multiplication by negative number
$den_1 - num_2 \leq den_1 - den_2$	addition of two previous inequalities
$num_1 - num_2 \leq den_1 - den_2$	previous and second inequalities
$B_{i,s}(c) \leq 1.0$	division

I now illustrate the use of these formulas by calculating $B_{SW}(58)$: case 58 was in fact generated by a sentinel of type $s = AD$.

CASE	INCOME	AFDC	AGE	CHSEX	ETHNIC	INHSTATP
58:	2	N	10	M	BL	1

Equivalently,

$$R(58) = \{(INCOME, 2), (AFDC, N), (AGE, 10), (SEX, M), (ETHNICITY, BL), (INHOME, 1)\}$$

For sentinels of type SW , RIPPER yields the following two rules.

(13) SW :- INCOME=9, ETHNICITY=NA

(14) SW :- AFDC=N, AGE=6, ETHNICITY=BL

Although rule (13) and $R(58)$ share no attribute-value pairs, rule (14) and case 58 share two attribute-value pairs: $(AFDC, N)$ and $(ETHNICITY, BL)$. Since, trivially,

$$T_{best} = \{(AFDC, N), (AGE, 6), (ETHNICITY, BL)\}$$

and

$T_{best} \cap R(58) = \{(AFDC, N), (ETHNICITY, BL)\}$, I can use T_{best} , $T_{best} \cap R(58)$, and the probabilities previously calculated in Chapter 10 to compute $B_{SW}(58)$.

$$\begin{aligned} num_1 &= P_{SW}(AFDC = N) + P_{SW}(ETHNICITY = BL) \\ &= \frac{3}{7} + \frac{4}{7} \\ &= 1 \end{aligned}$$

$$\begin{aligned} num_2 &= P_{SW}(AFDC = N) \times P_{SW}(ETHNICITY = BL) \\ &= \frac{3}{7} \times \frac{4}{7} \\ &= \frac{12}{49} \end{aligned}$$

$$\begin{aligned} den_1 &= P_{SW}(AFDC = N) + P_{SW}(AGE = 6) + P_{SW}(ETHNICITY = BL) \\ &= \frac{3}{7} + \frac{2}{7} + \frac{4}{7} \\ &= \frac{9}{7} \\ &= \frac{63}{49} \end{aligned}$$

$$\begin{aligned} den_2 &= P_{SW}(AFDC = N) \times P_{SW}(AGE = 6) \times P_{SW}(ETHNICITY = BL) \\ &= \frac{3}{7} \times \frac{2}{7} \times \frac{4}{7} \\ &= \frac{24}{343} \end{aligned}$$

so

$$\begin{aligned}
 B_{SW}(58) &= \left(1 - \frac{12}{49}\right) \div \left(\frac{63}{49} - \frac{24}{343}\right) \\
 &= \left(\frac{49-12}{49}\right) \div \left(\frac{63 \times 7}{343} - \frac{24}{343}\right) \\
 &= \left(\frac{49-12}{49}\right) \div \left(\frac{441}{343} - \frac{24}{343}\right) \\
 &= \left(\frac{37}{49}\right) \div \left(\frac{417}{343}\right) \\
 &= \left(\frac{37}{49}\right) \times \left(\frac{343}{417}\right) \\
 &= \frac{37 \times 7}{417} \\
 &= \frac{259}{417} \\
 &= 0.62
 \end{aligned}$$

Calculations of the above sort yield Table A.1. The following abbreviations are used in columns two through eight: INC(OME), AFD(C), ETH(NICITY), INH(OME), OCC(UPATION).

Table A.1: Case characteristics and initial actor beliefs

c	INC	AFD	AGE	SEX	ETH	INH	OCC	AD	SW	NU	TE	CO
0	1	1	11	2	4	1	2	0.64	0.00	1.00	0.49	0.00
1	1	9	6	2	4	2	5	0.00	0.24	0.71	1.00	0.00
2	9	9	6	1	5	1	2	0.64	0.90	1.00	0.95	0.00
3	9	9	9	2	5	1	2	0.64	0.90	1.00	0.54	0.12
4	9	9	11	2	5	1	2	0.64	0.90	1.00	0.54	0.00
5	2	2	8	1	5	2	8	0.21	0.35	0.39	0.58	1.00
6	1	1	6	1	3	2	5	0.00	0.57	0.60	1.00	0.00
7	9	1	7	2	4	1	5	0.64	0.90	0.62	1.00	0.00
8	9	9	9	1	2	2	2	0.00	0.90	1.00	0.49	0.12
9	3	2	8	1	5	2	5	0.21	0.35	0.39	1.00	0.12

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c	INC	AFD	AGE	SEX	ETH	INH	OCC	AD	SW	NU	TE	CO
10	9	2	6	1	5	2	5	0.21	0.49	0.39	1.00	0.00
11	9	9	11	2	5	1	8	0.64	0.90	0.35	0.54	1.00
12	9	9	10	2	4	2	2	0.21	0.90	1.00	0.49	0.00
13	1	1	8	2	4	1	8	0.64	0.00	0.62	0.49	1.00
14	9	9	8	2	3	2	5	0.00	0.90	0.38	1.00	0.12
15	1	1	10	1	3	1	8	0.64	0.47	0.60	0.38	1.00
16	1	1	6	1	5	2	8	0.00	0.24	0.72	0.58	1.00
17	1	1	6	2	3	1	8	0.64	0.57	0.36	0.68	1.00
18	1	1	7	1	3	1	8	0.64	0.47	0.60	0.56	1.00
19	1	1	9	1	3	1	8	0.64	0.47	0.60	0.38	1.00
20	1	1	6	1	4	1	5	0.64	0.24	0.95	1.00	0.00
21	1	2	8	2	3	2	8	0.21	0.62	0.71	0.49	1.00
22	9	9	6	1	4	2	8	0.00	0.90	0.51	0.49	1.00
23	2	1	6	1	5	1	5	0.64	0.24	0.37	1.00	0.00
24	2	9	10	1	3	1	1	0.64	1.00	0.46	0.45	0.00
25	9	2	7	1	3	2	1	0.21	1.00	0.38	0.49	0.00
26	2	2	6	1	3	2	1	0.21	1.00	0.38	0.95	0.00
27	2	9	11	1	5	2	2	0.00	0.00	1.00	0.58	0.00
28	1	1	8	1	5	1	2	0.64	0.00	1.00	0.58	0.12
29	1	9	6	1	5	2	5	0.00	0.24	0.72	1.00	0.00
30	2	9	10	1	5	2	8	0.21	0.00	0.39	0.58	1.00
31	2	2	8	1	5	2	8	0.21	0.35	0.39	0.58	1.00
32	9	2	10	1	5	2	5	0.36	0.90	0.39	1.00	0.00
33	9	9	10	2	5	1	1	0.64	1.00	0.35	0.54	0.00
34	1	1	7	1	4	1	2	0.64	0.00	1.00	0.56	0.00
35	2	2	7	1	5	2	1	0.21	1.00	0.39	0.47	0.00

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c	INC	AFD	AGE	SEX	ETH	INH	OCC	AD	SW	NU	TE	CO
36	2	2	10	1	5	2	8	0.36	0.35	0.39	0.58	1.00
37	2	2	11	1	5	2	8	0.21	0.35	0.39	0.58	1.00
38	3	2	10	2	5	2	8	0.36	0.35	0.70	0.95	1.00
39	9	9	7	2	1	2	1	0.00	1.00	0.38	0.67	0.00
40	3	1	8	2	5	2	5	0.00	0.00	0.70	1.00	0.12
41	2	9	11	2	5	1	8	0.64	0.00	0.35	0.63	1.00
42	9	9	9	1	3	1	8	0.64	0.90	0.38	0.49	1.00
43	9	9	9	1	5	1	5	0.64	0.90	0.38	1.00	0.12
44	1	1	7	1	4	1	2	0.64	0.00	1.00	0.56	0.00
45	3	2	8	1	5	2	2	0.21	0.35	1.00	0.58	0.12
46	1	9	11	1	4	2	2	0.00	0.00	1.00	0.38	0.00
47	1	1	11	1	4	2	2	0.00	0.00	1.00	0.38	0.00
48	1	1	8	1	4	1	2	0.64	0.00	1.00	0.38	0.12
49	9	9	9	2	4	1	8	0.64	0.90	0.70	0.63	1.00
50	9	1	8	1	4	2	8	0.00	0.90	0.62	0.49	1.00
51	9	1	10	1	4	2	8	0.21	0.90	0.95	0.49	1.00
52	9	1	6	1	4	1	8	0.64	0.90	0.62	0.49	1.00
53	9	9	10	2	4	1	2	0.64	0.90	1.00	0.63	0.00
54	9	9	6	1	3	1	1	0.64	1.00	0.38	0.49	0.00
55	2	9	8	1	3	2	5	0.00	0.47	0.38	1.00	0.12
56	2	2	7	2	3	1	5	0.64	0.62	0.23	1.00	0.00
57	9	9	9	2	3	1	5	0.64	0.90	0.23	1.00	0.12
58	2	2	10	1	3	1	9	1.00	0.62	0.46	0.45	0.00
59	2	2	7	1	3	1	8	0.64	0.62	0.38	0.47	1.00
60	9	9	7	2	4	2	8	0.00	0.90	0.38	0.67	1.00
61	9	9	7	1	3	1	8	0.64	0.90	0.38	0.95	1.00

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c	INC	AFD	AGE	SEX	ETH	INH	OCC	AD	SW	NU	TE	CO
62	9	9	11	2	4	1	5	0.64	0.90	0.56	1.00	0.00
63	2	9	8	2	4	2	8	0.00	0.00	0.38	0.63	1.00
64	9	9	11	1	4	1	8	0.64	0.90	0.56	0.49	1.00
65	9	2	6	2	5	2	5	0.21	0.49	0.70	1.00	0.00
66	3	2	10	2	5	2	5	0.36	0.35	0.70	1.00	0.00
67	1	1	9	2	5	1	5	0.64	0.00	0.67	1.00	0.12
68	2	9	11	1	5	2	8	0.00	0.00	0.39	0.58	1.00
69	9	9	7	2	5	1	5	0.64	0.90	0.35	1.00	0.00
70	1	9	10	2	5	2	2	0.21	0.00	1.00	0.49	0.00
71	1	9	7	2	5	2	2	0.00	0.00	1.00	0.67	0.00
72	1	9	8	2	5	2	2	0.00	0.00	1.00	0.49	0.12
73	1	9	11	2	5	2	2	0.00	0.00	1.00	0.49	0.00
74	1	1	8	1	5	1	9	1.00	0.00	0.60	0.58	0.12
75	1	1	7	2	5	1	9	1.00	0.00	0.67	0.67	0.00
76	2	2	6	1	5	2	5	0.21	0.49	0.39	1.00	0.00
77	1	9	7	2	5	1	5	0.64	0.00	0.67	1.00	0.00
78	1	1	7	2	5	1	8	0.64	0.00	0.67	0.67	1.00
79	9	9	11	1	5	2	8	0.00	0.90	0.39	0.95	1.00
80	2	2	9	1	1	1	8	0.64	0.23	0.38	0.45	1.00
81	2	9	7	2	3	1	8	0.64	0.47	0.23	0.95	1.00
82	9	9	7	1	5	2	5	0.00	0.90	0.39	1.00	0.00
83	1	9	7	1	5	2	2	0.00	0.00	1.00	0.58	0.00
84	3	2	10	1	5	2	5	0.36	0.35	0.39	1.00	0.00
85	9	9	11	2	3	2	2	0.00	0.90	1.00	0.49	0.00
86	9	9	10	1	5	1	5	0.64	0.90	0.46	1.00	0.00
87	2	2	7	1	5	2	8	0.21	0.35	0.39	0.47	1.00

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c	INC	AFD	AGE	SEX	ETH	INH	OCC	AD	SW	NU	TE	CO
88	9	9	7	1	5	2	5	0.00	0.90	0.39	1.00	0.00
89	2	2	11	1	5	2	8	0.21	0.35	0.39	0.58	1.00
90	2	9	7	2	5	2	5	0.00	0.00	0.70	1.00	0.00
91	1	9	7	1	4	2	8	0.00	0.00	0.95	0.30	1.00
92	1	9	10	2	4	2	8	0.21	0.00	0.71	0.49	1.00
93	9	2	8	1	3	2	2	0.21	0.62	1.00	0.49	0.12
94	9	9	10	2	4	2	2	0.21	0.90	1.00	0.49	0.00
95	1	9	11	1	5	1	5	0.64	0.00	0.60	1.00	0.00
96	1	9	10	1	5	1	5	0.64	0.00	0.60	1.00	0.00
97	1	9	11	1	5	2	8	0.00	0.00	0.72	0.58	1.00
98	1	9	9	1	5	1	8	0.64	0.00	0.60	0.58	1.00
99	9	9	10	2	5	2	8	0.21	0.90	0.70	0.54	1.00
100	2	2	9	2	5	2	8	0.21	0.35	0.70	0.63	1.00
101	2	9	11	2	3	2	8	0.00	0.47	0.38	0.63	1.00
102	1	9	10	1	5	2	8	0.21	0.00	0.72	0.58	1.00
103	1	9	9	2	4	2	8	0.00	0.00	0.71	0.49	1.00
104	2	2	8	1	5	1	8	0.64	0.35	0.38	0.58	1.00
105	9	1	11	2	5	1	8	0.64	0.90	0.56	0.54	1.00
106	1	1	10	1	5	2	2	0.21	0.00	1.00	0.58	0.00
107	1	1	7	2	5	2	2	0.00	0.00	1.00	0.67	0.00
108	1	1	10	2	5	2	2	0.21	0.00	1.00	0.49	0.00
109	1	1	7	1	5	2	5	0.00	0.00	0.72	1.00	0.00
110	2	9	6	1	5	2	5	0.00	0.24	0.39	1.00	0.00

A.4 A CORRELATIONAL ANALYSIS OF THE INITIAL BELIEF MODEL

It is a cornerstone of this study that school professionals of different types hold different beliefs regarding certain cases. The existence of a strong positive correlation between the beliefs of two types of actor would be contrary to this supposition. The correlation between the beliefs of actors

Table A.2: How the beliefs of actor types are correlated

	Principal	Social Worker	Nurse	Teacher	Counselor
Principal	+1				
Social Worker	+0.124	+1			
Nurse	-0.153	-0.336	+1		
Teacher	-0.011	+0.082	-0.346	+1	
Counselor	+0.013	-0.012	-0.314	-0.389	+1

is given in Table A.2.

I view the entries of Table A.2 that exceed 0.30 in absolute value as indicators of relatively strong agreement or disagreement. For example, the beliefs of the Counselor type show relatively strong disagreement with the beliefs of the Nurse type, as indicated by a correlation of (-0.314) . Likewise, the beliefs of a Counselor are in relatively strong disagreement with the beliefs of a Teacher type (-0.389) . The absence of relatively strong *agreement* amongst any pairs of actor types suggests that the initial beliefs of different actor types are indeed differentiated, as expected.

APPENDIX B

COMPUTING EXPECTATION STATES

Given *any* precedence graph, the aggregate expectation state can be calculated for each actor. As argued in Chapter 6, each tie in a precedence graph presupposes a pair of positive paths and a pair of negative paths in the definition of the situation. As an example, the total number of positive and negative paths associated with the precedence graph in Figure C.1 can be determined as follows.

Actors w , x , and d each have precedence over some other actor. This implies, as described in Chapter 6, that each actor has one positive path of length 4 and one positive path of length 5 connecting them to the task outcomes. In addition, actor d grants precedence to both w and a , so d also has two negative paths of length 4 and two negative paths of length 5 connecting it to the task outcomes. Finally, since actor z grants precedence to actor d , z has one negative path of length 4 and one negative path of length 5 connecting it to the task outcomes. Having the number of pairs of positive and negative paths, the aggregate expectation state for each actor can be calculated.

Figure B.1: A precedence graph

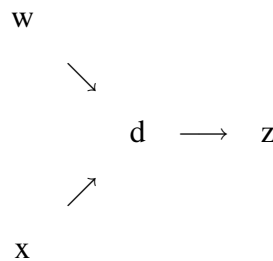


Table B.1: Initial aggregate expectation states

Actor	Type	k pairs of + paths	j pairs of – paths	ae_x
w	Counselor	1	0	0.18237
x	Principal	1	0	0.18237
d	Social Worker	1	2	-0.14911
z	Teacher	0	1	-0.18237

As described in Chapter 6, if actor x is connected to task outcomes by k pairs of positive paths and if x is connected to task outcomes by j pairs of negative paths, then $ae_{x^+} = 1 - 0.81763^k$ and $ae_{x^-} = -[1 - 0.81763^j]$ so that

$$ae_x = ae_{x^+} + ae_{x^-} = -0.81763^k + 0.81763^j$$

For example,

$$ae_x = -0.81763^1 + 0.81763^0 = -0.81763 + 1 = 0.18237$$

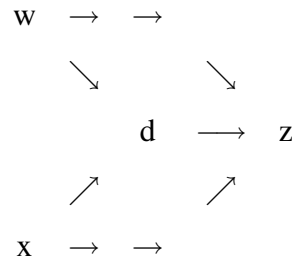
The calculated values for ae_x are given in Table C.1.

Hence, the Counselor, Principal, and Teacher are most *strongly* connected to a task outcome, either $T(+)$ or $T(-)$. The Counselor and Principal are connected to $T(+)$ and the Teacher to $T(-)$. The Social Worker is less strongly connected to $T(-)$ than the Teacher. In relation to $T(+)$, the definition of the situation presupposed by Figure C.1 implies that the lowest expectation state is that one associated with the Teacher.

As depicted in Figure C.2, it has been observed in a number of social situations that when one actor w takes precedence over d and d takes precedence over z , it often occurs that w takes precedence over z . The precedence graph in Figure C.2 generates the aggregate expectation states shown in Table C.2.

Hence, the fact that the precedence of actors w and x over actor z has been established results in a stronger expectation that a future performance output by either will lead to $T(+)$ and a stronger

Figure B.2: Successor precedence graph



expectation that a future performance output by actor z will lead to $T(-)$. The aggregate expectation state of actor d is unchanged. As illustrated above, changes in a precedence graph generates changes in (at least one) of the expectation states.

Table B.2: Updated aggregate expectation states

Actor	Type	k pairs of + paths	j pairs of - paths	ae_x
w	Counselor	2	0	0.3315
x	Principal	2	0	0.3315
d	Social Worker	1	2	-0.1491
z	Teacher	0	3	-0.4534

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