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CONCEPTUAL FRAMEWORKS FOR RESEARCH CIRCA 1991: IDEAS FROM A
CULTURAL ANTHROPOLOGIST; IMPLICATIONS FOR MATHEMATICS EDUCATION
RESEARCHERS

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Some of you are probably wondering: What is a conceptual framework and why all the fuss about whether you have one for your research project? Is it simply politically correct to have a conceptual framework or is there more to it? Perhaps some interpretivists out there are wondering whether concerns about conceptual frameworks aren't just another means for positivists to reassert their way of doing things in educational research. And you closet positivists are secretly hoping it's so.

I am a qualitative researcher, an anthropologist of education, an ethnographer, and someone firmly committed to the value of explicit conceptual frameworks for educational research. In this paper, I hope to give you some idea why I feel this way and what difference conceptual frameworks, particularly those informed by some recent work in cultural anthropology, might make in mathematics education research.

What is a Framework?

According to my dictionary, a "framework" is defined as a "skeletal structure designed to support or enclose something" (The Random House Dictionary of the English Language, 1979). As used metaphorically by researchers to "support or enclose" their investigations, frameworks come in various shapes and sizes; may fit loosely or tightly; are sometimes made explicit, sometimes not. In this paper, I will compare three kinds of frameworks--theoretical, practical, and conceptual. I use the comparison to suggest the special potential of conceptual frameworks. In the second part of the paper, I will argue for the importance of including particular elements in conceptual frameworks for current research in cultural anthropology. The elements I focus on are derived from a set of issues--which I refer to as the "structure/agency problem"--that is at the center of current debates affecting all the social sciences and philosophy. In the third and final section of the paper, I will suggest how these elements might also be valuable for conceptual frameworks in mathematics education research.

A Note on the Research Process

Before beginning the main part of my discussion of frameworks, I need to say a few things about how I conceive of the research process, so you can understand how I think frameworks fit into it. As I see the research process, it has three primary governing conceptual steps--by which I mean key steps that demarcate the study and require considerable mental planning.¹ First, a researcher must decide what is to be explained by the study (establish the research problem). In mathematics education, the range of research problems in need of explanation is broad: Why do girls eschew mathematics in greater numbers than boys? Why do U.S. students score lower than those from Japan or Hong Kong on international comparisons of mathematics test scores? What is the best way for students to learn and appreciate mathematics? What kinds of instructional changes can be stimulated and supported with policy initiatives, what kinds with site-based (locally-specific) initiatives? It's unlikely that a researcher would attempt to provide explanations for all these research problems in one study; instead, he or she selects one problem to concentrate on.

Deciding on the research problem does not automatically determine the perspective, or angle, from which the investigation will proceed. Each problem listed above could be investigated from numerous perspectives. For example, the researcher might choose a discipline-based perspective, e.g., one from psychology, sociology, or anthropology; a practice-oriented perspective, e.g., a formative or summative evaluation; a philosophical perspective, e.g., a positivist, interpretivist, or critical epistemology; or a pedagogical perspective, e.g., a constructivist or foundationalist approach. In the second conceptual step of the research process, the researcher must decide what perspective to use. At this point, an explicit framework becomes important: It is the (metaphorical) structure that defines the perspective taken and thereby guides the data collection for the study. The framework is composed of ideas or "concepts," i.e., abstractions, such as self-esteem, interactive thinking, culture, social organization, or pedagogy. These abstractions and their assumed interrelationships stand for the relevant features of a phenomenon, as defined by the perspective. In selecting a perspective/framework, the researcher is deciding upon the abstractions and relationships that will be used 'to enclose or support' the study and, in

¹ I have identified the steps separately and in a chronological order for the sake of clearly describing them, not because they do or must proceed in exactly this way.

turn, the data that will be collected.

To sum up the second step by way of example, a researcher might select a perspective from psychology that focuses on self-esteem as a framework for studying the research problem: Why do girls eschew mathematics in greater numbers than boys? For the same research problem, another researcher might select a framework from sociology that focuses on peer group socialization. In making the first selection, the researcher has decided to rely upon the abstraction, self-esteem, and to collect data about self-esteem and its differential impact on boys' and girls' attitudes and achievement. By choosing peer group socialization instead of self-esteem, the second researcher has decided to focus on such things as differential peer group norms for boys and girls and their influence on attitudes and achievement (cf. Shulman, 1988). In broad strokes, this is how frameworks "work" in the research process.

The third conceptual step in the research process begins when data analysis begins. At this point, the researcher must decide how to reduce the empirical data collected into meaningful categories, how relationships among categories of findings will be specified, and what form the explanation for the empirical data will take. Depending on the epistemological perspective chosen in step two (e.g., positivist or interpretivist), the originally specified research framework may or may not continue to serve as a guide for data analysis and explanation, but some framework--some coherent way of thinking about how to organize and interpret the data--must.

Recent critics of research practice have argued that an adequate explanation for empirical results must convincingly show that the data occur as they do because of the processes described by the explanation, and not accidentally or coincidentally (Liston, 1988). To meet this requirement, the researcher cannot simply describe or identify data in terms of a framework, nor unquestioningly accept a predetermined framework, as either would be to assume, rather than to demonstrate, that an explanation derived from the framework is adequate.

In brief then, I consider some kind of framework basic to both the second and third conceptual steps of the research process. With this background about the research process, I'd like to turn to the three kinds of frameworks: theoretical, practical, and conceptual. What are they and how are they used?

Kinds of Frameworks

Theoretical Frameworks

A theoretical framework is a structure that guides research by relying on a formal theory; that is, the framework is constructed by using an established, coherent explanation of certain phenomena and relationships, e.g., Piaget's theory of conservation, Vygotsky's theory of socio-historical constructivism, or Newell and Simon's theory of human problem-solving. In the second step of the research process (described earlier), the research problem would be rephrased in terms of the formal theory selected for use. Then research hypotheses or questions would be derived from the research problem qua theory, relevant data would be collected, and the findings used to support, extend, or revise the theory. In selecting a theory as the basis for a research framework, the researcher is deciding to follow the programmatic research agenda outlined by advocates of the theory. That is, she or he is choosing to conform to the accepted conventions of argumentation and experimentation associated with the theory. This choice has the advantage of facilitating communication, encouraging systematic research programs, and demonstrating progress among like-minded scholars working on similar or related research problems. Researchers testing the applicability of Piaget's theory of conservation in different settings and with different people, for example, work together with a shared set of terms, concepts, expected relationships, and accepted procedures for testing and extending the theory.

However, there are some disadvantages associated with the programmatic use of theoretical frameworks. Howard Becker, a fieldwork sociologist and ethnographer, has recently summarized the value of relying on theory and one of its drawbacks--that important information may be omitted or ignored when researchers rely too much on formal theory to guide their work:

Whenever scientists agree on what the questions are, what a reasonable answer to them would look like, and what ways of getting such answers are acceptable--then you have a period of scientific advance...[at] the price, Kuhn is careful to point out, of leaving out most of what needs to be included in order to give an adequate picture of whatever we are studying, at the price of leaving a great deal that might properly be subjected to investigation, that in fact desperately needs investigation, uninspected and untested. (1991, p.3)

Dan Liston (1988, p. 324), a sympathetic critic of radical theories of schooling and a teacher educator, has argued (following Crews, 1986) that scholars who use Marxist

theories of schooling (e.g., Bowles and Gintis, Apple, Carnoy and Levin), tend to address and explain research problems by theoretical decree, rather than with solid evidence to support their claims. John Van Maanen, another fieldwork sociologist and ethnographer, has lodged the objection that data collected under the auspices of theoretical frameworks have to "travel," by which he means that (unfortunately, from his point-of-view) data must be stripped of their context and local meaning in order to serve a theory.

Events must be specified, simplified, patterned, and to a large degree stripped of their context if they are to travel well and serve as fodder for formal theory. Such is true for all description, of course, but theory itself can be a formidable taskmaker. (1988, p. 131)

Another difficulty with the use of theoretical frameworks is the tendency for them to be used by academics to set a standard for scholarly discourse that is not functional outside the academic discipline. Conclusions produced by the logic of theoretical discourse about educational practice, for example, are often neither practical nor helpful in day-to-day practice. House (1991) makes the following pertinent observations about the relationship between the concerns of academic disciplines and those of practitioners.

A discipline is composed of groups and subgroups of scholars linked together through common communication—journals, meetings, associations, informal contacts, e-mail....At the center...are the leading authorities of the disciplines, the Cronbachs and Campbells, if you will. Those at the center are the gatekeepers who influence the others. The discipline changes as people in the field argue and debate new ideas....All [theories] in the field are subject to change over a period of time, subject to the critique of the group, so there is no certain foundation of knowledge, just the continual debate, dialogue, and argument, the disciplinary [theoretical] discourse.

So we end up with disciplines in which there is theory which is often irrelevant to the experience of practitioners. Some of this theory is...necessary for [academic] legitimation. [But, if] one waits until all the debates are over to do the work, then one will wait forever. (pp. 3-5)

Practical Frameworks

It is just this kind of irrelevance for practitioners and practical matters that has led some researchers, like educational evaluator Michael Scriven, to object to theoretical

(disciplinary) research as the model for educational research and to suggest practical frameworks as an alternative. Scriven's low regard for the value of theoretically-driven social science research to educational practitioners is clear:

...practical problems are defined by reference to several parameters concerning which the basic scientist gathers no data and rarely has any competence. These include the not-entirely-independent parameters of cost, ethicality, political feasibility, the set of practicable alternatives, system liability, and overall practical significance. (1986, p. 54)

Scriven's alternative is what he calls a "practical research approach" that would focus research efforts on "problems that really pay off for practitioners," and relegate "the search for...theoretical understanding...to a secondary position by comparison with the search for improvements" (p. 57). He further compares theoretical and practical research as follows.

Let us consider...the difference between the ivory-tower research approach to [a] particular problem and the practical research approach. The problem...is...how to improve the teaching of handicapped children....I have frequently posed this problem to groups of educational researchers....In all cases, the results are about the same. What one must do, they suggest, is find out—from the literature or by developing a theory—which variables control the outcomes in question and then modify those variables. I ask: Is there any way to find that out besides the ways that researchers have been trying for decades? Well, basically, No, they say; except to do it better: the literature search, the design, the run, the data crunch. But there is a much better way, and the fact they do not think of it immediately shows how far we have come from commonsense. You must begin by identifying a number of practitioners who are outstandingly successful at the task in question; you must then use all the tricks in the book to identify the distinctive features of their approach...; you then teach new or unsuccessful practitioners to use the winning ways and retest until you get an exportable formula. (pp. 58-59)

A practical framework, then, guides research by using "what works" in the experience or exercise of doing something by those directly involved in it, e.g., in the case of educational research: by using "what works" in teaching, administering, trying to change schools, being the helpful parent of a school-aged child, as a "kernel" idea or action that, if extended to other teachers, etc., could help to alleviate some educational problem. The

study is structured to determine key features of the practice, and whether, or in what circumstances, a practice (behavior, technique, strategy, way of thinking, style of teaching, etc.) works as expected or envisioned. This kind of framework is not informed by formal theory but by the accumulated practical knowledge (ideas) of practitioners and administrators, the findings of previous research, and often the viewpoints of politicians or public opinion. Research hypotheses or questions are derived from this knowledge base, and research results are used to support, extend, or revise the practice. In selecting practice as the basis for a research framework, the researcher is deciding to follow conventional wisdom as understood by people who are stakeholders in the practice.

Although this approach has at least one obvious advantage over a theoretical framework--the problems and the discourse are those of people directly involved, it shares some of the same drawbacks. Like the work based on a theoretical framework, the existing knowledge base--in Scriven's example, the accumulated wisdom of practitioners and interested lay persons--will constrain the topics of study, the data collected, and often the conclusions drawn. Again, there is the danger that conclusions will describe the data in terms of preexisting practitioner knowledge rather than provide convincing evidence that a particular teaching practice is best, all else considered. Further, results obtained from research based on practical frameworks are expected to "travel," as Scriven indicated. This is another dangerous situation. In the absence of theory, there is no systematic way to think about how well, or under what conditions, the results might or might not travel; there is also no readily available discourse to explain why the practice works or why anyone else should adopt it. Proponents would be in the position of imposing a practice on the (slim) grounds that it worked somewhere else.

Another more serious and perhaps more subtle difficulty with practice-driven research is one shared with research guided by a theoretical framework of extreme interpretivism.² Like extreme interpretivism, practice-driven research depends on the insiders' perspective--in Scriven's example, the insiders' perspective would be constituted by the views of various stakeholders in educational practice. Whereas insiders know the behaviors and ideas that have meaning to people like themselves who regularly participate in the practice, they are unlikely to recognize the patterns of group life of which their

² "Interpretivism" is used here, following Eisenhart, 1988, Howe & Eisenhart, 1990, and Howe, in press, to refer to the epistemological position that privileges the "insider's perspective" on the meanings and implications of social events and arrangements.

actions are a part (Eisenhart & Borko, 1991, p. 147). Insiders rarely consider the structural features and causes of social practices or the norms which they unwittingly internalize and use in communication and action (Howe, in press, following Fay, 1975). These features, causes, and norms are part of the taken-for-granted backdrop of insiders' lives. Because insiders take these constraints for granted, practical frameworks--built up as they are from insiders' perspectives--tend to ignore macrolevel constraints on what and how insiders act and how they make sense of their situation. I will return to this point when I take up current issues in cultural anthropology.

Conceptual Frameworks

A conceptual framework is a skeletal structure of justification, rather than a skeletal structure of explanation based on formal logic (i.e., formal theory) or accumulated experience (i.e., practitioner knowledge). A conceptual framework is an argument including different points of view and culminating in a series of reasons for adopting some points--i.e., some ideas or concepts--and not others. The adopted ideas or concepts then serve as guides: to collecting data in a particular study, and/or to ways in which the data from a particular study will be analyzed and explained.

Crucially, a conceptual framework is an argument that the concepts chosen for investigation or interpretation, and any anticipated relationships among them, will be appropriate and useful, given the research problem under investigation. Like theoretical frameworks, conceptual frameworks are based on previous research and literature, but conceptual frameworks are built from an array of current and possibly far-ranging sources. The framework may be based on different theories and various aspects of practitioner knowledge, depending on exactly what the researcher thinks (and can argue) will be relevant to and important to address about a research problem, at a given point in time and given the state-of-the-art regarding the research problem. For example, researchers developing a conceptual framework might build an argument for assessing the power of several different theories or explanations for an important research problem, such as why U.S. minority students are, as a group, less successful in school mathematics than their mainstream counterparts. In this case,³ a list of currently relevant theoretical propositions

³ My ideas here are adapted from Denzin who calls this approach "theoretical triangulation" (1978, pp. 297-301, following Westie, 1957).

and practitioner explanations would be compiled; their strengths, weaknesses, and appropriateness described and assessed; and an argument built for making some subset the focus of empirical investigation. Then, data would be collected to determine which propositions could be supported by empirical evidence. Finally, a record would be made of those propositions that passed and failed the empirical tests, and a theoretical system reformulated based on all the findings of the empirical tests.

The arguments of a conceptual framework also must be timely; that is, they should reflect the current state-of-affairs regarding a research problem. For this reason, conceptual frameworks may have short shelf-lives; they may be revised or replaced as data or new ideas emerge.

To illustrate the preceding points: In the NSF-sponsored study, "Learning to Teach Mathematics," that I am conducting of novice mathematics teachers with Hilda Borko, Cathy Brown, Bob Underhill, Doug Jones, and Pat Agard, we have developed a series of conceptual frameworks that draw on specific ideas from cognitive psychology, mathematics education, and educational anthropology (see especially Brown, et al., in press). To build our first framework, each of us consulted the literature in our respective fields (Borko-psychology; Brown, Underhill, Jones, and Agard-mathematics education; Eisenhart-anthropology) and wrote position papers on the concepts or ideas we considered most relevant to the research problem (which is: What kinds of changes occur as mathematics education students become mathematics teachers and what or who influences the changes?). As a group we read each others' papers and debated the merits of each idea for our study. We discarded some ideas (we couldn't study everything) and, for those retained, tried to organize them in a coherent way. The resulting framework guided the data collection during Year 1 of our two-year project (see Brown, et al., in press, and Eisenhart & Borko, 1991, for more information about the content of our framework). At the end of Year 1, we reconsidered the framework, revised and refined it in light of the data we had collected and new ideas that were emerging in our respective fields. The (temporarily) "chosen" ideas were then categorized into the six boxes represented in Figure 1 and, in their present incarnations, are serving as guides for the data analysis in which we are presently engaged.

Conceptual frameworks then, like the one represented in Figure 1, intentionally are not constructed of steel girders made of theoretical propositions or practical experiences; instead they are like scaffoldings of wooden planks that take the form of arguments about

what is relevant to study and why--in our case, about novice mathematics teachers--at a particular point in time.⁴ As changes occur in the state-of-knowledge, the patterns of available empirical evidence, and the needs with regard to a research problem, used conceptual frameworks will be taken down and reassembled.

Relative to theoretical or practical frameworks, conceptual frameworks facilitate more comprehensive ways of investigating a research problem. By coordinating concepts from anthropology and psychology in the conceptual framework for our Learning to Teach Mathematics project, for example, we were able to investigate a broader range of potential influences on novice teachers than would have been possible using a theoretical framework from either discipline alone (for more information on our collaboration, see Eisenhart & Borko, 1991).

Similarly, and unlike either theoretical or practical frameworks, conceptual frameworks routinely accommodate both outsiders' and insiders' perspectives. Because conceptual frameworks (merely) outline the kinds of things that are of interest to study from various sources, the argued-for concepts and their interrelationships--regardless of their source--must ultimately be defined and demonstrated in context in order to have any validity. Users of conceptual frameworks, then, must adopt what Norman Denzin (1978), another fieldwork sociologist, refers to as a "sensitizing approach":

If I choose a sensitizing approach to measuring intelligence [for example], I will leave it nonoperationalized until I enter the field and learn the processes representing it and the specific meanings attached to it by the persons observed. It might be found, for example, that in some settings intelligence is measured not by scores on a test but rather by knowledge and skills pertaining to important processes in the group under analysis. Among marijuana users intelligence might well be represented by an ability to conceal the effects of the drug in the presence of nonusers. (p. 16)

This sensitizing feature of conceptual frameworks encourages the researcher to tuck between the concepts advanced or assumed and the meanings given or enacted in context.

⁴ It is also important to note here that our analysis strategy depends on some additional decisions not reflected in Figure 1. For example, we decided to focus on "critical incidents" as a means to identify the sources of influence on the novice teachers. We also decided to focus on "case profiles" as a means to identify changes in the novice teachers over time. These methodological decisions and the way they have been integrated with the substantive elements of our conceptual framework are described in Borko, et al., in press, and Jones, et al., in preparation.

In this way, outsiders' and insiders' presuppositions, as well as their respective interpretations, have a place in the research project.

The inclusive and sensitizing features of conceptual frameworks also make it less likely that researchers who rely on them (compared to those who rely on theoretical or practical frameworks) will draw unwarranted conclusions or offer unsupported explanations for their empirical results. Westie summarized the advantages of these features as follows,

[Use of a conceptual framework] minimizes the likelihood that the investigator will present to himself [sic] and the world a prematurely coherent set of propositions in which contradictory propositions, however plausible, are ignored. (1957, p. 154, quoted in Denzin, 1978, p. 300)

In other words, it minimizes the likelihood that empirical evidence will be explained by decree, convention, or accident. In sum, then, I find conceptual frameworks better suited than theoretical or practical frameworks for research in applied areas such as education, at least at this point in time. Because of the various perspectives and disciplines that can be brought to bear on educational issues and the seriousness of educational problems, research frameworks that outline and enable comprehensive, inclusive, sensitive, appropriate, useful, and timely approaches to the problems of the day would appear to be especially valuable. In the next section, I turn to one potentially useful conceptual framework that is currently being constructed for research in cultural anthropology.

The Structure/Agency "Problem" as a Basis for One Conceptual Framework in Cultural Anthropology

Epistemology

At this point in historical time and space, many social scientists, including cultural anthropologists, are grappling with what is sometimes referred to as the "structure/agency problem," where "structure" is defined as constraining or enabling macrolevel forces--outside individuals but affecting what they do--and "agency" as (microlevel) individual intentions. The structure/agency problem derives from the insights of postpositivist and postinterpretivist epistemological debates. The root of the current debate is the definition of human nature and is described in broad strokes by Howe (in press) as follows:

...a theory of human nature specifies the kinds of beings that a theory of social scientific explanation has for its subject matter. Positivism, with its "spectator view" of knowledge [e.g., humans as molecules in motion] and

Humean conception of causation [where causes and effects have no conceptual connection], encourages a view of humans as passive and determined by exogenous causes; interpretivism, with its constructivist [self-created] view of knowledge and intentionalist conception of causation [where human intentions can "cause" things], encourages a view of human as active and self-creating...The correct view, or so I shall argue, acknowledges elements of truth in both of these views but rejects each as one-sided.

Intuitively, human beings are neither wholly passive and determined nor wholly active and self-creating. Instead, they exhibit these two characteristics in varying degrees...."[H]uman nature" is partially determined by how humans see themselves and partially determined by things of which they are unaware and over which they have no control. Accordingly, insofar as interpretivism remains trapped within the first perspective and positivism, within the second, neither view can give an adequate account of human nature. (p. 10)

Later in the same article,

[A new "compatibilist"] conception of human nature...concedes to the natural science model mechanistic (e.g., structural-functionalist) accounts of human behavior, preserving a place for the self-determined, "active" side of human nature. On the other hand, it concedes to interpretivism intentionalist accounts of human behavior, preserving a place for the self-determined, "active" side of human nature...[and] insofar as human behavior is an admixture of active and passive ingredients, a conception of [social science] explanation should capture both. (p. 12)

Following Howe then, an adequate social science explanation should (now) aim to account for both structural forces (positivism's 'exogenous causes') and human agency (interpretivism's 'self-created constructions'). To develop such an explanation with empirical evidence--as required in (empirical) research, frameworks for research must accommodate, and guide investigations and interpretations of, both structure and agency.

Cultural Anthropology

In cultural anthropology, the structure/agency problem can be phrased as: How is it possible to represent the embedding of richly described local cultural worlds (including individuals' intentions and a third concept, "culture," the anthropologists' favorite) in larger

impersonal systems of political economy (Marcus & Fischer, 1986, p. 77)? In summarizing recent trends in anthropologists' experimentation with ethnography, Marcus and Fischer explain the "problem" further:

...one trend of experimentation is responding to the imputed superficiality or inadequacy of existing means to represent the authentic differences of other cultural subjects; the other is responding to the charge that interpretive anthropology, concerned primarily with cultural subjectivity [insiders' perspectives], achieves its effects by ignoring or finessing in predictable ways issues of power, economics, and historic context. While sophisticated in representing meaning and symbol systems, interpretive approaches can only remain relevant...if they come to terms with the penetrations of large-scale political and economic systems that have affected, and even shaped, the cultures of ethnographic subjects almost anywhere in the world. (p. 44).

Later, Marcus and Fischer suggest why the task is difficult:

This would not be such a problematic task if the local cultural unit was portrayed, as it usually has been in ethnography, as an isolate with outside forces of market and state impinging upon it. What makes representation challenging and a focus of experimentation is the perception that the "outside forces" in fact are an integral part of the construction and constitution of the "inside," the cultural unit itself, and must be so registered....(p. 77)

In other words, processes of communication and meaning are thought to be constitutive of structures of political and economic interests and these interests, in turn, both enable and constrain individual intentional processes.

At the present time, debates among anthropologists about these issues are self-consciously taking place in the absence of grand theories. As in other social sciences, literary criticism, architecture, and even the natural sciences to some extent:

[the] authority of "grand theory" styles seems suspended for the moment in favor of a close consideration of such issues as contextuality, the meaning of social life to those who enact it, and the explanation of exceptions and indeterminants rather than regularities in phenomena observed....(Marcus & Fischer, 1986, p. 8)

The need for conceptual frameworks that can more adequately address "structure," "agency," and "culture," and guide research including these elements, in cultural

anthropology is exemplified in the limitations of many familiar works, including Shirley Brice Heath's educational ethnography, Ways with words (1983).⁵ In the book, Heath tells a story of literacy teaching and learning in three Southern (U.S.) communities. Her study was framed by an implicit theory of cultural difference; that is, consistent with cultural difference theory, she expected that reasons for children's differential performance in school could be found in differences in the ways of life and speaking (the cultures) they learned at home. By revealing the many ways in which the cultures of the three communities were different and how cultural elements learned at home matched (or did not) those expected at school, she intended: a) to explain the sources of children's early school success and difficulty; and b) to help teachers find appropriate ways to bridge the home-school gaps she found. Heath achieved both her goals, but in the book's Epilogue she acknowledged that the understandings and changes she helped produce were not sustained by the teachers for very long. She noted that the focus of school district policy changed, apparently eliminating the opportunities and rewards for teachers that had enabled their involvement in the kind of work she (and they) had begun and believed in. By ending the book with this discussion, Heath seemed to recognize some role for structure in the explanation of her findings, but it was a role that the theory of cultural difference had not prepared her for and could not account for. Heath's theoretical framework also was not able to account for individuals who did not fit the school performance profile predicted by her cultural difference analysis, nor for subgroups within each community that might have constructed an oppositional culture or resisted the dominant position within the group. Finally, she used "culture" to mean "tradition," as if "culture" had no dynamic or emergent characteristics. In Ways with words, individuals were always following their community's traditions (culture), as if tradition fully determined their intentions and actions. Use of this kind of cultural difference or cultural determinist theory is very common in educational anthropology and is analogous to the economic determinism of "structuralist correspondence" theories such as Bowles and Gintis' (1976), in which individuals are always following the dictates of their class position (see also Foley, 1991). (In work inspired by psychology of course, there is a corresponding tendency to focus on the processes of individuals as deterministic.)

⁵ I find Heath's book very powerful and wish to acknowledge its considerable contribution to educational research. I use it here for illustrative purposes because so many people in education are familiar with it.

The special contribution of Paul Willis' ethnography of schooling, *Learning to labor* (1977), for educational anthropology was his conceptual framework in which "structure," "culture," and "individuals" were conceived of and investigated as separate though interrelated phenomena. For Willis, "structures" are relatively fixed, enduring, and broadly constraining features of a society--features such as class stratification or patriarchy; "individuals" are viewed as semi-autonomous from structure (i.e., capable of considering or reflecting upon structures) and thus potentially able to choose (actively produce) their own "cultural" response to structures, where "culture" is conceived of as a medium in which individuals act and interpret the world as given and, simultaneously, as the medium through which structure passes in and out of individual lives (see also Foley, 1990; Holland & Eisenhart, 1990).

The relevant implications of this work, for my purposes in this paper, are that an adequate conceptual framework for research in cultural anthropology, including educational anthropology, must now include: 1) some conception of the structures that exist and have existed over time, recognizing that they act both to constrain and to enable the actors situated within their influence (these structures might include class and racial stratification, patriarchy, and the social organization of academic disciplines, e.g., mathematics); 2) some conception of the cultures that serve as mediums within which individuals and subgroups respond to the structures surrounding them (these cultures might include class culture, peer group culture, the culture of teaching, the culture of being a student, or the culture of school subjects or (specifically) mathematics; and 3) some conception of the meanings and actions of individuals (including individual "voices," individual intentions, and subjectivities).

Implications for Mathematics Education Research

Conceptual frameworks that direct attention to structures, cultures, and agency in this way have some important implications (I think) for research in mathematics education. For example, the activities and discourse through which children (and teachers, parents, etc.) construct their understandings of mathematics would have to be viewed and investigated as deeply embedded with historical and social contradictions and inequalities. If structures, e.g., class stratification, patriarchy, or academic disciplines, are conceived of as enduring constraints on and resources for the activities and discourse of individuals, then it is not adequate to study classroom teaching and learning in isolation or without reference to these structures. Although individual actions will be much more fluid and variable than

the surrounding structures, they will always be affected by them. I think we would also be asking our research programs to help us to understand how teachers and students rely, often inadvertently, on these structures in teaching and learning mathematics. In addition, we might ask: How are teachers and students (as groups or individuals) responding to these structures? What cultures of mathematics or of schooling are their mediums for interpreting the mathematical school work they are doing? To what extent are novice mathematics teachers learning that judgments of their competence as teachers depend on acquiring the characteristics of existing (conservative) teacher culture (cf. White, 1989)? And, to what extent are students learning that assessments of their school competence depend on acquiring the characteristics of existing (conservative) student culture?

Related questions might include: To what extent are "active" (enthusiastic, conscientious, well-intentioned) mathematics teachers merely "making do" (merely tinkering, or doing what Hatton, 1989, has recently referred to as bricolage, following Levi-Strauss) with what is available within a limited and fixed structure of schooling and curriculum (see also Kutz, 1990)? To what extent are mathematics teacher educators doing the same thing within the context of their university or college work (cf. Eisenhart, Behm, & Romagnano, 1991)? To what extent do these conservative learnings (constructions), along with enduring structural features of schools, constitute teachers' and students' "resistance" to (decisions to refuse to act in accord with) innovations such as those proposed by the NCTM standards? Is there any potential or some "language of possibility" (Giroux & McClaren, 1986) in these constructions that would enable the desired changes?

It would also be important to discover why individual students are doing the particular work they are doing in school, e.g., do they have worthy motives in doing it? Do teachers have worthy motives in guiding it? Who is advantaged or disadvantaged in the process?

I believe these questions are very important ones for mathematics educators to answer. I also believe that answers to these questions can be obtained, at least in part, by using ideas from cultural anthropology to build conceptual frameworks to guide the work that mathematics education researchers do.

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