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Postpositivist Scientific Philosophy: Mediating Convergences

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Chapter One Introduction: A Postpositivist Option

Abstract

Insights from Dewey, Popper, and Rescher suggest a broad-based postpositivist philosophy mediating critical space between positivism and constructivism based upon the quest for truth as a regulative ideal within a fallibilistic scientific epistemology. A critical issue in adult literacy education illustrates the viability of postpositivist research design as applicable especially to the social sciences. The object here is less to draw out the subtle distinctions and potential points of conflict between Dewey, Popper, and Rescher, than to highlight some of the ways in which the collective impact of their work contributes toward the shaping of a postpositivist temper.

When a man desires ardently to know the truth, his first effort will be to imagine what the truth can be. He cannot prosecute his pursuit long without finding that imagination unbridled is sure to carry him off track. Yet, nevertheless, it remains true that there is, after all, nothing but imagination that can ever supply him an inkling of truth (Peirce, 1955, p. 43).

If scientific knowledge enables us to estimate more accurately the worth of things as signs, we can afford to exchange a loss of theoretical certitude for a gain in practical judgment. For if we can judge events for indications of other events, we can prepare in all cases for the coming of what is anticipated. In some cases, we can forestall a happening; desiring one event to happen rather than another, we can intentionally set about institution of those changes which our best knowledge tells us to be connected with that which we are after (Dewey, 1929/1988, p. 170).

The quest for a scientific grounding for social science research has been a pervasive theme of 20th century scholarship. While the search for an exacting methodology has marked the century's efforts in the positivist mode, critical approaches based on other forms of constructing knowledge have also been perennial (Polkinghorne, 1983). This is certainly the case in educational research as reflected in the current Bush administration focus on "scientific (or "evidence") based educational research" with its penchant for experimental design, consequently, random sampling, as the "gold standard" in the "hierarchy of methods" (Comings, Beder, Bingman, Reder, and Smith, 2003, p. 5). On the scale laid out in *Establishing an Evidence-Based Adult Education System*, quasi-

experimental research comes next. Case study analysis is viewed as the least desirable methodology as it typically “employ(s) only a treatment group and assume(s) that differences among participants are not important or are obvious, since the sample is usually small” (p. 5). Consequently, there is little basis to establish generalized findings that apply from one given situation to another.

A document from the Institute of Education Studies similarly notes that “well-designed and implemented randomized control trials are considered the ‘gold standard’ for evaluating an intervention’s effectiveness, in fields such as medicine, welfare and employment policy and psychology” (U.S. Department of Education, 2003, p. 1), and therefore, also applicable to educational research. In another governmentally supported research paper, a similar analogy to medicine is made, with “treatment” the operative intervention relevant whether of the doctor to the patient or the teacher to the student. On this premise, socio-cultural interpretations of education are eliminated, as is the realm of values, which are viewed as outside the purview of legitimate science. The focus becomes, rather, on the technology of “what works” (Stanovitch & Stanovitch, 2003) in which the litmus test of verifiability stems from such scientific principles as “control, manipulation, and randomization” (p. 11) based on the ideal standard of statistically-valid “meta-analysis” (p. 18).

In certain lab-like environments where independent variables can be tightly controlled, experimental design can be a valuable, and, depending on the nature of the problem under study, an essential instrumentality. The methodology, even according to the more qualifying precepts of quasi-experimental design, is more problematic where variables interact in less than precisely discernable ways. This is particularly the case over regions of research like motivation and the murkier, yet, for the social sciences, the critical arena of consciousness, if one is seeking to *understand*, rather than simply to report on, the behavior of agents. In these regions evidence pointing to causal attribution may be susceptible to multiple explanations, which may require the “thick” description of case study analysis. In postpositivist design (see below) such areas of subjectivity do not simply collapse into the relativism of constructivism. They remain subject to the rigors of “experimental inquiry” (Peirce, 1955, p. 47) and to the ideal of “versimilitude” (approximation to the truth) (Popper, 1963) even if in a manner that would be difficult, if not impossible or irrelevant to be precisely broken down into statistically discernable categorizations or certain-like truth statements, however provisionally they may be held.

The underlying problem in the positivist quest for certainty is that of reductionism based on foundational sources of scientific analysis that stem from inductionist principles of verification through objective observation of given empirical data, or a priori rational principles of logic. Critics have noted that perception is theory-laden from inception and that both the selection and even the definition of what counts as data is a construct that cannot be accepted simply as given. Additional concerns include the underdetermination of theory by evidence that undercuts high levels of generality allegedly discerned through positivistic methodologies, as well as challenges to claims that analysis can be simply broken down into component parts given the ubiquity of situational contexts in which data is embedded. Critics also point to the centrality of the *social* dimension of social

science research in which “variables” complexly interact in a manner that may be susceptible to multiple causations and interpretations (Phillips and Burbules, 2000, pp. 14-25).

Notwithstanding the sophistication of the various anti-positivist critiques, given the allure of precision as a siren call of those seeking an exacting social science of human behavior, positivism in its several variants has continued to maintain a prominent position in social science research. Still, the criticism persists that the “human factor” cannot be calibrated into some precise equation, even as the counter pulls have sometimes led to a relativism in which science itself is viewed as simply another “metanarrative.” Those operating out of the positivist framework remain troubled by the specter of relativism of any methodology that is not rigorously based on modes of analysis that provide the most exacting information possible that can be verifiable through direct observation. The remedy is not a radical embrace of a constructivist alternative, but “to give contextual factors their proper place in investigation” (Pawson & Tilley, 1997, p. 53) while maintaining the ideals of objectivity and regulative truth.

In the current era, a mediating school of research has emerged in what has come to be referred to as postpositivism. This school is defined in the scholarly literature in varying ways, from that of an elaborated and up-to date form of positivism, which might be more accurately referred to as neopositivism (Mertens, 1998) to a sharp critique of scientific rationality itself characterized through the pejorative term “scientism” (Hawkesworth, 1988). Fischer (1998) provides one mediated picture, linking postpositivism with a coherent theory of truth and the realm of practical deliberation in the “anticipat[ion] and draw[ing] out of the multiple interpretations that bear on the explanation of social and political propositions” (p. 20). In this he gravitates toward the cultural axis of the postpositivist research tradition even in his quest for maximum rigor.

Phillips and Burbules (2000) provide a more rigorous definition in linking postpositivism to the scientific pole of critical analysis. Drawing substantially on Dewey and Popper, Phillips and Burbules (2000) embrace the concept of truth as a “regulative ideal.” For them, the quest for “reliable answers” (p. 2), what Dewey refers to as “warranted assertions,” honed through “rigorous inquiry” (p. 3), and capable of standing up to the test of falsification is both a feasible project for the human sciences and essential if such research is to lead to the progressive resolution of complex social problems. As the authors point out, such “competent inquiries” (Dewey, 1938/1991, p. 16) require both exacting rigor and an adequate accounting of the complexity of the subject matter at hand. In postpositivist design, it is the problem under investigation that determines the methodologies needed for its resolution, which can only be as exacting as allowed for by the topic under consideration (Popper, 1956/1983, pp. 7-8).

This paper seeks to extend the work of Fischer, and Phillips and Burbules through an exploration of three chords of 20th century philosophy congruent with the postpositivist temper: pragmatic functionalism via the experientially premised epistemology of Dewey, Popper’s critical rationalism, and a coherence theory of critical reasoning, articulated by contemporary philosopher Nicholas Rescher (2001). Through

this tri-partite analysis several approaches to the postpositivist quest for scientific rigor will be explored, as all three authors reject both positivism and a more relativistic “interpretive” theory of social science that averts the problem of probing into truth as a regulative ideal. Tensions between the scientific and cultural poles of postpositivist philosophy are also examined. Throughout the paper, I draw on a conflicting definitional issue in the field of adult literacy education, my area of specialization (Demetrian, 2004), to illustrate the various perspectives on research highlighted in Dewey, Popper, and Rescher.

Chapter Two Dewey's Functional Theory of Inquiry

Critical to Dewey is the foundational baseline of human experience as the pivot point for orienting an inquiry-based epistemology of logic (Hildenbrand, 2003; Shook, 2000). Core to his project is the progressive resolution of a problematic situation toward a more inclusive reconstruction that “satisfies” at some significant existential level. There is an emotional undertone to experience as lived and as reconstructed which can only be “had” rather than “known” in any discriminatingly cognitive sense. It is the dissonance or problematic gap within experience, grounded in biology, but also in society, culture, and psychology, which compels the search for satisfactory resolution, ultimately an aesthetic achievement. The role of inquiry is to adequately identify the dimensions of the problem, plausible steps needed for its proximate resolution through collection and analysis of relevant data, tentative concept (hypotheses) formation, and testing through controlled experimentation that evaluates the mettle of the proposed resolution toward the establishment of a satisfactory conclusion.

The resolution, a judgment, what Dewey (1938/1991) refers to as a warranted assertability, is subject to further modification as new conditions emerge. An underlying quest is Dewey's search for what he refers to as “intellectual organization ... on the ground of experience” (Dewey, 1938/1963, p. 85) based on a metaphysical faith that experience is something graspable by thought, notwithstanding an ineffable qualitative essence that defies description, unless there is some moving beyond it. The tensions in Dewey's project between the metaphysics of experience and explanation is attenuated by the processive teleology that grounds his project in an expanding social universe in which reconstruction is a critical aspect of human fulfillment. Even as what is “had” cannot be explained, but only experienced, what *was* had can, as the present is perpetually transformed into the past.

Although there is an inherently unstable aspect to this project, the underlying assumption is that stability itself, gained through controlled or competent inquiry, aesthetic accomplishments, and participatory engagement, is a genetic property of human experience, both to be established as well as found in a world that in many respects remains precarious and uncertain. For Dewey, the purpose of inquiry, and more broadly, the human vocation, is to help create this more desired experience, an aspiration of perpetual growth, which can never be fulfilled, or capable of transcending the realm of values. To this existential challenge, he recommended scientific inquiry as a critical instrument toward the progressive fulfillment of establishing more desirable reconstructions that cumulatively builds the human enterprise.

Logical Forms Accrue in and Through Inquiry

Dewey's project is grounded in the reasoned logic of human experience. Particularly troublesome to him were philosophical assumptions based on a priori methodologies and corresponding assumptions of human epistemology. On this he sharply criticized idealists, rationalists, and positivists alike for evading the fundamental challenge of linking philosophical science to the requirements of life and to the

possibilities of human flourishing within the context of concrete situations. Notwithstanding the criticism, Dewey drew heavily from the various schools of thought that he opposed, which resulted in a creative fusion that characterized his pragmatic vision.

One of Dewey's (1938/1991) most basic assumptions is that "logical forms" are functionally grounded in that they both "*originate*" [italics in original] and are defined through and "in operations of inquiry" (p. 11). Noting the variance between his view and more traditional schools of formal thought (both rationalistic and empirical), Dewey argued, "inquiry can develop in its own ongoing course the logical standards and forms which *further* [italics in original] inquiry shall submit" (p. 13). Thus, definitions and means of measuring progress in the attainment of literacy, while based on scientific reasoning, would develop from the inquiry process that this constructed term has undergone and will undergo in the future. This stance is essential on Dewey's reading in order to establish science as an effective instrument in the resolution of existential problems in which the criteria of satisfaction can only be determined in the crucible of human values as lived. As he stated elsewhere, "Genuine empirical method sets out from the actual subject-matter of primary experience, recognizes that reflection discriminates a new factor in it...makes an object of that...to regulate, when needed, further experiences of the subject-matter already contained in primary experience" (Dewey, 1929/1958, p. 18). The challenge, to which Dewey (1938/1991) posited as the project of his entire *Logic*, is the dilemma on "How can inquiry originate logical forms...and yet be subject to the requirement of these forms" (p. 13).

The underlying issue is whether there is anything a priori in any theory of logic. In Dewey's analysis there is at the most fundamental level, a habit of mind attuned to critical analysis of living experience. On this interpretation, knowledge itself takes on a functional role as an intermediary factor toward the movement from problem identified to progressive resolution. Consequently, axioms, what Dewey refers to as postulations, are also defined functionally as "stipulations," rules, or even laws that emerge from and ground the logical premises of the specific study matter under investigation, which can never be more, but also can never be less exacting as the particular case allows. The determination of levels of precision in any axiomatic theorem is a discovery process itself that takes place as the investigation unfolds. "Only after inquiry has proceeded for a considerable time and has hit upon methods that work successfully [in any particular case], is it possible to extract the postulates that are involved" (p. 25). Even with Dewey, a priori reasoning is evident, though more in the manner of how the problem resolution process proceeds as a naturalistic form of inquiry, than with predetermined assumptions of how the mind works or fixed relationships between data and analysis.

Situations as Field of Analysis

Another of Dewey's core assumptions is that behavior can only be understood by an accounting of its varying meanings as discerned within a situation. Dewey makes an important distinction between common sense and science in terms of how knowledge is constructed in pointing out the more central role of culture and dominant norms in the

former. To put this in more formal terms, on Dewey's considered view, "significances and meanings" reflective of common sense "are determined in reference to pretty directly existential application" while in the realms formal scientific analysis they are "determined on the ground of... systematic relations of coherence and consistency" (p. 71).

Even still, the substantive link that Dewey brings out between the two is the centrality of a context-based derivation of meaning that cannot be reduced to atomistic components or sharp isolation of independent variables in describing behavior that can only be grasped within the fields of contexts in which it is situated. More fundamentally, the specific field of focus and the relation of any part to the whole (in common sense and in science) depends on the problem focus of the investigation at hand in its role as a factor in serving as a critical piece of evidence in the actual formation of a particular judgment. In short, "independent" variables do not stand alone, whether in common sense or in science. Rather, they have functional capacity in relation to the specific project of focus as defined by the "total qualitative situation" (p. 74) in which even common sense becomes, in Dewey's vision, subject, to the degree possible, to the more rigorous methodologies of scientific logic.

Critical to Dewey's concept of situations is that of language and, in his usage, to the role of sign systems in referring to culture, and to symbols pertaining to science. Significance and meaning are derived from these abstractive capacities, from which inference making emerges, the *sine non-qua* of Dewey's interpretation of logic as a theory of inquiry. Thus, the very shaping of a problem, for example, the definition of literacy, whether as a synonym descriptive of the technical mastery of reading and writing, or whether applied in a more metaphorical way to that of knowledge acquisition ("multiliteracies") can only be grasped within the context of the mutual interaction of culture and language. In the former case, reading and writing proficiency are taken as the ultimate determinants of literacy. These technologies, in principle, are subject to more exacting methodologies of assessment based on scales of measurement than those plausible through the more metaphorical definition of literacy. In the latter case, reading and writing technologies are viewed as subset variables that may be more or less salient in given circumstances, as determined by the broader contexts in which various "literacy practices" are embedded (Barton, 1994). Whether pertaining to common sense or to science:

...no sound, mark, product of art, is a word or part of language in isolation. Any word or phrase has the meaning which it has only as a member of a constellation of related meanings. Words as representative are part of an inclusive code. The code may be public or private. A public code is illustrated in any language that is current in a given cultural group. A private code is one agreed upon by members of special groups so as to be unintelligible to those who have not been initiated. Between these two come argots of special groups in a community, and the technical codes invented for a restricted special purpose, like the one used by ships at sea. But in every case, a particular word has its meaning only in relation to the code of which it is one constituent (Dewey, 1938/1991, p. 55).

The challenge to which Dewey's *Logic* sets out to achieve is to provide a mode of reasoning that accounts for situations, which are shaped by such symbolically mediated discourse. In order to do so, Dewey's "new logic" needs to fully account for their existential complexity and particularity, while providing a mode of inquiry that brings the desired level of satisfaction that progressively resolves the initial problematic situation in the process of reconstructing a more satisfactory one. The work, which takes place through what Dewey refers to as a "means-ends continuum," brings maximum scientific reasoning through "controlled inquiry" to the process, consistent with the complexity of the problem at hand.

Pattern of Inquiry

Inquiry-based logic is rooted in biology. This is a core axiom of Dewey's Darwinian-based naturalistic epistemology and that which separates it from traditional schools of logic, whether those more empirically or rationalistically based. It is this assumption that grounds Dewey's problem-solving functionalism in which the organism transacts life processes through an environmental medium in which privation and danger compel an instinctive search for restoration that typically moves beyond the always tentative equilibrium initially disturbed by the problematic situation. On this view, the requirements of living itself exhibit "a continual rhythm of disequilibriums and recoveries of equilibrium" (p. 34) with the pressing medium of need and the compulsion to survive driving the process of reconstruction.

The "searching activities" (p. 35) that follow are sequenced responses that take on different functions in the various stages in the hunt for satisfactory resolution, which are guided by the qualitative whole that defines the problem situation, on Dewey's reading all the way through the means-ends continuum. "At each intermediary stage [en route to resolution] there is still tension between contact activities and those responses to stimuli through distance-receptors. Movement continues until integration is established...in the consummatory act" (p. 36) resulting in the resolution of whatever it was that drove the process of active searching. Thus, whether a stimulus or response, various functions of behavior do not stand alone. They are an organic part "of the total coordinated serial behavior" (p. 37) leading ultimately to the resolution of the focused upon problem. The various stages of behavior are instrumental in which their function is defined by what they accomplish at the given time toward the greater whole that is driving the process.

On this biological interpretation, "logical forms" can only *but* accrue through the process of investigation itself, in the cumulative construction of reality toward the desired restoration. To draw from our example, an understanding of the meaning and significance of literacy may emerge from a systematic examination of the conflicting definitional viewpoints, which propels the research that may bring a sense of resolution to the field missing out of the arguments and sources of evidence that are currently prevalent to this particular arena of investigation (Demetrian, 2004). The process, discussed more fully in later sections of this paper, requires a broad range of methodologies in the pursuit of questions and potentially fruitful lines of research that

may come to be accepted as a warranted assertability, which may only open up as the work ensues in which the logic underlying it unfolds through what is discovered.

Human inquiry builds on these biological processes, adding the important components of language, including inference capacity, symbolization, and highly discriminating forms of reasoning of both analytic and synthetic dimensions. The a priori exists only in the process itself in which consciousness emerges as a pressure point out of a more general habitude of “mind” through a problematic disruption that sets off the search for satisfactory resolution (Dewey, 1929/1958, p. 303). Thus, in our example, lack of clarity and broad-based agreement on the meaning and significance of adult literacy, *to the extent that it is perceived as a problem*, drives the investigative process, which cannot rest until some reasonably satisfactory resolution has been achieved. “Restoration of integration can be effected... only by operations which actually modify conditions, not by merely ‘mental’ processes” (Dewey 1938/1991, p. 110). These operations need to be carefully calibrated to the investigation of “the facts of the case” (p. 113) all the way through the various stages in the working from problem identified to problem resolved.

Once a problem is identified, the critical next stage calls for an initial hypothesis as a potential solution to guide both the collection and analysis of relevant data. This process of concept building informed by data analysis and tightly correlated to the “functional fitness” (p. 114) of the case at hand continues as long as the investigation endures, though taking on different hues as the process unfolds. What is crucial is that whatever stage of investigation that is underway that the forming concepts represent the best possible hypothesis consistent with the data that the researcher can access in its potential problem resolution function. The focus at any given time may be on either emergent idea formation or concentrated data collection and analysis in the testing out of the functional fit. The underlying dynamic is that maximal efforts to resolve the problem are operative throughout all the stages of the process.

Consequently, the ends-in-view are symbolically embedded throughout the means-ends continuum, creating a holographic effect in which the different dimensions of the effort are functionally correlated to that which needs to be accomplished at the given time in moving the inquiry to its destination. This crystalline effect establishes a tension that stimulates the compulsive drive toward the achievement of the ultimate aim, itself modifiable as the inquiry proceeds. Various “intermediate meanings” are formed that are progressively “more clearly *relevant* [italics in original] to the problem at hand than the originally suggested idea” (p. 115). Dewey explains the functional inquiry-based inquiry process that grounds his thesis in *Logic* in this representative statement:

Facts are evidential and tests of an idea in so far as they are capable of being organized with one another. The organization can be achieved only as they *interact* [italics in original] with one another. When the problematic situation is such as to require extensive inquiries to effect its resolution, a series of interactions intervenes. Some observed facts point to an idea that stands for a possible solution. The idea involves more observation. Some of the newly

observed facts link up with those previously observed and are such to rule out other observed things with respect to their evidential function. The new order of facts suggests a modified idea (or hypothesis) which occasions new observations whose result again determines a new order of facts until the existing order is both unified and complete. In the course of this serial process, the ideas that represent possible solutions are tested and ‘proved’” (p. 117)

It is this reconstructive process emerging from problem resolution to which Dewey refers as “controlled inquiry” in which its logic unfolds through the investigation.

Judgments of Practice

Dewey’s concept of judgments of practice has two meanings. The first is related to the resolution through inquiry of problematic situations in the existential realm of living experience. The second is related to the methodology that gives shape to the increasingly controlled inquiry that scientists engage in formal investigations. In either case, the achievement is not the attainment of certainty, but one sufficiently satisfactory based on the available evidence that brings a close to the case at hand. The close “which will resolve the predicament in which the agent finds himself involved” (p. 169) will be as precise or as fluid as the situation that defines the reconstruction as *that* determinative solution allows. For the field of adult literacy, any definition of literacy that does emerge as a warranted assertion will most likely represent some combination of a culturally acceptable interpretation of the meaning and significance of literacy with that of some technological precision in the progressive capacity to read and write print texts. This at least is my provisional hypothesis, which will be spelled out in greater detail later.

An analogy, which Dewey frequently draws on, is that of a judgment in a court of law in providing sufficient evidence to close the case at hand. Although a legal decision is open to further consideration, it has a binding impact that can only be opened if there is sufficient reason to modify the original verdict that typically requires a formal appeal process. As in the case of a legal ruling, final judgment “is dependent on a series of partial judgments” (p. 125) in which the cogency of inquiry all the way through the process inevitability bears upon the quality of the final resolution. As Dewey more formally describes the means-ends continuum:

Every complex inquiry is marked by a series of stages that are *relative* (italics in original) completions. For complex inquiries involve a constellation of sub-problems and the solution of each of them is a resolution of some tension. Each such solution is a heightening of subject-matter, in direct ratio to the number and variety of discrepant and conflicting conditions that are brought to unification. The occurrence of these judgments of completion, not different in kind from those ordinarily called esthetic, constitutes a series of landmarks in the progress of any undertaking. They are signs of achieved coherence of actual material and the consistency of conceptual material (p. 178).

The key feature is maximum inference making at each and every stage, in which the ends-in-view are embedded within the various means that are utilized towards its achievement. The problem situation, as a succession of qualitative wholes, moves forward through controlled operations designed both to sift the evidence and to test the various hypotheses formed in the progressive movement toward the desired outcome.

The “judgment,” in short, “is a process of temporal existential resolution” (p. 136). Inference making is a critical aspect in the shaping of such judgments, but only to the extent to which increasingly rigorous conjectures are coordinated to the operations that emerge from and shape the guiding direction of the inquiry process. The “end brought about only by means of existential change” through operations of inquiry, results in “some new situation in which the difficulties and troubles which elicited deliberation are done away with” (p. 163). The ends-in-view, the anticipated desired outcome, provides a general guide to the inquiry project at hand. However, the resulting achievement is not an ideal, but an actual change that, however temporal, resolves the situation at hand and brings a close of some substantive portion to the matter.

However subjective such a view of logical inquiry might seem from a more objectivist epistemology, it is in line with Dewey’s project in the seeking of the intellectual organization of experience and in linking philosophy to the challenges of living experience. Such a philosophy can only be *but* value laden, which is not to discount the role of science both in defining a problem and in articulating the modes of operation in progressively moving toward its resolution—a science that speaks to the exigencies of the human condition. On Dewey’s reading, the logical forms of such a science itself accrue in the crucible of grappling with the quest to resolve the existential situations of a problematic nature that stimulate the inquiry process. Such forms can only be as precise or as fluid as the human situations under scrutiny allow, as applicable, for example, to working definitions of adult literacy as emerging from the collective influences of those who have the capacity to shape it.

Chapter Three Popper's Critical Rationalism

Notwithstanding the divergent intellectual and cultural background of the American pragmatist Dewey and the Austrian-born critical rationalist, Popper, there was considerable affinity in their work. In rejecting inductionism as a foundational basis for grounding science, they both identified the quest to resolve a problem as the critical starting factor in scientific investigation. They each in somewhat different ways drew out the importance of theory in guiding the initial sense of direction for research and linked competent inquiry to an increasingly refined relationship of idea formation and data analysis all the way through the analysis that includes the mediation of rigorous experimentation and the testing ground of falsification.

In drawing on truth as a regulative ideal, both Dewey and Popper were equally rigorous in their quest to become as precise as the data allows in the analysis of causation of any given problem. They both sought to expand upon common sense realism through formal scientific investigation and viewed science and more generally human experience as a potential field of unending growth. They both rejected idealism and positivism in science, grounding investigation in whatever methodologies, approaches, and theories were deemed most effective throughout the various stages of a research project. They were mutually broad in their application of scientific investigation to the problems of living experience. However, Popper had more of an orientation toward the resolution of scientific problems while Dewey focused on the quest for the intellectual organization of experience through the unity of reconstructed existential situations.

Logic as a theory of inquiry, in the language of Dewey, was of central interest to both, representing the passionate consummation of their work as they mutually focused on a rigorous methodological process through the iterative relationships between hypothesis formation, data analysis, experimentation, and testing. However, Popper was less inclined to accept the Deweyan thesis that logic accrued by a rigorous means-ends process of knowledge construction as the inquiry proceeded. Popper, rather, took a more open approach to theory construction, focusing less on its development and more on the capacity of a particular theory to progressively resolve problems that remained unresolved in a previous theory, and therefore providing a better approximation to the truth, an ideal that can never be conclusively established. Combined with a methodology of falsification Popper sought weighty explanations that possess the capacity to withstand critical testing. Dewey also stressed the litmus test of falsification, although he placed more focus on the emergence of theory growing out of an inquiry process as a result of rigorously controlled inferences, whereas Popper placed more emphasis on bold conjectures not necessarily dependent on developmental processes. These, then, would have to prove their mettle by the extent to which they resolved a problem, opened up new learning, and withstood the challenges of critical tests.

To press a point, one might argue that Popper sought objectivity more as an ideal than Dewey who emphasized critical inquiry processes linked to his quest to seek the intellectual organization of experience. As with Popper's search for truth as a regulative ideal, Dewey's vision was also an ideal never achievable except in aesthetically

experienced consummatory moments, although it was one that prompted a powerful searching for its realization. The very effort, based on Dewey's hope in a world under construction, and therefore partially open to human intervention, contributed, however meagerly, toward its progressive attainment.

The commonalities between Dewey and Popper along with the depth of the probing of their scientific philosophies, alone, make their work of considerable importance in contributing to the development of a postpositivist science. Of value also are their subtle differences, which, when juxtaposed to their commonalities, add to a broad array of concepts that lend much weight to a postpositivist research design.

Conjecture and Refutation

Popper was an unabashed idealist (that is, a "metaphysical realist") in the faith he placed in humans to acquire knowledge about the world through logical reasoning, critical experimentation, and bold conjectures. He argued that although truth remained ever elusive, as a regulative ideal its quest provided an orientation beyond subjectivism by which to understand significant things about the world—important matters that did not depend on the perception of the thinker, but grounded in the substance of objective reality as squared by the facts. His purpose was to establish a surer sense of knowledge than available through Kantian a priori reasoning and the inductive empiricism of Hume and Locke.

Popper (1963) acknowledged as critically important the Kantian emphasis on intuition in the repudiation of the assumption that "we must begin with observations in order to derive our theories from them" (p. 256). Notwithstanding the role of intuition in setting out certain theoretical conjectures, which then direct further perception and cognition, for Popper, this Kantian baseline was an inadequate framework to ground the important work of critical reasoning needed to move from perception to knowledge. Intuition provided, rather an indispensable orientation, "an almost poetic" (p. 260) source of insight that helped establish a stance toward the world, but compared to scientific reasoning and critical experimentation, often wrong as a guide in the pursuit of truth, and therefore, an unreliable guide to the logic of scientific discovery. In some contrast, in Dewey's new logic, intuition regulated by controlled inquiry in the progressive working out of a problem, remained an important guiding source of illumination all the way through the inquiry process, although with Popper, Dewey rejected intuition on its own unaided merits as a valid source of knowledge.

As with a priori reasoning, so with inductive observation, which, according to Popper also depends on a priori assumptions in the belief that general laws can be assumed from regularities that appear in experience. That supposition, according to Popper, requires a leap in inference beyond the data that violates the assumptions undergirding empirical analysis, which can capture past and present experience, but nothing definitively certain about the future. This argument does not discount an exploratory belief that posits regularities as a bold conjecture, but the mettle of any speculation needs to be tested through rigorous experimentations that can exhibit the

capacity of withstanding severe testing both on the grounds of logical reasoning and relevant data analysis. More fundamentally, Popper (1963) argued that the truth of any scientific theory cannot be proven in “that we have no criterion of truth” even as we are “guided by the idea of truth as a *regulative principle*” (italics in original). However, to the degree that a theory withstands critical testing, solves problems in earlier relevant theories, and adds new important knowledge not previously encapsulated, it can be relied on in moving the enterprise of scientific knowledge forward even as the theory may be ultimately be proven false. In this respect, “there are criteria of progress” in achieving approximations “toward the truth” (p. 306).

Balanced Reading Theory

For example, balanced, or integrative reading theory is posited as a more satisfactory interpretation of how students learn to read than either whole language or phonemic based theories. This case is succinctly made by Purcell-Gates (1997), who argues, “most reading theorists...have abandoned such all or nothing approaches and embrace some form of interactive theory of the reading process, while prioritizing different parts of it” (p. 5). Whole language theorists emphasize the importance of learning how to read via an unconscious process of assimilation combined with regular practice in reading “real texts” over time, which taps into the motivational dynamics of students. Phonemic-based methodologies are not rejected, but are contextualized as but one crucial cueing system that may or may not be salient in any given learning situation. A core assumption of whole language advocates is that learning to read is as natural as learning how to speak (Smith, 1985).

Those emphasizing the priority of phonemic-based instruction argue that a mastery of the sight-sound connection (the alphabetic principle) is the foundational baseline upon which success in independent reading depends. This requires the processing of individual phonemes (letter sounds and digraphs – e.g., “sh,” “ch”) and syllable units, typically in a sequential format based on the logic of what should be learned first according to the precepts of the alphabetic principle. As explained by Purcell-Gates, on this assumption, “the reading process is linear, with letters being recognized first feature-by-feature by a visual system and then transferred to a sound (phonemic) system for recognition and held [however briefly] until the next letter is processed in the same way” (p. 5). Thus, on the phonemic-based theory, the processing of every letter is critical.

This represents the very opposite of the whole language assumption, based on a schema theory of learning, which places more emphasis on the brain in which letters and sounds operating as partial cues, (i.e., mental representations) interact with other cues, including meaning-based ones in providing the needed information to read a given text. In whole language approaches, educated guesses are encouraged as an important intellectual process of inference making and internalization, while that approach is rejected categorically in phonemic-based theories. While in the whole language

approach, making sense of the text is the primary objective; in the phonemic approach accurate reading of the words is central, without which comprehension is impossible.

In Popperian terms, advocates of balanced theory argue that its mediating approach represents a better approximation “toward the truth.” In short, from this vantage-point “learners need to focus on meaning with real, authentic text and to work on skills” (p. 7). More fundamentally, learning to read is based on “the reciprocal influence of different levels of knowledge held by a reader—from letter featural knowledge of the features of the letters to semantic knowledge.” Even more to the point is the “interaction with each other” (p. 8) of these dimensions of the reading process in their varied influence with specific students or sets of students. Moreover, and this is a key assumption with Purcell-Gates, balanced theory flows along the continuum from a skills orientation to various holistic approaches. What places the continuum in the balanced framework is the rejection of foundational claims that one approach or the other is at the base. The balanced argument is that students learn to read in different ways, and that the primary dynamic is the interactive (or better yet, the transactional) one in the utilization of whatever methodologies, approaches, and sources of materials that best tap into the student’s capacity to learn to read. While certain methods and approaches will have more effect with certain students, in the broad scheme of things, learning to read requires interactive, “whole-part-whole instruction” (p. 8). These are the core concepts of the integrated approach.

The operative assumptions of balanced reading theory are particularly important in the coming to terms with conflicting definitions of adult literacy in that the whole language approach reinforces the metaphorical one of “multiliteracies,” while the phonemic approach emphasizes the foundational premise of reading instruction as the central purpose of what any literacy program should focus on. With the phonemic approach, balanced theory does emphasize reading, *along with* that of the utilization of “meaningful” text, the exploration of ideas, and the attainment of significant knowledge that can be grasped by students, even if reading ability remains quite limited. Thus programs can, and as argued later, should, focus on both reading development and the progressive mastery of knowledge and insight, even as the ways in which these two aspects of learning are played out with different students are varied in which effectiveness and growth may require more attention to one of these areas than the other, in any given situation. Such may sometimes be the case even with the same student. The underlying argument of balanced theory is that its core concepts and methodologies provide the best accommodation available for this variability of student background and need.

Versimilitude

Thus, even more fundamental than the concept of truth is that of the explanatory richness of a theory, or its versimilitude as opposed merely to its literal truth content. While a simple arithmetic calculation, for example, is accepted as truth, its theoretical value in opening up new knowledge may be inconsequential. By contrast, a rich provocative theory like balanced reading theory opens up a much broader exploratory

realm even as the more the theory seeks to explain, the less likely that it will prevail as truth and ultimately fail the litmus test of severe testing. Notwithstanding the likelihood of its ultimate falsification, in providing new world knowledge, the theory serves a significant heuristic function in expanding human knowledge about some defined area of scientific importance. This may be in nothing other than in the demonstration of the conditions under which the theory fails, which then has the potential of raising new questions, provoking the search for knowledge in new directions, resulting in new theories and new sets of tests. That alone is the grounding point of scientific investigation and sufficient unto itself for the kind of critical work Popper views as essential in progressively moving human knowledge about the universe forward.

The theory postulated is obviously even more significant if severe testing does not result in falsification, for example, if balanced reading theory holds up against stringent scrutiny. To the extent that it does, it represents a strong candidate for regulative truth, which does not mean that it will not ultimately be falsified as a result of rigorous testing. As is evident, Popper's deductively premised problem-oriented focus differs substantially from inductionist premises that start with observation and moves toward analysis and interpretation. Summing up his position, Popper offered the following conjecture upon which he staked his intellectual identity:

Neither observation nor reason is an authority. Intellectual intuition and imagination are most important, but they are not reliable; they may show us things very clearly, and yet they may mislead us. They are indispensable as the main sources of our theories. But most of our theories are false anyway. The most important function of observation and reasoning, and even of intuition and imagination, is to help us in the critical examination of those bold conjectures which are the means by which we probe into the unknown (1963, p. 37).

While maintaining the importance of an inductive methodology as a function of scientific investigation, Popper (1979) emphasized the centrality of deductive logic stemming from identified problems and theories best suited to solve them. In determining which theories were better than others, several principles applied. The first is the criticality of comparing "*competing theories*" (italics in original) that "are offered as solutions to the same problems" (p. 13). Thus, in the imaginative construction of bold conjectures, "a good theory is not *ad hoc*" (italics in original) (p.15), but as closely as possible related to the specific problem under investigation, and, ideally linked in as many ways as possible to competing theories such, to use our example, as the relationship between balanced reading theory to those of whole language and phonemic-based theories.

This is essential, Popper argued, in order to compare and contrast as precisely as possible points of congruence as well as to determine as closely as possible exactly where and why one theory breaks down, which the other theory better explains. That is a critical test in itself in deductive logic of the relative validity of the one theory over the other. As Popper explains the logic, one way of proceeding is to demonstrate that the theory "leads to unintended or undesirable consequences" and therefore is not likely to

prove what it claims. Even better, to the extent that it offers a plausible improvement toward the resolution of a problem, “we show that there is a competing theory...which clashes with” the original one, “and which we try to show has certain advantages” (p. 35) over the original theory.

The theory or possible theories that survive the critical litmus test “of proposing theories and submitting them to the severest tests we can design” (p. 16) are the best candidates for providing solutions to the problem under investigation. In this process of rigorous analysis, testing, and elimination, “we may hit on a true theory” even though that does not establish the truth. That is because “the number of *possibly* [italics in original] true theories remains infinite, at any time, and any number of crucial tests” (p.15) could still be applied to the better theory, which could, and likely would, ultimately, falsify them. Even if the better theory is ultimately falsified, if the conjecture was a plausible one based on logical deductive reasoning and consistent with the squaring of available facts, then the breakdown of the theory still contributes to the ongoing work of knowledge expansion in the opening up of new areas of investigation that the initial project stimulated. Thus, even if balanced reading theory breaks down, it is at least reasonable to assume that some of the creative insights that have gone into its construction will be filtered into more sophisticated theories of how adults learn to read.

As Popper concludes, “*all theories are hypothesis; all may be overthrown*” (italics in original) (p. 29). Yet, there are scientific criteria by which to establish the relative validity of one theory over another. The extent to which scientific investigation is grounded on those standards based on certain “expulsion procedures as well as entrance examinations” (Miller, 1994, p. 7) establishes its validity even in the near certainty, on Popper’s reading, that the conclusions may be ultimately proven false. For the unending quest of growth in knowledge is built on many best guess failures as well as conjectures that have endured the rigorous tests of some enduring trials over time.

There is a close linkage in Popper’s epistemology with Dewey’s concept of warranted assertability. A critical difference is that Popper is in pursuit of objective knowledge, which is not dependent on the realm of human subjectivity. With Dewey, Popper was a committed fallibilist, although one who made a sharp distinction between scientific knowledge and non-scientific speculation, and thereby rejected as outside the purview of science Dewey’s existential quest for harmonization through the reconstruction of a more desirable “total qualitative situation.” By contrast, for Dewey, the application of scientific methods to the “problems of men” was the primary purpose of competent inquiry. Popper was committed, rather, to a purer quest for truth as related to the *scientific* problem under study in keeping the distance sharply demarcated between the topic of investigation and the psychology of the investigator. For Popper (1957), practical application was crucial, but required a different epistemology, that of “piecemeal social engineering,” taking political, social, and economic reality into account.

Notwithstanding these subtle differences, as fallibilistic scientific philosophers seeking to cut a discerning path through various schools of rationalism, idealism, and

empiricism, upon which they deeply drew in their respective syntheses, Dewey and Popper were closely in sync on the core assumption that:

Every solution to a problem raises new unresolved problems; the more so the deeper the original problem and the bolder its solution. The more we learn about the world, and the deeper our learning, the more conscious, specific, and articulate will be our knowledge of what we do not know, our knowledge of our ignorance. For this, indeed is the main source of our ignorance—the fact that our knowledge can be only finite, while our ignorance must necessarily be infinite (Popper, 1963, p. 38).

In their divergent ways, Dewey and Popper pressed hard against this goad in seeking truth, if only as a regulative ideal, through rigorous scientific methodologies for the purpose of learning important things about the world and changing some portion of it, however piecemeal, for the better.

Objective Knowledge: An Evolutionary Approach

While rejecting the possibility of attaining certainty, Popper argued forcefully for achieving objective knowledge. Such an attainment is possible as a result of the rigorous work of formulating best-case bold conjectures and subjecting them to severe tests. This refining process of critical inquiry is stimulated by the infinite gap between any current attainment of knowledge and what might be achieved as a result of new insight and information gained in the struggle to work out problems that challenge humans to push beyond the boundaries of given understandings, even while necessarily building on what has been previously learned. Popper noted that any new knowledge gained remains a conjecture, and therefore open to ongoing analysis even as falsification closes certain doors, at least until further notice, so that the theories that remain are viable candidates as truth propositions even though the veracity of such a claim cannot be positively ascertained.

Motivating Popper was the desire to press against the specter of relativism that knowledge gained can only be categorized as a perception in which, in principle, any interpretation is as valid as another in terms of its truth content. In this respect he argued that human knowledge grows through the process of trial and error in the pursuit of probing questions and problems that stimulate the imagination even as such knowledge gained remains invariably fallibilistic. Consequently, Popper acknowledged the gap between the finitude of human cognition and truth as a regulative ideal defined as correspondence with the facts. In stressing the possibility of getting closer to the ideal, he maintained that any notion of “closer” is a metaphor that stands for our best striving, which nonetheless cannot close the perpetual disparity between the reality and the ideal in any absolute sense given the unending human capacity to transcend any current understanding. Thus, Popper pointed to a realistic *metaphysics* undergirding his epistemology that he could not prove, yet one essential on his reading to situate a view of *scientific* knowledge, which if either indeterminism or the possibility of science as a

disciplined body of logical analysis were closed, the enterprise of human growth would be curtailed.

Strictly speaking, the ideal is based on the possibility of attaining approximation toward the truth in an exacting as possible probing of significant issues related to some objective reality. Thus, the scientist makes plausible conjectures as an exploratory foray into the problem, the logic of which is closely compared and contrasted with a previous explanation in order to assess the extent to which it potentially resolves problems not adequately addressed in the earlier explanation. The richer the content, the closer it is as a regulative ideal toward a better understanding of the problem at hand. Balanced reading theory is one such candidate. That points to its content. It is from this baseline that severe testing comes into play in adding important knowledge about a topic, which, if rigorously attended to “may actually suggest how to construct a better theory” (p. 144), say of learning to read, even if the theory is ultimately proven false.

It is this to this richer concept of verisimilitude to which Popper (1979) referred rather than to truth in any precisely defined exacting sense (or “probability of calculus”) related to a question or perplexity that stimulates a search and requires an answer, which is proximately achieved in the better tested theory. As Popper puts it: “*All acquired knowledge, all learning, consists of the modification (possibly the rejection) of some form of knowledge, or disposition, which was there previously; and in the last analysis, of inborn dispositions.*” More to the point, “*All growth of knowledge consists in the improvement of existing knowledge which is changed in the hope of approaching nearer to the truth*” (italics in original) (p. 71). Along with Dewey, Popper maintained that it is from our basic dispositions from which the beginning of knowledge typically springs. These starting points require the refining process of publicly based critical inquiry in which claims made are evaluated on the extent to which they achieve “nearness” to the truth, clearly a metaphor, but also a regulative ideal that situates human knowledge in a source beyond perception, however much it evolves from it.

Thus, Popper made a sharp distinction between subjective knowledge based on dispositions, from which springs the search for the resolution of problems and perplexities and “knowledge in the objective sense, which consists of the logical content of our theories, conjectures, guesses” (p. 73). Those conjectures that survive the refiner’s test of falsification are particularly durable as proximate objects of truth which have proven their mettle in settings beyond the realm of purely subjective perception in the “exosomatic” environment of the “real world,” what Popper refers to as World 3 knowledge.

Popper acknowledged that his three worlds of knowledge are a typology, although a highly useful one in the making of subtle distinctions on the ways in which knowledge is constructed by and through human knowers. Briefly, World 1 refers to the physical world, World 2 to our conscious experiences, our perceptions, and World 3 to “the world of logical contents” (p. 74), that of exosomatic reality. Popper admitted that World 3 knowledge emerges from perceptions and dispositions, and that central to his typology is the transactional relationship among the three types of knowledge. His basic point

remained, however, that the objective reality of World 3 knowledge is largely autonomous in that what is created by human beings takes on a life of its own in the shape of durable products that cannot be reduced or explained by the perceptual confines of the subjective process of human knowledge making.

Popper noted the difficulty of grounding a philosophy of scientific realism premised on best-case fallibilism rather than at least the allure of the positivism of induction in which “sure,” but false knowledge is guaranteed by the alleged cleanness of a value-free observation. That is, he was aware of the intrinsic difficulties of his thesis, in which, in the final analysis, he depicted science as a form of literature, the logic of which is ultimately grounded in the persuasiveness of its narrative argumentation in which counter-narratives are always plausible. As he wrote, “we can never rationally justify a theory—that is, a claim to know the truth—but we can, if we are lucky, rationally justify a preference for one theory out of a set of competing theories, for the time being; that is, with respect to the present state of the discussion” (p. 82) of any particular matter at hand. Such theory construction, Popper argued, is only possible in the publicly contestable and conjectural arena of World 3 knowledge in which knowledge claims can be falsified, or accepted as a plausible approximation to the truth, provisionally verified for the time being, serving as a baseline for further investigation.

Contrasting World 2 and World 3 is the difference between “*knowledge or thought in the subjective sense*, consisting of a state of mind or consciousness, and *knowledge and thought in an objective sense*.” The latter consists “of problems, theories, and arguments as such” (pp. 108-109), those that are scientifically accountable through the public means of critical conjecture and scientific refutation. In this sense, *knowledge “is knowledge without a knower: it is knowledge without a knowing subject”* (italics in original). (p. 109). It is knowledge embedded in the objective reality created, the human artifact, whether a theory, a set of propositions, or publicly articulated arguments that have been marshaled about a topic (such as learning to read) that gain legitimacy based on the rigor of argumentation and evidence provided in making a particular case that can stand the test of time. This is the challenge, for example that advocates of balanced reading theory have only begun to thoroughly confront, notwithstanding important preliminary research stemming from the stimulating concept of balance as “the radical middle,” and its inherent plausibility among a broad stream of literacy practitioners.

Einstein’s theory of relativity is an example of World 3 knowledge as determined by the coherence of its theoretical logic, the ways in which it provides a more satisfactory explanation of certain aspects of physics than Newton’s theories, and in its capacity to withstand severe tests of falsification even though ultimately it is likely to be proven false. What Popper argued is that human knowledge advances much more extensively by focusing on the objective phenomenon of achieved scientific theory than by studying the process by which the scientist came to the conclusion. He noted that the latter may have some relevance in providing part of the explanation that may be needed to obtain a fuller sense of the context of the set of problems resolved by the theory, and Popper was interested in how perception and formulated outcome interface.

Even still, his larger concern was the apprehension of subverting the objectivity of the achieved theory for pursuit of a perpetual process of knowledge construction in its various unfolding in the mind and the emotions of the producer of the outcome. He did postulate that an analysis of World 3 knowledge can provide valid World 2 knowledge in accurately articulating the process whereby the producer drew the logical conclusions that led to the desired outcome. However, the reverse is not the case in that the process in itself reveals nothing other than the subjective meanderings of one searching for resolution of particular “*problem situation[s]*” (italics in original) (p. 165) without the accompanying achievement of the actual attainment in “exosomatic” knowledge.

To push Popper’s realistic epistemology, new theories and new knowledge emerge in the critical dialectic between conjecture and refutation so that truth proximately unfolds in the very process of its vigorous pursuit. Thus, while focusing on the products of objective reality as the crowning achievement of human growth, what remained of even more fundamental value to Popper was the “give-and-take...interaction between our actions and their results by which we constantly transcend ourselves, our talents, our gifts” (p. 147).

Process remained, for Popper, a delicate subtext of his epistemology given the self-acknowledged fictive nature of science itself. In any absolute sense, Popper did not transcend the relativism of World 2 knowledge and this is an observation of no minor importance. Nonetheless, as creative myth he provided a fictive pathway via World 3 objectivity, toward truth as a regulative ideal with real world consequences in products achieved as well as growth in knowledge that might not have become available without its vigorous pursuit. For Popper, science remained “a branch of literature” (p. 185), an artifice, but no mere fiction, if one considers that term in its pejorative sense. Rather, it was a highly appealing fiction in pointing to the ideals of truth, objective reality, and to the expansive growth of human potential in an indeterminate social and natural universe in which what is available at most is an element of “plastic control,” which can be only modulated by various degrees of analysis, feedback, and testing.

This tensive indeterminate space in a growing, yet potentially knowable world, Popper argued, is the grounding point for the flourishing of human creativity, particularly, but not exclusively in the realm of science. Closer approximation toward the truth, not its attainment, was at the center of Popper’s epistemology, the driving force of his unending quest. In Bernstein’s (1983) pursuit of the subtle space “between objectivism and relativism,” in his quest also for a valid postpositivist social science based on truth as a regulative ideal, Popper’s critical rationalism, which Bernstein did not examine, holds a significant place.

Chapter Four Rescher's Coherence Theory of Critical Reasoning

Strong family similarities are evident between Rescher's view of philosophical science and those of Dewey and Popper, particularly their fallibilism, their rejection of positivism, atomistic thinking, and their quest for comprehensiveness. They all sought to get as close to the truth as possible even in the realization that an unbridgeable gap separates the most rigorous cognitive processing and a partially elusive reality of which human knowledge is infinitely expandable, yet also limited in potentially grasping. When pressed, each of these authors viewed progress as a myth, but an essential one that is compelled by the human vocation in its shaping of philosophy as well as in giving texture to the challenges and opportunities of daily life. That is, there is a praxeological bent to their respective philosophies designed for real-world consequences whether in the physical or, especially for Dewey and Rescher, the social sciences in application to the "problems of men." Such progress is determined, according to these authors to the extent that problems identified are significant ones, critical factors related to them are attended, warranted solutions proposed and assessed, and complications and refinement factored in.

In their exacting conceptualizations each of these authors spanned a wide outlook that complements their microscopic examination of key issues in their respective philosophies designed to analyze the relationship of problems within the contexts in which they are (or could be) situated. Illuminating the subtleties and the various dimensions of the context as defined, however precisely or fluidly as the case at hand necessitates, and allows, was a core element of their commonality. Rescher added a focused attentiveness to systematicity, not necessarily as a reflection on reality, but on the cognitive work that is essential in the pursuit of rational, philosophical inquiry. In this respect his philosophical probing is of a methodological rather than ontological nature.

Rescher (2001) based the quest for systematicity and coherence on a biological mooring as something that compels humans in their "seek[ing] to resolve problems arising from the incoherence of the matter of our extraphilosophical commitments." On this rationale, to "abandon philosophy is to rest content with incoherence" (p. 9). It is this charge Rescher leveled against postmodernism even while sharing its openness to pluralistic interpretations. What he rejected is the tendency in postmodernism to view texts as equal, in which "every interpretation is as good as any another" (p. 58). With Dewey and Popper, Rescher emphasized the need for philosophy to hone in on the better argument based on a set of rational standards that he laid out in *Philosophical Reasoning*.

At the core methodological level is the need to resolve incompatibilities in reasoning itself or in the analysis of relevant information, which for Rescher "is the only road to comprehension and understanding" (p. 11) available. Thus, in the pursuit of any project in philosophical reasoning, "only a coherent, alternative-excluding resolution is a resolution at all" (p. 11). On this, Rescher made a strong distinction between *possible* and *plausible* resolutions. He pressed hard on the latter toward an ideal of maximum resoluteness gained through severe discrimination, which nonetheless remains elusive given the range of contexts that need to be considered in moving toward solutions that are sufficiently sophisticated as demanded by the complexity of the issue under investigation.

This complexity is further compounded on Rescher's assumption that reality is pluralistic in which more than one solution is plausible consistent with the principles of systematicity as defined in part as coherence with the data. Moreover, Rescher pointed to a built-in tension between plausibility and complexity in which the push toward the latter at some level undermines the former. This tension requires trade-offs in balancing the various criteria deemed essential in achieving a high degree of systematic coherence that grounds his methodology of cognitive reasoning. This calls, in turn for acceptance of imperfection and the need for discerning judgment both in deciding when enough information and analysis is sufficient and what factors to weigh more heavily than others as applicable to any particular line of investigation. There is, therefore, "no alternative but to settle for the *best available estimate* [italics in original] of the truth of the matter – that estimate" when all available resources are factored in and calibrated, "for which the best case can be made out according to the appropriate standards of rational cogency" (p. 14).

On this scenario, while data are essential to any philosophical investigation, they serve a functional role in sharpening plausibility, which remains subject "to criticism and possible rejection" or revision and modification as germane to the case at hand. Consequently, while a methodology of systematization and coherence with the data are regulative ideals, on Rescher's argument, "everything is potentially at risk" (p. 17) in terms of establishing relevant theoretical constructs and the role of specific informational input in a particular investigation.

Narrative Coherence and Its Grounds

Next to that of identifying appropriate problem areas for investigation based upon the twin criteria of their compelling consequences and capacity for proximate resolution, is that of charting out the key set of questions that give initial focus to the required work. Their importance is in the presuppositions underlying the questions in which an exacting as possible discernment of their significance, as implied, in part, in their prioritization go a long way toward defining the nature and purpose of the proposed investigation. If the object in research on adult literacy education, for example, is to discern how constituents derive their presuppositions, such questions as the following might be asked within the following proximate order:

- What is literacy? (definition)
- On what criteria is such a definition based?
- In what ways does the particular definition adhered to conflict with other definitions and what role do alternative interpretations play on the one defined within a given line of investigation?
- What is the significance of this resolution to that of identifying criteria in establishing an effective literacy program?
- How does such programming give shape to the flow of corresponding models instruction and curriculum frameworks?
- In what ways can such instruction be effectively assessed?

The order is important here in moving from basic assumptions and definitions toward proximate functional resolution in program orientation, instruction, and corresponding modes of assessment. According to Rescher, “the structuring of our information as responses to a logically dynamic unfolding of questions is the most basic and doubtless the most important mode of cognitive system-building.” A change in the order of questions alone is likely to affect the overall nature of the inquiry process, in which systematicity requires rigorous attention both to the nature and exact phrasing of questions and to the order in which they are handled. In short, “to *systematize* (italics in original) knowledge is to set it out in a way that shows it to be the rational resolution of a logically connected, exfoliated family of questions” (p. 27).

What complicates the matter is that different sets of presuppositions with corroborating data could be equally systematized and made coherent. Thus, one could start either with a presupposition that literacy is a metaphor for knowledge which includes reading and writing, or one in which the mastery of reading and writing drives the definition in which knowledge gained through the study of content is viewed as a desirable consequence. Each of these broad definitions is based on a set of partially different presuppositions and requires alternative sets of questions to ground rational inquiry, based on their underlying logics. Given the legitimacy of pluralism of human philosophical knowledge, the struggle for definition needs to be worked through in what Dewey (1938/1991) refers to as the broader cultural matrix. Even on that relativistic playing ground Rescher adhered to his core methodological premises of systematicity (maximum coherence consistent with the relevant data) as the means to establish valid epistemological criteria to substantiate the legitimacy of a given investigation.

Crucial to systematicity is that of narration, defined as “a coherent story that makes sense overall..., an all-comprehending account...as it were” (Rescher, 2001, p. 45). Rescher’s argument is not that such coherence is achievable in any final sense, but that the quality of a particular line of philosophical investigation depends on the overall symmetry of the argument in its various levels of unfolding, including the resolution of knotty incongruities which, in principle, could be resolved in a variety of ways. The process of the proximate resolution of problems is a constructive one that emerges through the identification of key issues and questions, the grappling with complications, the balancing of various key principles of systematicity that invariably conflict when pressed too hard, and the pursuit of various lines of query that the investigation opens up. Scholarly “rules of thumb” are operative that serve as important “guidelines.” These can be violated if necessary, but doing so extracts certain costs and therefore should not be lightly ignored. Still, the possibility of further analysis beyond what can be effectively managed in any line of inquiry requires perpetual discernment not only on the substance of what can be discovered, but on what sources of evidence to stress and what aspects of reasoning to press. As put by Peirce (1955) “there is no royal road to logic, and really valuable ideas can only be had at the price of close attention” (p. 40).

Rescher (2001) noted an unavoidable tension between rhetoric, what he referred to as “unconditional commitments” (p. 79) or first principles that lay at the basis of any

line of inquiry, and rational argumentation based on evidentiary premised critical reasoning. Notwithstanding the invariable tension between these two factors both of which claim long philosophical lineage, these also have “to come into a mutually supportive overall harmonization” (p. 86) if the investigation is to be maximally sound. At a minimum coherent systematicity requires that the logic upon which the rhetoric is premised contains no intrinsic contradictions. Also important is the substance of the first principles. These need to be premised “on a common, shared basis of judgment” (p. 86), which are consonant “with duly highlighted aspects of our experience” (p. 84) that gain the adherence of some legitimate body of inquirers even as other communities of inquirers will operate out of a different set of premises.

The proposed methodology is based on standards of “*rational conjecture* and “*responsible estimation*” rather than that of “mere *guesswork*” (italics in original) (p. 48). “Cogent processes of evidence, inferences, and the usual instruments of rational substantiation” (p. 48) are required. While Rescher provides much latitude for a range of potential interpretations that could become subsumed within his methodology of coherent systematicity, a core maxim is that cogent “evidence and argumentation must always pervade and underpin” (p. 49) any philosophical case made. “No logically airtight guarantee that what is best” can be provided. Nonetheless, the very nature of critical philosophical inquiry requires “the best estimate of the truth that we can make,” utilizing all the resources available even though the outcome may ultimately be proven to be “well off the mark” (p. 49).

In addition to depending upon traditional scholarly modes of empirical evidence, Rescher also stressed the importance of genealogy in the linkage of chains of argumentation and reasoning to earlier analyses and schools of thought. Consequently, ongoing development is “exfoliative” with “a superengrafting of new distinctions upon old, with new topics and conditions continuously emerging from our efforts to resolve prior problems.” The result “is an unending process of introducing further elaborative refinement into the setting of old, preestablished views, which sees an ongoing emergence of new positions to implement old doctrines” (p. 51). Thus, criteria for the coherency of narratives in support of the most fruitful lines of philosophical investigation combines traditional scholarly methodologies with historical modes of analysis that project chains of reasoning that extend from the past, to the present, and to at least the near-term future.

On these interpretations, narratives formed are neither free-floating nor merely speculative, but grounded in substantive modes of evidence, reasoning, and schools of scholarship that contain histories and projective modes of development susceptible to highly creative forms of construction. With these criteria as a base, Rescher then outlined his four laws of text interpretation. These are, “coherence,” “comprehensiveness,” “sophistication,” and “imperfectability” (pp. 71-76). Given the perpetually creative dynamic of human knowledge to break through boundaries of definition, these laws do not smoothly work together. Rather, they are tensional in their respective objectives in which resolution of any particular line of investigation requires an overall fit in which certain trade-offs among them are inevitable.

Resolving Conflicts and Making Subtle Distinctions

Systematicity presupposes narrative coherence within a given context and is therefore, situational. On this assumption what is important are not merely individual statements, but the linkage of various statements to each other in a given investigation. While each one may be accorded legitimacy on its own, inconsistencies may be evident in their grouping, which then requires some type of resolution. Thus, Rescher refers to “an aporetic cluster...a family of philosophical relevant contentions” (p. 93) that in their collectivity contains an inconsistency, which needs to be worked through to move the investigation forward. As an example, consider the following set of potentially conflicting statements, which Rescher refers to as an “apory”:

1. Literacy is a metaphor for knowledge acquisition drawn upon in the symbolic grappling with print-based texts.
2. Literacy refers to the capacity to read, write, and comprehend print-based texts.
3. Efficacy is determined through the ways in which readers draw meaning from texts, including its appropriation, however elliptically, into their lives.
4. Efficacy is determined by the degree of gains made in reading, writing, and the comprehension of print-based texts.
5. Literacy as a metaphor resides in the transaction between the reader and the text.

On its face, there is nothing intrinsically contradictory about these statements, which depend on the contexts to which they refer. As identified throughout this essay, our context is that of deriving a definition of literacy based upon the two choices previously identified. Thus, if one accepts the first premise the definition is contained in the statement. On this interpretation, statements 3 and 5 invariably follow, while statements 2 and 4 serve as supplementary sources of the overall definition. A problem sets in when no evidentiary progress is discernable in the support of statements of 2 and 4 regardless of the definition of literacy. The problem is heightened if evidence actually points to lack of progress in those areas. That does not mean that the definition in statement 1 cannot pertain, but it does require a radical embrace of its assumptions in which the metaphorical description dominates without equivocation. By contrast, if literacy is defined by progressive mastery of the technologies of reading and writing, then the definition is contained in statement 2 and directly supported by 4. Similarly, statements 1 and 3 could serve as supplementary sources of the overall definition. However, if no discernable progress on the mastery of reading and writing is made can it be meaningfully inferred that progress in literacy education has been achieved based only on the elusive concept of “meaning making?” Based on the definition in statement 2, one would have to draw a negative conclusion.

The critical question for those who adhere to the following position is whether a meaning making, transactional definition of literacy pertains regardless of how much progress or lack thereof is made in the decoding and encoding tasks of mastering the text. As Rescher maintained, that depends, in this case on the operative definition of literacy in play. What is brought out in the five points listed is the need to resolve potentially

contradictory statements, each one of which could conceivably stand on its own when sharply distinctive definitions are contrasted. In terms of moving toward systematic resolution, such contradictions need to be made sense of in one way or the other lest the inquiry project be marred by internal incoherencies. It is not that such inconsistencies are not endemic, for on Rescher's reading they surely are. His point, rather, is that their manifestations at various places throughout the inquiry process require substantive confrontation if progress toward coherent systematicity is to be achieved.

When sharply polarized "rival 'schools' resolve an aporetic cluster in different and discordant ways...different priorities are by nature incompatible and irreconcilable" (p. 102). Such points of clear antinomy play an important role in determining precise points of signification at various places along the axis in grappling with certain philosophical issues that sharply conflict. Thus, if one is satisfied with simply one or the other of the two definitions of literacy, then further resolution of the potentially conflicting statements may not be that important. One chooses one definition and blocks out the other. Even still, each of the statements listed has an independent validity, which has some relevance to adult literacy education in any definition short of an extreme embrace of either statement 1 or 2.

The need, therefore, is for further qualification. Clarity may be gained through sharply honed definitions, yet at the cost of neglecting a more sophisticated definition that could emerge through a subtle modulation of the conflicting polarities. Through such modifications, on Rescher's argument, one is in a better position "to give proper recognition to a fuller range of considerations that initially led to the aporetic difficulty" (p. 116) in which "appropriate distinctions" can assuage the need of "abandoning" one position or the other "altogether" (p. 118). All things being equal, as Rescher has it, such a "Hegelian" approach adds important sophistication to the effort, thereby contributing toward a more systematic resolution. In his words:

The operative principle at work here is that of achieving optimum alignment with experience – the best overall balance of informativeness (answering questions and resolving problems) with plausibility by way of negotiating with the claims, which, on the basis of our relevant experience, there is good reason to regard as true. We want answers to our questions but we want these answers to make up a coherent systematic whole. It is neither just answers we want (regardless of their substantiation) nor just safe claims (regardless of their lack of informativeness) but a reasonable mix of the two – a judicious balance that systematizes our commitments in a functionally effective way (p. 96).

Using our example of exploring the relationship between literacy and the mastery of the technology of reading and writing, one might make the following provisional statements:

1. Literacy facilitates knowledge acquisition in the grappling with and mastery of print-based texts.

2. Literacy is enhanced to the extent to which individuals gain the capacity to read and write print-based texts.
3. Growth in literacy is experienced to the extent to which readers progressively comprehend and draw meaning from texts and appropriate them into their lives.
4. Literacy has a technological component in the mastery of reading, writing and the comprehension of texts, and a metaphorical dimension that resides in transactions between the reader and the text in which meaning making and significance lies beyond the text into that of appropriation, however variously that may be defined.

As put by Rescher, this represents “a duly hedged synthesis” (p. 121) that in the final analysis may raise as many problems as it seeks to resolve. Clearly it does not resolve the antinomy when the polarities of definition are pressed and there may be contexts where such clarification remains essential. Thus, there is no final synthesis achieved as a result of the distinctions provided here, which are those primarily of qualification. However, and this is the critical point, a modulation of perspectives as reflected in this second list of attributes offers the possibility of drawing on more of each of the independent statements in the first list that were individually consistent, but did not hang together. The second list represents a proximate synthesis. To the extent that it is effective, it provides a more complete definition of literacy than if one or the other of the antinomies had prevailed over the other. This may appear as a mere blending. Yet, the critical new factor is the flexibility in what is opened up through a creative synthesis on what at first blush may seem like a polarized distinction. Thus, literacy, after all, may not be an either/or phenomenon. It may be a matter of degree in which each of the new statements allows for the flourishing of competency in one or the other of the blended definitions without ruling out progressive mastery in both, even if not necessarily on an equal level. As Rescher explained:

Distinctions provide for a higher synthesis of opposing views; they prevent thesis abandonment from being an *entirely* [italics in original] negative process, affording us a way of salvaging something, of giving ‘credit where credit is due’ even to those theses we ultimately reject. They make it possible to remove inconsistency not just by the brute force of thesis rejection but by the more subtle and constructive device of thesis qualification (p. 121).

Even still, the process of resolution through inquiry is continuous. New syntheses arise and break down as the press of new problems persists, pointing to the subtle tensions inherent in value clarification and what it is that can stand for intellectual satisfaction, however temporal, in the pursuit of a processive reality, in which the reach perpetually outflanks the grasping at any given time. The investigative process, in short, is continuous and needs to be worked out on an ongoing basis or at least as long as the effort seems worth the investment.

A Network Model

At the core of Rescher’s argument is a network model of epistemology in which the overall outcome of an inquiry process brings a level of coherence (compatible with

the relevant data) that cannot necessarily be discerned from the sum of its individual components. Given the critical role of context in the shaping of the factors under consideration in any inquiry process, singular ones are seldom determinative. Crucial, rather is the “overall best fit” (p. 143) in how the various aspects of an inquiry project are related to each other. The similarity with Dewey’s concept of the “total qualitative situation” is striking even as Rescher stresses more the epistemological role of systematization as the basis to establish a “rational warrant” (p. 193) for truth claims.

Rescher’s argument is epistemological through and through in positing a sharp distinction between truth and what can be warranted through critical reason, which by definition “must be self-consistent if it is to merit serious consideration” even if it is “a coherent theory of an inconsistent reality” (p. 162). In this respect, Rescher has made a rhetorical claim in which “to systematize our knowledge into a coherent whole” (p. 163) is by definition what is meant by rationality. For Rescher, this “first principle” is ipso facto what is meant by philosophy. With that premise established, “the parameters of systematicity – coherence, consistency, uniformity”—serve as “methodological guides” (p. 163) or regulative ideals of inquiry.

Rejecting axiomatic truth claims, Rescher, as with Dewey and Popper, has taken “for a starting point...a relatively generous and undemanding quest for well-qualified candidates or prospects for truth” (p. 175). Searching for “plausibilities” and “probabilities” rather than mere “possibilities” (p. 179), the critical rational work is in the winnowing process of honing in on the “best fit in terms of mutual accord and attunement” (p.178) based on a contextual analysis of the factors impacting on the research project at hand. Rather than depending upon “the implicative capacity of certain basic prior truths” (p. 178), a systemic approach starts with a wide span of information, theory, and data, which then evolves through “suitable reductive maneuvers” (p. 179). “For the coherentist knowledge is not a Baconian brick wall, with block supporting block upon a solid foundation; but rather a spider’s web in which each item of knowledge is a node linked to others by thin strands of evidential connection, each weak, but all together, collectively adequate to create a strong structure” (p. 173). Dispensing with claims of “foundational certainty” (p. 173), the coherentist theory espoused by Rescher “sees a cognitive system as an organized family of interrelated theses...linked with one another by an *interlacing network* [italics in original] of connections.” Its truth claims are of a “*confirmatory*” nature rather than “necessarily *deductive*” (italics in original) (p. 174).

In his 10 point description “of the parameters of systematicity,” Rescher highlighted the following characteristics: “unity and integrity as a genuine whole that embraces and integrates its constituent parts,” “comprehensiveness, the avoidance of gaps,” “connectedness, interrelationship, interlinkage, coherence,” “absence of internal discord or dissonance,” and, among other factors, “a well-integrated structure of arrangement of duly ordered component parts” (p. 191). Not all the component parts are included in every inquiry, nor are they totally integrated. As a best fit option consistent with the drive toward rational coherence, the result “has the character of a profile rather than an average” (p. 192). Its claims are verifiable based on the overall convincingness

of the supportive narration upon which it hangs and is susceptible to decomposition as additional evidence warrants.

In Rescher's coherentist philosophy "datum" adheres as "a *truth candidate*, a proposition to be taken not as true, but as potentially or *presumptively* true" (italics in original) (p. 186) in which there is substantial reason to accept it as a serious possibility. Such facts of the case need to prove their mettle in the overall fit of an inquiry process as determined by the contexts in which they are embedded. In this respect, the facts play a secondary, or what Dewey referred to as a propositional role, to the criteria of systematization itself in the attunement process of getting at a substantial warranted claim. By presenting datum as part of the context that needs to be factored in, Rescher has sought to answer critics of coherentist theory in their accusation that those espousing such views accept coherence *in itself*, as a basis of verifiability. Rescher's counter-argument is that the very notion of coherence only makes sense as related to particular situations and contexts in which factual information, which may be as much of a construction as that of a logical articulation of what is evidently discernable, plays a critical role. This requires a rigorous delineation of the contexts that give shape to the inquiry, and all the relevant details that needs to be factored in. On Rescher's argument, "we do not really have a coherence theory in hand at all, until the *target domain* [italics in original] of coherence is specified" (p. 190).

The broader point remains that in an intellectual climate in which foundational premises are viewed as increasingly dubious, another standard for the making of maximally warranted rational assertions is required, lest the grounds of critical rationality itself become suspect. For Rescher it is the coherence of the overall explanation on the grounds that even if reality cannot be subsumed within a systematic framework, the principle of rationality requires the highest resolution possible of contradictions and incompatibilities and maximum explanatory integration of the factors at hand giving shape to an inquiry project.

With Dewey and Popper, Rescher perceived the drive toward coherence as rooted in human biology in a need to overcome a problematic situation, which stimulates a search for its resolution. Nonetheless, it is in the nature of reality itself to exert pressure beyond current explanations or levels of satisfaction, and therefore to break down temporal syntheses that have been achieved in particular situations and settings, in turn, setting up the need for a more comprehensive resolution. There is nothing static or preconceived in Rescher's theory of coherent systematization, which provides a regulative ideal in a world in which the reach of human aspiration perpetually exceeds its grasp. Rescher's philosophy is praxeological rather than descriptive of ultimate reality in unleashing the instrumentalities of critical reasoned analysis in the provision of a vision of wholeness as a standard by which to assess and grapple with the many aporias of human experience. In its rejection of the certainties of indubitable truth for best-fit attunements in an uncertain world, it is a highly constructive philosophy in which there is little alternative other than to acknowledge the need to do the imperfect best we can" (p. 213) if one is to engage in philosophy at all. This is the essence of Rescher's contingent-based argument that seeks maximum coherence consistent with the data.

Chapter Five Summary Arguments and Reflections

Notwithstanding subtle and at times significant differences between Dewey, Popper, and Rescher, what each has provided are systematic means of probing into complex problems in which variables intersect in ways that typically cannot be reduced to singular, isolated causes. There are sharp differences between their respective views and the positivist research tradition in their mediating perspectives that seek to establish only as much precision as possible within the context of a complex problem focus, in which exactitude may not be the most important need. Within their subtle differences, Dewey, Popper, and Rescher have veered toward the scientific pole of what could be called a postpositivistic temper in the fleshing out of a multi-faceted research design that rejects inductionism as a fundamental axiom.

The biologist Ernest Mayr (1997) argued similarly against positivism, although in an overstated rhetorical flourish, in his repudiation of the “misconception among inductionists that a pile of facts would not only permit generalizations, but almost automatically produce new theories.” Criticizing further a particularly positivist bias that “the aims of science are to understand, predict, and control,” Mayer noted that in “many branches of science...prediction plays a very subordinate role” (p. 25). More fundamental is the nature and significance of the problems identified and the rigorous methodological process at work that takes careful hypothesis formation, data collection and analysis, and testing into account in assessing the interaction of variables in the critical work of making sound judgments about complex investigations in the natural and social sciences. This orientation has been central to Dewey, Popper, and Rescher. In this respect, they rejected some of the more relativistic aspects of postmodernism while being in tuned to its non-foundational premises in establishing criteria for a philosophical science that does justice to the complexity of the particular problem area in its relevant contexts under investigation.

While Popper argued that such complexity is normative in the natural sciences, as it certainly is in the life sciences (Mayr, 1997), such is particularly the case in the social sciences, in which the intricacy of how variables interact, renders problematic any assertion of a singular “gold standard” based on experimental design (Comings, Beder, Bingman, Reder, & Smith, 2003). Consider the example highlighted in this essay on the definition of literacy as applied to adults with no or little reading ability in a field in which the research base is limited. A substantial working through of the issues will require much new study through whatever methodologies that brings illumination to the problem of definition as articulated in this essay. Notwithstanding a few key empirically supported ethnographic studies, much of the field’s scholarly literature is of a theoretical nature. Moreover, much of the scholarship on reading, whether of an empirical or theoretical bent, is focused on elementary school studies. However limited, all of these sources provide important elements that could lead into more refined research in adult literacy education.

Thus, in the articulation of the problem focus that I have used as an example throughout this essay, I juxtapose the conflicting theoretical work on reading theory

(Smith, 1985; Adams; 1990; and Pressley, 2002) and the socio-cultural interpretation of literacy as highlighted in the New Literacy Studies (Barton, 1994; Merrifield, 1998). The dialectical resolution provisionally suggested through Rescher's coherence theory stems from this juxtaposition and requires much additional refinement. On this, the research model schematically laid out by Popper, which could have come directly from Dewey or Rescher, provides a framework for additional research on the meaning and significance of adult literacy. A working standard for experimental research as described by Popper (1956/1983) consists of the following:

- (1) A clear exposition of the problem—, or if the problem may be assumed to be well known, a clear reference to it and to an exposition of it...[including any clarifications of] the always shifting *problem situation* (italics in original).
- (2) A more detailed survey of the relevant hypotheses bearing on the problem (and of the experiments bearing on the hypotheses, indicating the degree to which these are able to contribute to the appraisal of the hypotheses).
- (3) A more specific statement of the hypothesis (or hypotheses) which the author intends to propose, or to discuss, or to test experimentally.
- (4) A description of the experiments and the results.
- (5) An evaluation: whether the problem situation has changed; and if so, how.
- (6) Suggestions for further work arising from the work reported (pp. 50-51).

Popper maintained that his framework is applicable to the natural and social sciences and even to that of mathematical studies, at least in situations that do not depend on pure logic. A painstaking examination into such a claim of a universal scientific methodology would add much in terms of clarifying the role of a postpositivist research paradigm. While that broader analysis moves beyond the purposes of this essay, there is much within the philosophies of Dewey, Popper, and Rescher to suggest that their insights provide considerable grist for a viable social science design. I draw on Popper's framework, focusing primarily on his first two points, to illustrate the viability of a postpositivistic research design in adult literacy education.

The Problem Situation

It is generally accepted that knowing how to read (decoding print text), comprehending meanings of texts at various literal and inferential levels, and applying knowledge gleaned from such texts to any number of contexts beyond the text are all essential aspects of adult literacy education. Without necessarily adopting the political orientation of Paulo Freire (1970), few adult literacy educators would reject Freire's aphorism on the importance of "reading the word" in order to "read the world." Problems begin when matters of emphasis are stressed in terms of (a) the relation of reading and writing to that of knowledge acquisition, and (b) and conflicting perspectives on how reading is learned most effectively. To the extent that learning to read and knowledge acquisition occur more or less simultaneously, distinctions are less problematical than when the technical processes of learning to

read and write, and that of knowledge acquisition through a study of a given text are not occurring apace, which is the more frequent reality in adult literacy.

The concept of “multiliteracies” has emerged particularly in the New Literacy Studies (Barton, 1994; Merrifield, 1998), which, for the field of adult literacy has served, in part, as response to this dilemma. According to this school of thought, literacy is defined as a symbolic sign system in which print text is mediated through and within the contexts in which it is situated as one variable among others to be drawn upon to attain whatever knowledge is required or desired by a particular individual or group of individuals in a given situation. This viewpoint has had a prevailing influence in much of the theoretical work that has given shape to adult literacy studies over the past several decades (Auerbach, 1992; Fingeret and Drennon, 1997; Demetrian, 2004; Merrifield, Bingman, Hemphill and Bennett deMarrais, 1997; Quigley, 1997; Stein, 2000, and Sticht, 1997). Many of these studies have stemmed from, but moved beyond Freire’s (1970) political landmark, *Pedagogy of the Oppressed*.

From this perspective the definition of literacy has taken on various forms that need not concern us here, but that draw upon a metaphorical interpretation of reading the world (Barton, 1994). These, in turn, have given shape to literacy programs that, while teaching basic reading and writing skills, have spent as much, if not more emphasis on helping adults in learning to learn, as well as on the more ineffable aspects of the learning process related to the stimulation of motivation and the enhancement of self-esteem. Some adult literacy educators view these latter areas as foundational in the laying out of an emotional basis to ground the hard work of progressively learning how to read in context-based formats (Lytle, 1991), while others, also focusing on the metaphorical definition, stress the attainment of specific outcomes, which, in principle, can be measured through quantitative means.

Whether emphasizing the emotional impact or the attainment of specific outcomes, many students and instructors who are attuned to the learning/teaching moment, point to the value of the metaphorical dimensions of literacy in leading to certain levels of satisfaction that very well may be ignored or marginalized without such an emphasis. Even still, students in phonemic-based literacy programs also often report on their satisfaction, particularly if the socio-emotional climate of the instructional program is supportive of their aspirations, which is not to minimize the symbolic nature of the learning/teaching process that also infuses programs of this type. Consequently, attitude and the culture of a learning environment may play the more significant role in adult literacy setting, irrespective of instructional methodologies and content foci, although exactly how so, for what sets of students (Kegan, Broderick, Drago-Severson, Helsing, Popp, Portnow, & Associates, 2001), and its relation to more objective measures of impact inside and outside the program requires much clarification (Beder, 1999). At the least, progress in research requires empirically supported study as related to perplexing or challenging problems, and the formation of sharply honed questions and hypotheses designed to probe into them.

For the problem at hand, an examination of the relation of learning to read to that of learning to learn in an adult literacy context, the credibility of a study would be enhanced through comparative analyses among diverse students and programs of some to be determined significant quantity. All things being equal that would be so even if much of the needed work consists of delineating variables through in-depth case-study analysis that then become sifted through comparative research even without the prospect of a randomized sample. The utilization of whatever methodologies and approaches that brings further clarity to the matter throughout all the stages of the investigation (fidelity to the scientific method) within the historical evolution of the problem itself is the critical factor.

Whether learning to read or learning to learn is, or should be the central focus of adult literacy education, is a matter of some dispute, which has not been resolved within the literature of the field. There is substantial middle ground within these perspectives via the medium of balanced reading theory and a context-derived educational program that focuses on employment, family education, civic literacy, and lifelong learning (Stein, 2000). Nonetheless, tensions between the operative assumptions of the New Literacy Studies and advocates of phonemic-driven approaches to reading are particularly sharp in their articulation of competing definitions of literacy. In moving toward a dialectical resolution that incorporates balanced reading theory within a context-based adult literacy framework, my working hypothesis, much clarification is required.

Supportive Hypotheses and Related Statements

Recall the provisional statements about adult literacy education based upon Rescher's "duly-hedged synthesis" as a first-cut resolution to our problem, which fuses elements of learning to read with that of learning to learn.

1. Literacy facilitates knowledge acquisition in the grappling with and mastery of print-based texts.
2. Literacy is enhanced to the extent to which individuals gain the capacity to read and write print-based texts.
3. Growth in literacy is experienced to the extent to which readers progressively comprehend and draw meaning from texts and appropriate them into their lives.
4. Literacy has a technological component in the mastery of reading, writing and the comprehension of texts and a metaphorical dimension that resides in transactions between the reader and the text in which meaning making and significance lies beyond the text into that of appropriation, however variously that may be defined.

Each of these statements, as working hypotheses of the "duly hedged synthesis" requires additional clarification, including the grappling with new contradictions that may arise as the investigative proceeds. Let us take these statements one at a time.

Literacy facilitates knowledge acquisition in the grappling with and mastery of print-based texts.

- Knowledge acquisition may refer to understanding and progressively attaining the skills and knowledge needed for the technical mastery of reading and writing.
- Literacy may refer to the enhanced ability to read to the extent of providing an independent resource that students can apply to texts that they encounter either in the instructional program or outside of it without assistance from others.
- Knowledge acquisition may refer to the mastery of the content of print-based texts at varying levels of literal and inferential comprehension.
- Literacy may refer to the knowledge needed for such acquisition regardless as to how much or how little a student learns to read.
- While both learning to read and learning to learn are valid indicators of literacy, educators need to determine where priorities should be placed in terms of various student need and ability and what focal points of concentration stimulate what aspects of learning for any given student or groups of students.

Literacy is enhanced to the extent to which individuals gain the capacity to read and write print-based texts.

- If not by definition, it is at least a strong inference among most adult literacy educators and students that literacy includes the ability to read and write print-based texts and may even be its main purpose.
- All things being equal, increased capacity to read and write texts enhances literacy, whether a literal or metaphorical definition of literacy is adopted.
- The extent to which adult literacy students increase their ability to read print-based texts varies widely. Such variability needs to be factored into the reading and writing aspects of a given program and corresponding modes of assessment and accountability regardless of reading methodologies and the instructional content selected.

Growth in literacy is experienced to the extent to which readers progressively comprehend and draw meaning from texts and appropriate them into their lives.

- The capacity to comprehend and draw meaning from print-based texts in a supportive instructional environment does not depend on the ability to read the text independently.
- Students who have enhanced their ability to read and write have gained additional skills in comprehending and drawing meaning from texts in their ability to study independently. As a general rule, this capacity enhances a student's mastery of the content embedded in printed texts.
- There may or may not be any intrinsic correlations between comprehending the authorial meaning(s) of a text and a student drawing meaning from it. While literacy may be enhanced through either, as a general rule, it is strengthened most so when reasonable inferences between the two can be made.

Literacy has a technological component in the mastery of reading, writing and the comprehension of texts, and a metaphorical dimension that resides in transactions

between the reader and the text in which meaning making and significance lies beyond the text into that of appropriation, however variously that may be defined.

- Literacy, in the most comprehensive of definitions includes both the technological mastery of reading and writing, along with that of comprehension and deriving meaning from print-based texts.
- Taking the capacities of students into account, literacy progresses most when all of these dimensions are factored in, in which none of them serves as the privileged foundation of the definition.
- Even adults who remain at beginning levels of reading and writing ability who do not even come to approximating independent fluency can benefit as a result of the progress they achieve in the areas of comprehension and meaning making, although how durable such learning is and its significance requires much research.
- The extent to which even advanced students who progress in their reading and writing benefit in doing so also requires discriminating analysis. The salience to which gains in reading ability short of the GED certification open up opportunity structures for life improvement requires careful analysis in which the separation of variables may prove difficult.
- Even if little in the realm of opportunity structures is attained, being able to read, write, and comprehend print-based texts and appropriating such knowledge for one's own purposes has a certain value in itself (although how much so remains in question) as a form of self development that may or may not have broader societal impact.
- What is determined as efficacious in relation to adult literacy education may have as much to do with values of individual students and programs that seek to support them as with specific impacts subject to objective forms of direct measurability.
- Literacy is a cultural metaphor of considerable pluralistic range and scope of knowledge acquisition that includes the technical capacity of reading and writing as an important, but undetermined variable of the broader definition encapsulated in the term, "multiliteracies."
- Definitions of literacy that programs appropriate will be shaped by the sum total of cultural, social, political, economic, and intellectual influences interacting on them. In short, the cultural matrix as a variant in adult literacy education is unavoidable.

The Postpositivist Temper

These four hypotheses and 19 related statements presuppose a provisional acceptance of a "duly-hedged synthesis" that literacy is appropriately defined as a transactional relation between learning to read and write and broader content learning stemming from topics within and suggested by print-based texts. While both of these aspects of literacy are critical, neither is accepted as the foundational baseline of the definition. If anything is, based upon the precepts I have laid out, it is the tension between the radical particularity of student need, interest, and aptitude and the broader cultural matrix that

gives shape to that which achieves social and political legitimacy through which definitions and purposes of adult literacy education are mediated.

In this respect, whatever value there is in adult literacy as an educational phenomenon, which, on my reading, is a great deal, I am also proposing that literacy, however it is defined, has a semiotic reference, which needs to be grasped as an ecological sign system manifested in a range of psycho-socio contexts (Barton, 1994). This is the case, I am positing even if one defines literacy as mastery of reading and writing in which the technologies themselves possess cultural symbolic reference, which include, but also point beyond their literal meaning. Consequently, there is no “autonomous” literacy outside a contextual frame, but a definition that is socially and culturally shaped all the way down (Street, 1988). On this claim I am radicalizing the logical assumptions of the New Literacy Studies in accepting both definitions of literacy proposed in this paper in symbolically significant mediational terms as pointing beyond themselves into the realm of their cultural significance (Barton, 1994).

To move beyond these core suppositions of literacy (the “duly-hedged synthesis”), including the 19 bulleted statements would be the beginning of shifting into an actual research project. That cannot be undertaken here, but what merits further discussion is the salience of postpositivist research design. In the briefest of terms this mediating school seeks maximum precision consistent with the complexity of the problem under investigation in the quest for truth as a regulative ideal. This is the core definition of “competent inquiry” in the postpositivist mode.

In the scientific pole of this research design, there is a tendency to limit problems to those that are susceptible to “piecemeal social engineering” or “middle range theories” (Pawson & Tilley, 1997; Phillips & Burbules, 2000). Such a limiting propensity contradicts the broader philosophical tenets of postpositivism in which research is designed in accordance to the needs of the problem under investigation, however complexly these may intrude into the cultural matrix, consequently, into the realm of values even at the level of political culture. The provisional statements about adult literacy education proposed in this paper require examination of highly specific (yet complex) matters, for example, on how adults at different levels of reading ability learn, or expand on their ability to read. Some of the statements also require broad cultural interpretations on the construction of meaning mediated via a power/knowledge nexus within the context of the politics and sociology of adult literacy programs and networks. On this assumption, the construction of literacy in the external environment feeds back into the field with obvious consequences for the ways in which programs are shaped and the ways in which literacy is defined in highly specific instructional setting (Demetron, 2004). This also requires highly competent postpositivist analysis if this school of research is going to gain the credibility it needs to achieve its mediational vision.

In the example provided in this paper, the quality of the research design (stemming from the core definition of literacy, to the four supportive hypotheses and 19 related statements) is in the competence of the set up, including the salience of the problem posed. The issue is not whether the frame that I have provided could be improved, but

the extent to which it lays out in detail, sequence, and scope, something of the dimensions of a significant problem and viable pathways toward its exploration and potential resolution at least in the Peircian sense of long-range cumulative research. Assuming these to be relatively sound, at least for the sake of the current discussion, then the research to be undertaken needs to draw on whatever methodologies are required to probe into the relevant content.

Fidelity to the scientific *methodology* is the key, as laid out, for example, in Popper's six points, Dewey's "patterns of inquiry," and Rescher's network model. Critical in postpositivist design is a problem focus, the stimulation of imagination in the making of bold conjectures, attunement to the significance of provisional hypothesis formation in pushing an investigation forward, the correlative role of guided experimentation, and the capacity to discern which data in which contexts is relevant to the problem at hand. Also needed is searing and, as relevant, comparative analysis of any given theory or study, acceptance of falsification as a core criteria as subtly defined by Popper and Dewey, a probing into alternative scenarios suggested by the data or a given hypothesis, a drive for problem resolution, and the search for truth, however provisional, as a regulative ideal. These ideals are embodied in Dewey, Popper, and Rescher, whose collective reflections make a substantial contribution to postpositivist design. My purpose in this paper is less to draw out the subtle distinctions and potential points of conflict among these scientifically oriented philosophers, than to illustrate how their collective work contributes to the development of a broad-based postpositivist temper. Any research project on adult literacy that stems from the framework provisionally laid out here will be credible to the extent that it follows along its pathways.

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