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ABSTRACT

The revolution in hard sciences is explored, from the Cartesian-Newtonian worldview to the Heisenbergian universe, and consideration is given to whether the conventional, Cartesian model is a serviceable one for research in the social/applied sciences. Five axioms comprising the existing paradigm of logical positivism are outlined (reality, subject-object dualism, generalization, causality, and values), and these axioms are contrasted with a naturalist view. The set of trustworthiness techniques developed to handle questions of rigor are then compared, with credibility, plausibility, dependability, and confirmability taking the place of the conventional paradigm's terminology of internal validity, external validity, reliability, and objectivity. The naturalistic model emphasizes qualitative research methods in an open system of inquiry. Implications of naturalistic inquiry for special education researchers include the need to look for counter-evidence as well as evidence, determine formally what comprises the field of special education, and treat respondents as persons with rights and decision-making power. Political implications include the extraordinary justification that researchers must make for such work, the difficulty in finding outlets to publish research, and the disadvantage in competing for research funding. The transcript of a question-and-answer session follows the speech. (JDD)

Naturalistic Inquiry: Politics and Implications for Special Education

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NATURALISTIC INQUIRY: POLITICS AND IMPLICATIONS FOR SPECIAL EDUCATION

It's a pleasure to be here, especially since some of my best friends are special educators. In fact, my guess is that one of my very best friends prompted this invitation. The shootout at the Dupont corral between Tom Skrtic, my old friend and colleague from Kansas and Robert Yin must have been great fun. For those of you who attended last year, this must seem the continuing episode of "naturalistic inquiry", which Egon and I are rather wont to call "Son of Naturalistic Inquiry", or "Bride of Naturalistic Inquiry". But since the request to talk concerns my favorite topic, I'm glad to do it.

Apparently Marty Kaufman felt that this group needed to know something in a more formal way about naturalistic inquiry, and I'd like to begin by laying some groundwork from the hard sciences. As most of you who read out of your discipline know, there has been a complete revolution in the hard sciences, a switch from the Cartesian-Newtonian worldview to something which I'll call the Heisenbergian universe. Since Heisenberg first enunciated his Uncertainty Principle following closely on Einstein's ruminations on the nature of matter and Schrodinger's famous metaphor of the cat who symbolized "created reality" -- physics has been operating at far remove from the classical physics which had predominated since the alchemists of the middle ages. The long-term effect of the Heisenberg Uncertainty Principle, Bell's Theorem, Einstein's theory of relativity, and Schrodinger's cat has been to release physics (and the rest of the hard sciences) from the logical positivist assumptions

regarding whether or not objectivity is possible in science, whether or not there is a "real" reality out there, waiting to be converged upon, and whether generalization is possible in an a-historical sense.

The question as to whether the social and applied sciences can be more like the physical sciences is today a singularly interesting question. Those who ask it presume that science continues to operate along the lines of scientific method. Nothing could be farther from the truth, except in the most classical of studies. Science appears to be much more like Zen Buddhism (Żukav, 1979) than it appears to be Newtonian. Thus, my plea today is an unusual one. I would ask that you, like physics, chemistry, biology, and the other hard sciences, give some thought as to whether or not the conventional, Cartesian model of the universe is a serviceable one, or whether the particular constraints and problems of your own discipline - special education - might not be worth moving to a new vision of the universe.

Let me review what the old universe looked like. We call a unified theory of the universe a paradigm. A paradigm is simply a model which not only tells you what reality ought to be like, it tells you how to seek data from that reality, and how you ought to talk about the search for those data, or knowledge. The Newtonian universe was much like a clock, and in fact, the clockwork was a guiding metaphor for centuries. The mechanical, assembly-like properties of a clock led us to postulate that we could take apart reality into small chunks, study them one-by-one, and discern -- by building knowledge piece by piece -- how

the entire clockwork worked. Assembly, machines, subsystems, aggregation, and determinism were a large part of this universal story regarding the cosmos. When set out in formal terms, the philosophical position was called logical positivism.

Essentially, logical positivism (depending on who you read) was composed of five axioms, usually subsumed today under the rubrics of ontology, epistemology, methodology and axiology. The five axioms run something like this, at least in their most rarified and idealized form.

1) reality -- reality was envisioned as a singular entity, subdivisible into pieces which would be studied independently of each other (we call them variables). It is "out there", and the purpose of science is to converge upon that reality until at last it can be described and understood. Science disagreed as to whether reality could be finally seen, or merely approximated, but no one disagreed as to whether or not it was really out there.

2) subject-object dualism -- the scientific or conventional view of the world understands that researchers and researched interact, all right, but believes that this is undesirable, since the role of the scientist is to be a disinterested observer, totally objective, uncontaminated by his or her phenomena. About the best than can be done is to put the thing under study at as much remove as possible, thereby bringing reactivity and

reactivity to a minimum. The ideal position, of course, is to have no interaction, as interaction introduces bias of the worst sort -- that is, untrackable bias -- into the experiment. The position on this epistemologically is to do the best you can, and hope for findings which are as contamination-proof as you can make them.

3) generalization -- the aim of science, since it must converge on that presumed reality out there, is to write laws which govern the reality. This worked for physical matter in the Newtonian universe (although please note, it does not work for subatomic particles), and John Stuart Mill believed it would work for the social world. If we just knew enough about social life, we could write laws, obey them, and engineer "Utopia". Fat chance. Nevertheless, the task of the scientist was to generate these time- and context-free laws, called generalizations, which would indicate the meta-laws under which nature and the social world operated. The very <u>stuff</u> of science was, finally, to be generalizations.

4) causality -- in a deterministic universe, nothing occurred without a prior, or at least temporally co-terminous (called effective and efficient) cause. A causes B, or A, in the presence of B, brings about C. The thought-pattern is linear, determinism sets the world in motion, and the role of the scientist is to find out how things work

by describing the causes in the form of laws (those were the gereralizations about which we spoke). Causality is spoken of in "if-then" statements, and once all the mechanisms and their efficient causes are described, we should be able to tell you how the universe works.

5) values -- science has been believed to be, and normatively hoped to be, value-free. Since science was conducted by disinterested observers, only the most partisan of scientists could be accused of embarking on value-laden research. The findings of science were taken to be pure knowledge about the social world, and therefore, without bias, prejudice or hidden values. When values did creep in, we labelled the scientist as 'hardly objective" -- a terrible curse -- and dismissed his or her work as partisan, impure, and therefore, of no great moment or significance, certainly not in the policy formulation arena.

[INSERT TABLE 1 ABOUT HERE.]

These axioms are captured in Table 1.

Each of these specific axioms, of course, is a purist version, and we all know it. But until you see the real thing in pure form, you don't know what variations of it might exist. None of the axioms has been free from attack. Responsible scientists have always known that their inquiries were not exactly objective, and thoughtful ones have contemplated the role

TABLE 1

CONTRASTING POSITIVIST AND NATURALIST AXIOMS

Axioms About	Positivist Paradigm	Naturalist Paradigm
Ontology: The Nature of Reality.	Single, tangible, fragmentable, convergent.	Multiple, intangible, wholistic, divergent.
Objectivity: The Inquirer-Respondent Relationship.	Independent.	Inter-related.
Purpose: Generalization.	Context and time free generalizations; nomothetic statements; focus on similarities.	Context and time bound working hypotheses; idiographic statements; focus on differences.
Explanation: causality.	Real causes, temporally precedent or simultaneous.	Interactive shapers (feedback and feedforward).
Axiology: The Role of Values.	Value-free.	Value-bound.

of values in their choice of problems. So rare is the person who accepts these axioms wholesale. Nevertheless, they are useful to observe in their unmodified form, since they allow observation of a flawless logical positivist framework which <u>should</u> guide inquiry, even if it does not perform perfectly.

With what might you counter this system -- which has, after all, worked well for several hundred years ? You might play the geometry game. If you took Euclidian geometry and turned each axiom on its head, what would you have? You would have Lobachevskian geometry, a seemingly non-sensical geometry which could hardly be of use to anyone but another mathematician, right? Wrong. We need Lobachevskian geometry to put men on the moon and to recover them. Since Euclidian geometry is predicated on a linear, straight-line world, we cannot cope with the curved-ness of outer space with that limitation; we need the predicated roundness of Lobachevskian geometry in order to plot circular and parabolic orbits, and get our astronauts safely home. I'd like to play the same game here, turning conventional, scientific, or logical positivist inquiry on its axiomatic head. If I did that, what would it look like The axioms would go something like this:

1) reality -- rather than a singular reality, reality would become a multiple, socially-constructed, divergent set of entities, theoretically endless, and at least as proliferated as there are persons who might hold different constructions. The more involved science becomes in a given question, the less it converges, and the more the research

diverges, like Portnoy's famous onion, layers upon layers of realities. Reality in this paradigm is built upon the assumption that it is created from moment to moment as various individuals enact it; it exists as persons experience their world: holistically, seamlessly. To attempt to tear it apart into something scientists call variables destroys essential elements of meaning hidden within, and does violence to the individual whose construction it is we are investigating.

2) subject-object dualism -- the essential reactivity and interactivity of human researchers and respondents is here recognized, but its treatment is conceptually, pedagogically and morally different from that of the conventional scientist's. The interactivity is not resented, nor is it presumed to be a matter of great methodological error potential. Rather, reactivity and interactivity are assumed to be opportunities for interdependent mutual learning, with respondent teaching researcher which questions are of high salience, and with researcher reflecting to respondent her or her understanding of contextual meaning, and the constructions of other persons. Researcher and researched each move between the roles of teacher and learner, teaching each other about the world they inhabit, and how they make meaning of those worlds.

Clearly, this is a research situation where the researcher cannot remain distanced from the object of her or his inquiry. Involvement is key, and that involve-

ment has to have a very special quality. It must be honest, authentic, trustworthy, moral and utterly caring. Integrity in the research process is paramount with high face-to-face interaction between inquirer and respondents. (Please note that I have switched to the term respondents. The new paradigm demands that the use of the term "subjects", from the Latin subjugo, to go under the yoke, or to be enslaved, is wholly inappropriate. I prefer the term respondents, from the Latin respondere, to answer back as an equal. It should be apparent from this usage that I mean seriously to evoke a far more power-balanced form of inquiry than science has been accustomed to in the past, and indeed that is the case.)

3) generalization -- the possibility of nomothetic laws, time- and context-free rules about human behavior is non-existent in this form of inquiry. Since all human behavior is presumed to be time- and context-bound, and changing the time and the context may change the behavior --and, of course, the constructed reality --of the respondent, about the best you can hope for is idiographic and local knowledge (Geertz, 1983). This knowledge is encapsulated in what Lee Cronback calls "working hypotheses." Working hypotheses are propositions which have truth value for a given time and place; if one wants to know whether or not they hold somewhere else, that is a matter of

empirical testing and on-site verification, including comparison of sending and receiving contexts.

In this axiom, the social nature of the knowledge production function is recognized. Producing knowledge, however tentative it might be, is a form of human endeavor, complicated by history, time, place, and the belief systems of the co-producers.

4) causality -- clearly, in a non-deterministic universe, linear causal chains are insufficient to describe the complexity which characterizes human affairs. The alternative is to move to what Kaplan (1969) calls "pattern theories" of human behavior: theories where events and circumstances describe not linear chains, but rather patterns, much as a spider's web has a discernible pattern, even though each individual spider spins one differently. Events are viewed not from the perspective of straight-line order, but rather from a perspective of mutual influence, of plausible rather than definitive inferences, and not with variables, but with factor patternings. Conventional causality turns out to be as ephemeral and problematic as we intuitively knew it to be all along.

5) the role of values -- we are now in a position to acknowledge the role of values in the human enterprise known as science. Science cannot be value-free. Marion Namenwirth says that when scientists have declared they were not con-

scious of any bias in their research studies, this did not mean they were free of bias; it merely meant that they were unconscious (Namenwirth, 1987)!

We see now that values enter into the research process in at least five ways. First, values enter in when inquirers choose, frame and bound a problem. The choice of problem itself represents a set of value decisions, particularly regarding what individuals believe is important, or, what they believe is fundable. Second, values enter in when researchers choose a paradigm within which they will work. As Michael Patton points out, the choice of a paradigm is predominantly an unconscious act, handed down whole-cloth from one generation of inquirers to another. But in an age of the paradigm revolution, with two legitimate models for disciplined inquiry competing for primacy, the choice of paradigm is more problematic. You must make a conscious choice, remembering Sister Carita's observation that to not make a choice is to make a choice. After today, if not before, you will have had your consciousness raised, and if you do things the same way you have always done them, you will have made a decision, whether you recognize it or not.

Third, values enter in when inquirers choose an overall research strategy (which we call methodology) and a set of methods, qualitative or quantitative (which we call methods) to support the overall strategy. Fourth,

the inquirer faces values when she/he enters into a context and confronts respondents. Values inhere in contexts, and inquirers must take them into account. The choice of a context itself is a values decision. Working in the laboratory is a considerably different decision than working in a natural context.

Finally, researchers are confronted with values when the previous decisions are compared. Comparing all the decisions for internal coherence and consonance allows one to make a judgment regarding whether all the previous decisions support one another -- in which case, you may label the inquiry resonant, or whether the decisions are internally inconsistent or incongruent, in which case you label the inquiry dissonant. Values are an inescapable part of inquiry, just as they are an inescapable part of all human endeavors.

These axioms are displayed on the right side of Table 1, in contrast to the conventional axioms on the left side.

Rigor and Trustworthiness

There is a set of trustworthiness techniques developed to handle questions of rigor which might arise, although I'll not review them extensively here, since they are well-covered elsewhere (Lincoln and Guba, 1985). I do want to comment on them however. The conventional paradigm's criteria look like those in Table 2.

[INSERT TABLE 2 ABOUT HERE.]

We have substituted the terms credibility, plausibility, depen-

TABLE 2.

THE SCIENTIFIC PARADIGM TREATMENT OF RIGOR

Inquiry can be affected by:*	Which produce effects of:	Design Criteria To guard against which we:	In the hope this action will lead to:	And produce findings that are:
Masking or competing factors	Confounding	Control and/or randomize**	Internal validity	Contamination-proof
Situational variations	Atypicality	Require probability sampling	External validity	Context-proof
Instrumental drift or decay	Instability	Replicate	Reliability	Inconsistency-proof
Investigator predilections	Bias	Insulate the investigator	Objectivity	Investigator-proof

* These factors are seen as introducing errors.

** Randomization is necessary in all cases because resource limitations prevent controlling all possible confounding variables. It is that fact that makes statistics so indispensible--to permit estimation of "error terms" (random effects) and testing of "real" effects against them for significance. But statistics require quantification. Is there a qualitative analog?

dability and confirmability for the conventional paradigm's rigor terminology of internal validity, external validity, reliability and objectivity. We have switched terms for several purposes: first, we wanted to indicate that new paradigms require new languages of discourse, and our terms represent a first start at a new discourse; we wanted to cue our audiences that conventional proofs of rigor were inappropriate; third, we wanted to indicate that when you are using primarily qualitative methods, as you would be here, you cannot expect to apply exactly the same criteria you might for "hard" or quantitative data. Field methods require different forms of testing for validity and reliability. The tests and internal structures are themselves in place; we have not invented something in the way of field methods which takes the place of anything else. We have freely borrowed and adapted from old field anthropologists their techniques for ensuring that the results of their research were authentic, that is, had a form of truth value, and therefore could be asserted to be something more than the product of a demented mind gone native. The criteria are displayed in Table 3.

[INSERT TABLE 3 ABOUT HERE]

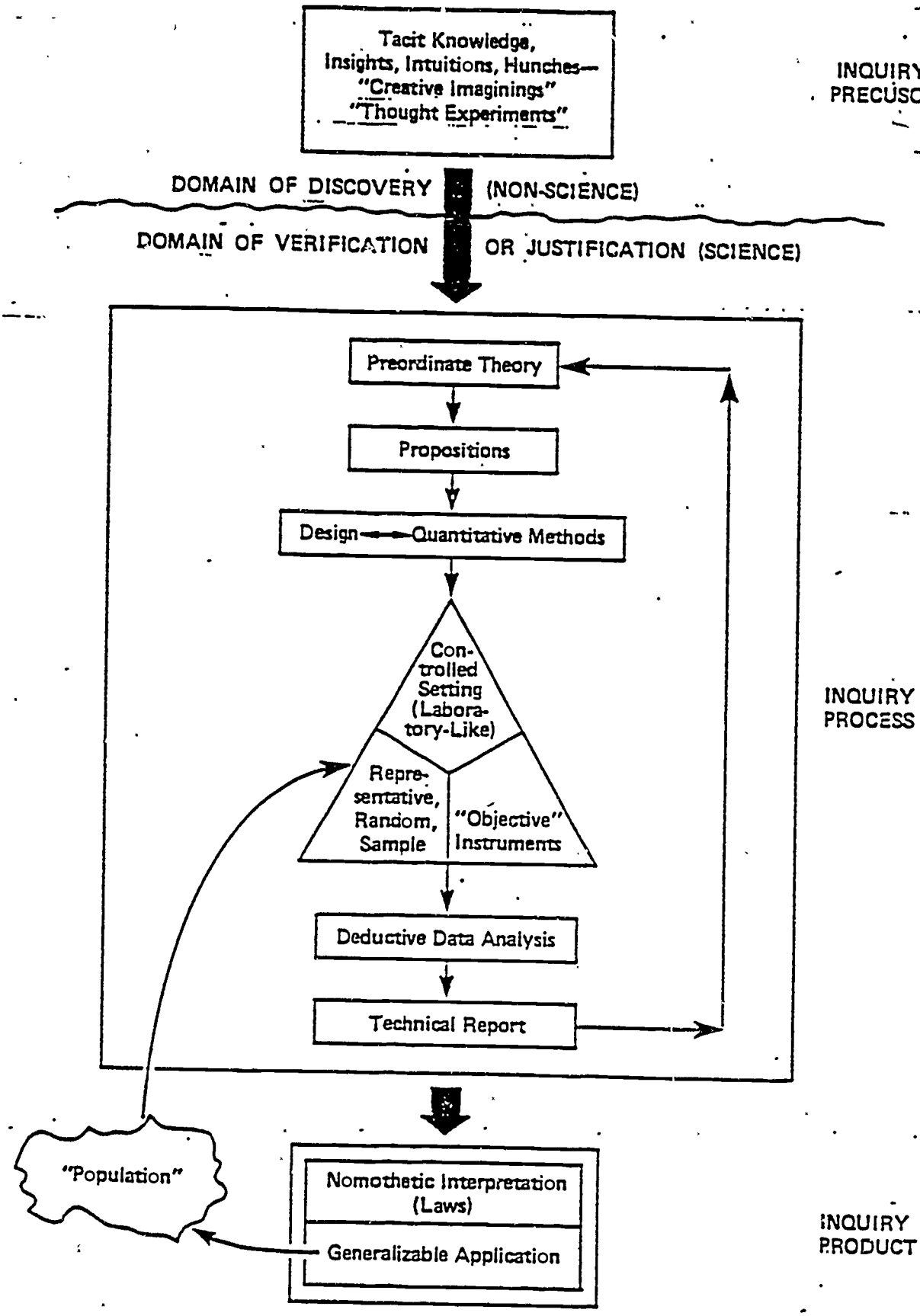
The important thing about all of this is not that you cannot get the same rigor in this paradigm that you believed you could in the conventional scientific paradigm. Conventional inquiry is a closed system. It walls off external criticism, non-corrorborating evidence, contrary data, in defense of the proposition under warrant. The model for conventional, or closed-system, inquiry looks like Figure 3. And naturalistic

[INSERT FIGURE 1 ABOUT HERE.]

TABLE 3.
THE NATURALISTIC PARADIGM TREATMENT OF RIGOR

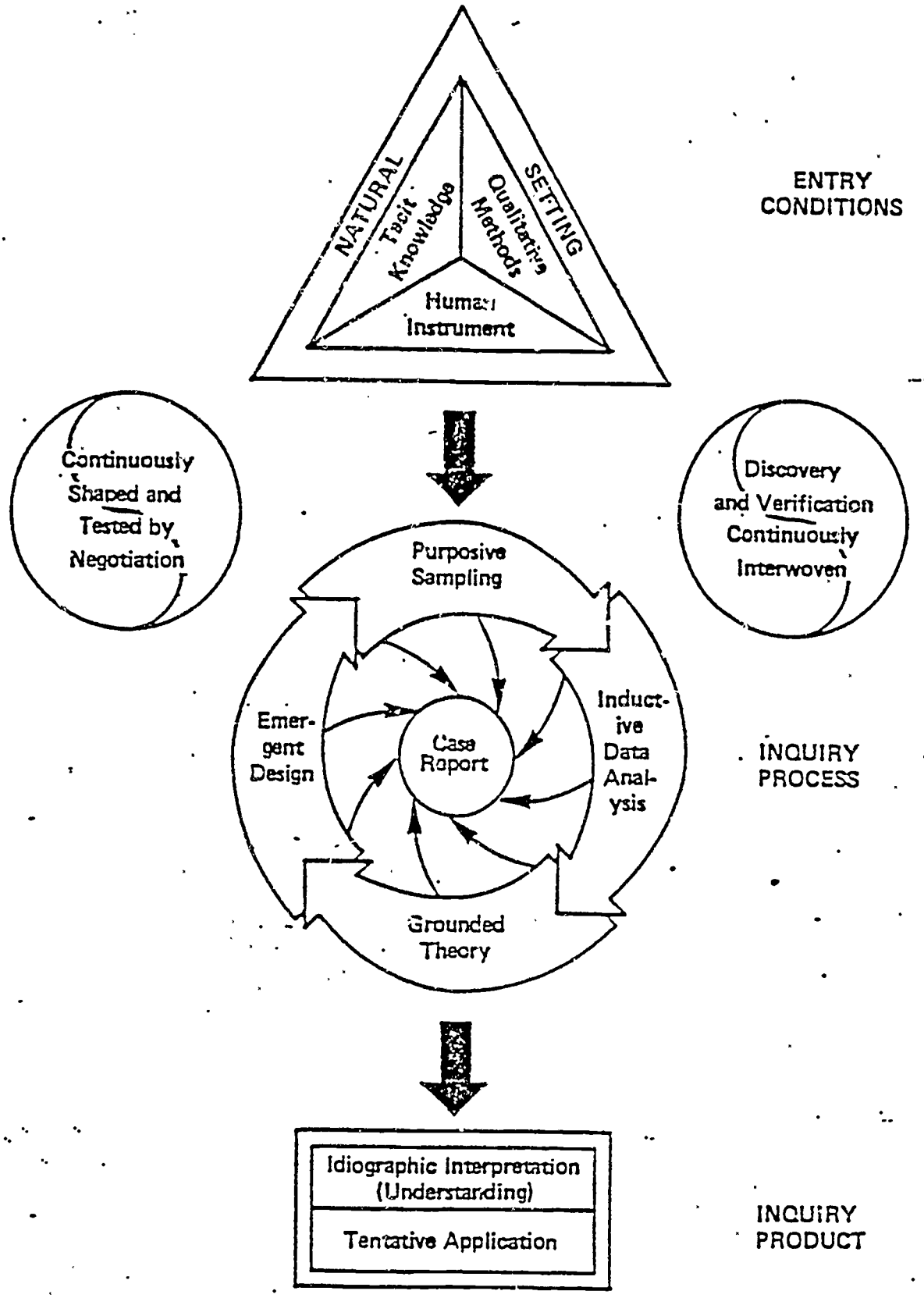
Inquiry can be affected by:	Which produce effects of:	Design Criteria To take account of which we:	In the hope this action will lead to:	And produce findings that are:
Factor patternings	Non-interpretability	Use prolonged engagement Use persistent observation Use debriefing by peers Use triangulation Establish structural corroboration Establish referential adequacy Do member checks	Credibility	Plausible
Situational uniquenesses	Non-comparability	Provide thick description Develop working hypotheses	Fittingness	Context-relevant
Instrumental changes	Instability	Use overlap method Use stepwise replication Leave audit trail	Auditability	Verifiable
Investigator predilections	Bias	Use triangulation	Confirmability	Investigator-free

FIGURE 1. THE REPRESENTATION OF CONVENTIONAL INQUIRY*



*All bounded by the problem, the evaluand, or the policy option, and tested by techniques relevant to positivistic trustworthiness criteria: internal validity, external validity, reliability, and objectivity.

FIGURE 2.
THE REPRESENTATION OF NATURALISTIC INQUIRY*



*All bounded by the problem, evaluand, or policy option, and tested by techniques relevant to naturalistic trustworthiness criteria: credibility, transferability, dependability, and confirmability.

inquiry is exactly the opposite: it is open system inquiry. As systems theorists among you may well remember, open systems are not impervious to outside data, outside evidence, or outside criticism. So there is a lack of finality, and a lack of elegance, to naturalistic inquiry. The lack of finality has to do with being open to new and contravening evidence at any moment; the lack of elegance has to do with the inquiry's reflection of the messy, multiple, social worlds of respondents. In short, when you switch, you are trading chic and smooth, the "Chanel effect", for rumpled and comfortable tweeds, the everyday-world, ordinary-language effect. You are trading your spit-shined wing-tip Florsheims for your Reeboks -- but at least they'll be you.

What are the Implications of New-Paradigm Inquiry for Special Education Researchers?

There are implications other than just axioms for what it is you do. Since this is open-systems inquiry, please note that your job has expanded some. Now you cannot just look for evidence. You must look for counter-evidence. You have to be committed to seeking constructions which are at variance with the ones you hold, or the ones which are held by a majority of your respondents. This is not something you do because you are a good researcher, although that is important. It is something you do because it is an ethical responsibility within the new paradigm, a moral obligation (please note here a new consideration: change paradigms and you change ethical problems and constraints). If there are mulitple constructions out there, you are under ob-

ligation to find them, to report them, to honor them. You are under obligation to have them enter into the negotiations regarding what gets into print about people, since they own their own data, and have a right to say how it is used.

And if you want their constructions, you must negotiate with them for those constructions. You cannot merely have them sign a consent form. They must understand what it is you're doing and why. And please notice, too, that deception, characteristic of many social and psychological studies in the past -- in the service of the search for that elusive "real" reality out there -- only thwarts the naturalist's search for multiple constructions. Thus deception is never warranted in the naturalistic, phenomenological paradigm. If you don't believe there is a single reality out there, but that reality is a social construction, then your job is to search for the multiple social constructions. You can't get at social constructions if your respondents don't know what to respond to. Thus the warrant for deceit is abrogated.

Closer to home, you have the problem of confronting what makes up your field. I would contend, with no disrespect intended, that most of the time, researchers do not know what makes up the field of special education. Special education researchers have exactly the same problem with giftedness or mental retardation or learning disability that the physicists have with the inside of an atom. We call it the "black box" syndrome. We cannot see into the brains of LD children, so we are left with the alternative of observing the outward process. How can we contend

with that? Just as the physicists do: by making inferences from process as to what might be going on (which is, of course, what we have been doing all along -- although we should remember that science tells us this is a poor substitute for "real science"). The point of this is to help us see that we have been doing things in many ways all along which contravene pure scientific method. Now we can justify those sensible things with a formal philosophical stance.

Another implication is what I call the democratic option. Naturalism demands that inquirers treat respondents as they would like to be treated themselves: as persons with rights, with agency, and with the power to make many, if not most, of the decisions regarding their lives. This, of course, gets abbreviated somewhat when researchers deal with retarded persons, but this does not mean that rights can be abrogated because persons cannot speak for themselves. We have an obligation to bend over backward in helping our respondents understand what it is you need from them and how you will use this information. You have an obligation to tell them you are seeking constructions from others which may be in opposition to their own constructions. We have an obligation to not only ask for their information and data, but to check our research findings with them to discover whether or not they would agree with our interpretations of their realities.

In naturalistic inquiry, data cannot be, as they so often are in conventional inquiry, separated from the interpretations which grow from it. The interpretations are, after all, representations of the constructions which we have gathered. It

is not enough to ask to use data; we must also request the use of interpretations -- ours, theirs, and those of others. And people have a right to remove more than their data; they have a right to demand that we do not present them in ways which they believe to be against their own best interests. We cannot hide behind our white lab coat and assert that what we are doing is for the larger purpose of gathering truth (translate: converging on that "real" reality out there), or serving society. Society is, after all, nothing more or less than a group of individuals who have given their common consent to live in lawful relations with one another, without violation of agreed-upon rights. The predominant purpose of naturalistic inquiry is furthering understanding -- understanding of how we group ourselves to achieve common purposes, understanding how patterns in society are sometimes good and sometimes impoverished, and understanding what sorts of things tend to occur together, without reference to causality. Verstehen: the Germans said it best when what they meant was profound insight and comprehension of something's essence.

On the Political Front

But there are other implications, too. We all live and work in a political world, a world where majority rule is the basis of the polity, and where legitimacy, primacy and hegemony often determine the "right". And the political implications of this form of inquiry are as important as the methodological implications. Just as the paradigm requires that we move out of the laboratory and into the natural setting, rely increasingly on

the human as instrument, depend on qualitative methods as the best way to get at multiple social constructions, and let our research designs emerge as you begin to sense salient issues from the context rather than from our prior office-bound formulations, the paradigm also unfortunately requires that we make extraordinary justification for such work, that we will sometimes find ourselves looking extra hard for outlets to publish our research, that we will compete at a disadvantage for funding for our research.

This is because there is a revolution going on, and the conventional scientists, who currently hold hegemony, ascribe both primacy and legitimacy to one single paradigm, and only one form of discourse: the logical positivist stance. The question here is power -- power to control funding, power to control who is hired and who is promoted and tenured, power to determine what gets published, and power to influence policy decisions.

Darwin and Kuhn both believed that new paradigms can only succeed older ones when holders of the conventional die off or retire from faculties and research centers. I do not believe that is the case. There is a plethora of evidence from this field that members of the field are calling for an abjuration of the old paradigm. I believe we can change the way we do research in this generation.

But it will mean making concerted efforts to educate funding sources, program officers, journal editors, and deans about the utility, the purposes, the hoped-for products from non-conventional inquiry. It will mean that those of you in this

audience, whom I am told represent the best, the brightest, the most powerful and the most senior, will have to put yourselves on the line. If you will not do this kind of research, at least you must support those who do as persons who may have a new vision of the world.

And finally, persons in the audience must rethink what it is that they are about. John Donne said, "No man is an island", and you are not, men and women, islands. We are historically-situated, socially-located beings, operating within dominant frames of reference of which we have little if any awareness. We have an obligation to become aware of those frames and social constructs. We are obliged to understand how science, like other political and social processes, has acted to preserve power in some and disenfranchise others, particularly women, persons of color, the elderly, the mentally disabled, the poor, children and those who have non-majority views of culture and society. We should understand how we speak from a position which is privileged, and therefore, legitimate; and when we do that, in our findings or our policy recommendations, we have a special obligation to speak for those who have no voice, and to write for those who have no outlet.

The important thing, from the perspective of today, about my being here is that we all understand that one paradigm reinforces power structures, and the competing paradigm reinforces democratic and participative modes of being in the world. Operating from one will preserve the status quo; operating from the other will necessarily redistribute the power balance. Just as science has political overtones and is not value-free so our

own research processes have political overtones. How we will use that power, and on whose behalf, is up to us. As Werner Erhard is fond of saying, "Are you going to make a difference, or are you just going to run your racket?" A switch in paradigm is one way of making a difference. For sure what we've been doing so far hasn't.

THE END.

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Yvonna S. Lincoln -- NATURALISTIC INQUIRY: POLITICS AND IMPLICATIONS FOR SPECIAL EDUCATION

QUESTION & ANSWER SESSION

Q. I think that we've worked long and hard the last couple of years, at our university at least, to try to make room for and to allow qualitative forms of investigations to occur, and that we're looking for accommodation in viewing them as different forms of research and methodology rather than competing forms. That's something that I think we've tried at our place, and I'm wondering what other folks have seen in their own institutions. It may not be an issue of either/or; it may be an issue of collaboration. It seems that in our own institution, there are more and more studies that combine qualitative and quantitative approaches. Statisticians (meaning myself) sometimes have a difficult time explaining significance. And the qualitative researchers, on the other hand, can add some dimension to the actual results that we are getting and the framework that we're working in. So, I think it's important, instead of looking at either/or, to look at how those two can collaborate.

A. This is often suggested, but please notice that is not a switch in paradigm. That is merely a switch in methods, and that's certainly one stance on the paradigm revolution, which is "We don't need to fix logical positivism, all we have to do is

use more qualitative methods." I don't have any problem with that, but you need to understand that we're talking at very different levels of the onion.

Q. I guess it's a question, too, of whether you're talking evolution or revolution, and I think more people are comfortable with evolution than they are with revolution. And if you're going to change, (viewing change as a process), then I think you're going to see more of that initially than people simply switching from one domain to the other.

A. I don't have any trouble with that interpretation, too. I think most people do not like dramatic change. No doubt about it. I, myself, think 400 years is hardly a revolution. I think it is sort of evolutionary. We waited a long time, but that's O.K.

Q. We're talking about a paradigmatic shift, and yet this approach to investigation has existed for decades. Aren't we actually seeing it applied in areas in which it wasn't applied before, rather than a paradigmatic shift?

A. You're right on both points. This is not new. What strikes me as new is that this is the first time anybody has created some kind of whole system for a phenomenologically based world view. Yes, it has existed for a long time. And it's absolutely true that many applied social sciences have used it. The question is one of primacy. It does not have great legitimacy now, and the problems that I've pointed out I have case studies to document.

People can't get funded because they want to do this kind of inquiry. So it's not that it hasn't been around, it's not that it's not well recognized in other social sciences. It's just that in education, educational research, and I'm using it in a very broad way, we simply have not given it much credence.

Q. Those of us who have done single-subject research have encountered exactly the same thing in the last 25 years, and interestingly enough, in the last 10 years that these people have gone back and found incidences or examples that demonstrate such approaches have been used. So, it seems to me that you're talking about the social phenomenon of acceptability in approaches. I don't know if you can cut it short, but I think that (rest of sentence inaudible).

A. But twenty years is better than waiting for everybody to die off, right?

Q. Can you give examples of educational research where this kind of approach has been used successfully?

A. I can't cite you findings, but, of course, Tom Skrtic's technical report exists in the ERIC database--it's absolutely excellent. It has a set of case studies, it has a set of policy recommendations, and it has a very extensive technical report that tells you how the field work was carried out and in what ways it's internally consistent with the axioms of naturalistic

inquiry. It's well worth the investment of the sixty bucks or whatever it takes to pull it out of the ERIC system--it's four volumes long, but it's absolutely first-rate. And it's in your area of special education. It's called Special Education in Rural America by Skrtic, Guba and Knowlton. It's the best full length, two-and-a-half year study that I know about. And that would probably be much more consonant with some of your projects. So it looks like your research.

Q. (First part of question inaudible) and the follow up to that would be, is acceptance of the paradigm more than an article of faith, and are there problems with the frameworks we already have not tolerating the tenets that we have here?

A. You cannot, without going crazy, both believe that there is a reality and there isn't a reality all at the same time; that generalization is possible, and generalization is impossible; that linear causality is possible, and linear causality is impossible; and keep all of that stuff in your mind, just like the queen in Alice in Wonderland, remember, who believed three impossible things before breakfast every day. You're welcome to blend them, but remember, we're talking here about world views, we're talking about what you think the nature of the cosmos is. And my guess is--as Egon is wont to say, "You're going to go crazy trying to believe this stuff." You can't mix and match, for the simple reason that the axioms are mutually reinforcing of one another. If you believe there is a reality out there, but

that you can write no generalization about it, then who would believe there is a reality out there? See what I'm saying? You can't blend them very well. It's like saying to yourself, "I believe there's a God, but I don't believe there's a God." To take both of those propositions seriously, to really try to believe those at once, will drive you nuts. So, no, you can't blend the paradigms. I remember now what your second choice was: Koons says that the paradigm switch is not a matter of scientific proofs, that it's a conversion experience, an article of faith. He says you just decide that one of the other feels more comfortable, or matches your own particular experience. That's essentially how you decide what your paradigm is.

A. A follow up, if I may. Do you think it's important to know what is the paradigm of those who are your respondents? And is it your experience that the respondents are generally more knowledgeable about conventional science?

Q. That's a question for which I have no answer. I think if you're doing very close, careful interviewing, you will come to know aspects of the world view of your respondents. I don't think that most of the people that you use as respondents will be able to articulate it in a nice clear, clean way--the way we've done here today--to say this one and this is the other and these are all the tenets of my faith. That's too much like The Book of Common Prayer. Most people can't do that. But if you're

doing good interviewing or good observation, you can make inferences about the meanings that people attach--it depends upon your problem. You had another question, too.

Q. Where can we read about the paradigm shifts in the hard sciences, if we're really interested in looking at how the shift is functional in the hard sciences?

A. Probably the best thing that's available is in paperback, and it's by Gary Zukav. It's called The Dancing Wu-Li Masters, believe it or not. And what it does is look at the new physics. It gives you sort of a history, and Zukav is not a scientist--he's a technical reporter for a newspaper. He went about interviewing physicists, saying, "What is this new physics that you're doing, because I don't understand it." It's told in lay-person's terms--you don't have to be a physicist to understand this--and you can buy the book for $2.95 on the newsstand. It's still in print. Fritzof Capra is a good one on the paradigm shift. The new book, Chaos, is one. Chemistry Transformed, by Charles McCann, which talks about the paradigm revolution when chemistry switched from phlogiston to oxygen. The French scientists were saying, "O.K., we can understand this. This oxygen is cool and it accounts for all of the phenomena we have observed for centuries, but explain to us what happened to the phlogiston." That's kind of what people who are in the middle of a paradigm shift do. They're O.K with oxygen, just tell them where the other stuff went. Those are all places to read about

it, plus Time and Newsweek magazines, the latest issue on Stephen Hawking, the physicist who's trying to unify macro- and micro-physics into a grand cosmos theory. If you can get through that stuff, you're well on your way to understanding what's happening in the hard sciences. Actually, it's quite interesting. It's an adventure into the hard sciences, and Zukav says (I hate to use this word) it's "psychedelic" what's happening out there. But he explains things like Heisenberg's uncertainty principle and Bell's theorem and how relativity enters into this. And he explains what Schrodinger's cat is, and what it means, in lay-person's terms. Excellent book.

Q. I find your predicates provocative, ones that many of us share, but I don't necessarily think that your conclusions follow.

A. Where do you take exception?

Q. Well, one, perhaps in the characterization of what the current state of thinking about the philosophy of science is in a group like this. I get a feeling that I'm hearing about 1940's kind of logical positivism, rather than a contemporary version of science as it occurs in purely conventional forms, and kind of a work-a-day operational look. It seems to me that we've incorporated many different aspects from chronological approaches, we've read our Gestalt. Well, we have a lot of different things (rest of sentence inaudible). So I disagree

with your conclusion that we must have a revolution. It seems to me that what we've learned from the physical sciences is that we didn't reject Newtonian physics when Einstein gave us a different view; we said there are certain classes of problems for which the one view serves us well and other classes of problems for which another view would be more profitable. Now, when you argue that we must reject the one in order to accept the other, that's good scientific theatre, but I think that it runs the risk of not paying careful enough attention to some of the basics by which every science has "boot-strapped" itself. We need decent descriptions of environments in a variety of ways. So, it is in the conclusion that no, not evolution, up with revolution, that I think your case is a little overstated.

A. I think you haven't been in the literature. I'm currently working on an extraordinarily long piece; I have reviewed nearly a thousand pieces of literature from 30 different academic disiciplines. We have a revolution. Nobody is going to revolt based on whatever Yvonna Lincoln says. Who's Yvonna Lincoln? I know four people in the audience. Right? People are in revolt. The academic disciplines are in open revolt, and they have been for more than a dozen years. My call to you is to be a part of the revolution, not to call for a revolution. We will, we are evolving. My call is not to say you must decide if you are going to have a forcible revolution or have a nice gentle change-process-oriented evolution. There is a revolution going on out

there, and it does have to with the phenomenological paradigm. Now, with respect to your other question, I think that's right, but that's why I put caveats on the early part of my statement to say, "These things up here on the left side of the chart represent, essentially, very rarified forms of conventional inquiry." And I don't think you, or anybody else, operates by those. But I do believe that they do represent assumptions about the nature of the universe. I think they do represent the operating assumptions. For instance, throw me any six articles out of your journal, and I'll do a content analysis for you, and show you where the assumptions exist. That they are routinely violated we all know. I gave you that on page four.

Q. Will you specify the rules in advance?

A. Pardon?

Q. What are the rules by which you will do that?

A. But you see, the point is that individual researchers do it. I don't understand the thrust of what you're saying. My comment to you would be, individual researchers make up the rules about what they will systematically violate as they go along. I can't tell you what those rules are. I can tell you about conversations with different researchers in this room and outside of this room, and I can tell you what they say to me. They say things like, "Well, of course, we know that this isn't

'objective,' but we have to talk that kind of language if we want to get funded." I think individual researchers and teams make up the rules for where and under what conditions they'll stretch the belief system. I'll give you that. I don't have any problem with that. But it doesn't "fix" the system.

Q. To say that there is a group of people that you've had a conversation with, with whom there is an admission that the process isn't working well, and that therefore the process is not adequate on the basis on that line of reasoning, does not really discredit what is the system.

A. I think we've been miscommunicating because I didn't reason in particularly that way. I reasoned by a content analysis from the literature out there, not because individual researchers told me. Individual researchers acted as qualitative data sources for what we saw going on in the literature. I'm not sure that's how I would characterize an ad hominem attack, or argument, or whatever. In any event, they were not my primary or sole data sources.

Q. Looking through the literature, where those are your respondents and you're looking at their assumptions, vis-a-vis naturalistic or rationalistic explanations, how do you check your interpretations when you're talking about thousands and thousands of articles? How do you go back, from the naturalistic ethical perspective, to see if, in fact, they agree that your characterization of their methods is accurate?

A. Sometimes you ask, but sometimes you don't have to--they just say it. They say we have found three causes...

Q. You mean it's written?

A. Yes, it's written in a journal article. They assert it in technical language.

Q. O.K. I thought it was more of a dialog process--that you were characterizing it from that as well as the (inaudible).

A. Only with my doctoral students.

Q. They're making another strawman that you've set up but haven't acknowledged, and that has to do with the difference between the single, isolated researcher and the research community. And I want you to make a speech as to how findings in naturalistic inquiry accrue from study to study. I have an image of our fine state of unity as being one that has within it individual studies which are all flawed, and all violate assumptions, and all are poorly designed. But in toto, they begin to approximate something like truths. Maybe the question is not even apropros in the new jargon, but if knowledge is so local, how does knowledge improve from study to study?

A. You heard that question? This is one of the funner questions around, because it starts from an assumption that the way we build knowledge is exactly the way Egyptians built pyramids. You

know, we put blocks, and then we put blocks on top of those, and when we get up here you should have what Stephen Hawking's wants, which is the unified theory of the universe. All you have to do is change your social construction about what knowledge is. See, I don't think that all knowledge (I think there is some knowledge) is knowledge that we can aggregate and treat taxonomically. I think there are other kinds of knowledge which may be circular--non-linear, non-hierarchical, non-parametal. So, the question about how do we know if knowledge accrues, becomes a critical one. It's actually a very good question. I'm making light of it because it's sort of warm up here and I'm getting kind of ditsy, but if there are some knowledges which do not accrue, that is aggregate, pile up, stack up, look neat and square, then what constitutes knowledge? And my response would be, ever-increasing sophistication and understanding about social and human processes--that's not necessarily an aggregationist statement. Do you see what I mean? I don't know where to go. I don't have all the answers, but that's my best answer now. I honestly believe there are some knowledges that we have which are not accretionary, which do not accrue, in the same way interest accrues on your checking account. I think there's some knowledge which enlarges, there are some bodies of knowledge, maybe, which address impoverishment, knowledge impoverishment, or spiritual impoverishment, and I believe that those knowledges may be circular, they may be spiral, they may be helical. They represent not bits and pieces that we can put on a pile somewhere

as what science has done, but they represent increased sophistication among all of us about what is happening and what we want to do about what is happening. I think, in other words, that your model is a singular model, but it's only one model of knowledge. And that it is a helpful model of knowledge, but it's not by a long shot all the models of knowledge which we could be using.

Q. One of the problems that I'm experiencing is that you have (words inaudible) a very extensive and intricate presentation, that it's not really possible to think through and respond to (words inaudible) but that's part of the structural problem. I've read the Capra book quite closely, (rest of question inaudible).

A. You need to read the book or see the movie, Naturalistic Inquiry. I couldn't begin to do in 35 minutes any kind of justice to the kind of arguments that are mounted. You still might not buy into the arguments. You might never want to be converted, but at least you could see the form and the structure that the arguments take. I think that's what you're calling for here. a chance to be able to chew some of this stuff over and think about it and react to it. And it might help you if you picked up the book because then you've got something much more substantive. You're right, you don't have anything in your hands at the moment, to work with. The arguments I've made today in more extended and substantive form would be helpful.