Human Nature and Research Paradigms: Theory Meets Physical Therapy Practice

Margaret M. Plack
The George Washington University, mppt@aol.com

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Abstract

Human nature is a very complex phenomenon. In physical therapy this complexity is enhanced by the need to understand the intersection between the art and science of human behavior and patient care. A paradigm is a set of basic beliefs that represent a worldview, defines the nature of the world and the individuals place in it, and helps to determine criteria used to select and define research inquiry. A paradigm guides scientific inquiry, not only in the manner in which an investigation is performed, but also in how the investigator defines truth and reality and how the investigator comes to know truth or reality. A paradigm guides the types of research questions that will be posed, the methodological approach to the inquiry, and criteria for assessing the trustworthiness of the inquiry. Research plays an important role in enabling physical therapists to fully embrace the values of the profession, including evidence-based practice and client-centered care, in making informed clinical decisions. However, to do so, the research provided must include not only the views of the researchers, but also the lived experiences of the clients as well. This paper provides the reader with a solid foundation in the positivist/post-positivist, constructivist, and critical theorist research paradigms and how they apply in physical therapy practice. Research perspectives in physical therapy are explored, as are implications for future practice in physical therapy.

Keywords

Qualitative Research, Post-Positivism, Constructivism, Critical Theory, Trustworthiness, and Physical Therapy Practice

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Margaret M. Plack
The George Washington University, Washington, DC

Human nature is a very complex phenomenon. In physical therapy this complexity is enhanced by the need to understand the intersection between the art and science of human behavior and patient care. A paradigm is a set of basic beliefs that represent a worldview, defines the nature of the world and the individual's place in it, and helps to determine criteria used to select and define research inquiry. A paradigm guides scientific inquiry, not only in the manner in which an investigation is performed, but also in how the investigator defines truth and reality and how the investigator comes to know truth or reality. A paradigm guides the types of research questions that will be posed, the methodological approach to the inquiry, and criteria for assessing the trustworthiness of the inquiry. Research plays an important role in enabling physical therapists to fully embrace the values of the profession, including evidence-based practice and client-centered care, in making informed clinical decisions. However, to do so, the research provided must include not only the views of the researchers, but also the lived experiences of the clients as well. This paper provides the reader with a solid foundation in the positivist/post-positivist, constructivist, and critical theorist research paradigms and how they apply in physical therapy practice. Research perspectives in physical therapy are explored, as are implications for future practice in physical therapy. Key Words: Qualitative Research, Post-Positivism, Constructivism, Critical Theory, Trustworthiness, and Physical Therapy Practice

Introduction

As a physical therapist for over twenty-five years, I have been a clinician, an administrator, an academician, and more recently a researcher. I have witnessed and been part of the lived experiences of patients, families, colleagues, and students. The power of these experiences has shaped who I am as a professional and as a researcher. Patients have shared their successes and their frustrations; they have shared their thoughts and feelings about living with disability, about medicine, and about physical therapy. Colleagues have shared their frustration with the concept of evidence-based practice, perceiving that there is a propensity to devalue personal experiences and the uniqueness of each patient, which they believe are critical to the decision-making process. I have had other colleagues question the validity of non-positivist research simply because there are no statistics reported. I have observed students make clinical decisions based purely on statistics and numbers because the lived experiences of the patients are not available for

review in mainstream research literature. It is for these reasons that I decided to write this paper. Clinicians value a comprehensive approach to patient care that maintains the patient at the heart of the decision-making process. I believe this same philosophy is critical in health care research as well and must be supported through research within the profession.

Human nature is a very complex phenomenon. In physical therapy this complexity is enhanced by the need to understand the intersection between the art and science of human behavior and patient care. In June 2000 the Board of Directors of the American Physical Therapy Association adopted a vision statement for the profession entitled *Vision 2020.* It states that physical therapy will be provided by doctors of physical therapy; who will provide evidence-based practice in an autonomous environment (American Physical Therapy Association, 2004a). In addition, core values of the profession that clearly place the client at the center of care, have recently been made explicit (American Physical Therapy Association, 2004b). Research plays an important role in enabling clinicians to fully embrace both evidence-based practice and client-centered care in making informed clinical decisions. However, to do so, the research provided must include not only the views of the researchers, but the views of the clients as well. This paper provides the reader with a solid foundation in various research paradigms, which is then applied to physical therapy practice. Research perspectives in physical therapy are explored, as are their implications for future practice.

Historical Perspective

According to Guba and Lincoln (1994) a paradigm is a set of basic beliefs that represents a worldview, defines the nature of the world and the individual's place within it, and guides action. Kuhn (as cited in Crotty, 1998) described a paradigm as a "unitary package of beliefs about science and scientific knowledge…an overarching conceptual construct, a particular way in which scientists make sense of the world or some segment of the world" (p 35). Guba and Lincoln (1994) note that a paradigm contains the investigator's assumptions not only about the manner in which an investigation should be performed (i.e., methodology), but also in how the investigator defines truth and reality (i.e., ontology) and how the investigator comes to know that truth or reality (i.e., epistemology). More recently, Lincoln and Guba (2000) have added axiology, or the values underpinning ethics, aesthetics, and religion, to this framework on research paradigms. They suggest that answers to questions regarding these four elements provide an interpretive framework that guides the entire research process including strategies, methods, and analysis.

Paradigms of inquiry are historically based. Throughout history, different paradigms were seen as privileged. This privileged position often came from the political or ideological perspectives present and accepted at the time (Crotty, 1998; De Landsheere, 1997; N. K. Denzin & Lincoln, 2000). De Landsheere discusses several major periods of change in the approach to inquiry in the 20th century.

Traditionally (pre-1930's), research was modeled after the "hard" sciences and scientific inquiry and empiricism became the "gold standard" for research. Positivism represented this gold standard and was the predominant paradigm during this period. Researchers in new fields of inquiry (e.g., the social sciences) believed that if they

emulated this successful paradigm, then they too would be successful. It was a means of gaining credibility for their inquiry (Guba & Lincoln, 1994); Rist as cited in Candy, 1991). Positivists approached research in a very objective, controlled, rigid, and rigorous manner; attempting to reach an objective, determined truth.

During the 1930's-1950's, World War II and economic crises fostered more of a philosophical and political slant on research and research design. Less rigid and less pre-ordinate methodologies began to emerge as inquirers began to question whether the rigid positivist approach could truly be applied to human behavior with all of its subtle nuances. Post-positivists attempted to soften this view of inquiry by looking to trade off a bit of the rigor and rigidity for more ecologically valid and relevant results. Post-positivists began to look at approaching inquiry into human behavior from a number of different perspectives, both quantitatively and qualitatively.

During the late 1950's Russia launched Sputnik, which offered a significant challenge to the United States and had a profound effect on politics and ultimately on educational research. Major funding became available through the federal government and more powerful and advanced technology provided more advanced statistical analyses, leading to an upsurge in research development. However, it was not simply the financial or technological aspects of research that had changed. With increased knowledge of psychology, anthropology, linguistics, economics, and sociology inquiry was being viewed from many different perspectives. The empirical-analytical approach was being questioned as inquirers became increasingly interested not only in simple discovery of human behavior, but also in how people attribute meaning to their life events (De Landsheere, 1997; Candy, 1991). Researchers began to look at alternative paradigms to inquiry. The constructivist paradigm began to gain favor in the social scientific community as more and more scientists and educators began to debate different methodologies and philosophies of inquiry and began to look beyond discovery to develop a richer understanding of the complexity of human behavior.

With the 1980's came acceptance within the social science community, that no one research paradigm can be relied on to answer all types of inquiry into human behavior (De Landsheere, 1997). Politically and socially, critical issues began to focus on the influence that class, gender, and race had on human behavior (Denzin & Lincoln, 1994). Again scientists were faced with issues and questions that did not fit comfortably within existing paradigms. This gave rise to the critical theory paradigm. Critical theorists did not just perform inquiry for discovery or understanding, but rather were concerned with issues of power and oppression, and sought to encourage action that would change the status quo and uphold emancipatory ideals (Crotty, 1998; Kim, 2003; Kincheloe & McLaren, 2000).

Finally, 1990's inquiry began to abandon the "distant inquirer" in education and the social sciences and move toward more social action. The inquirer sought to enhance the voices of previously silenced groups and increase the number of perspectives viewed in research efforts. Thus, movement toward more "thick descriptions" and narrative formats began to gain favor in educational and social science research (Denzin & Lincoln, 1994).

Before exploring each paradigm in more detail it is important to understand that the introduction of each new paradigm also brought controversy. Much debate continues to surround each of these research paradigms with different theorists using different

terminology. While I will not address all of the controversies or differences in terminology, since this has been addressed elsewhere in the literature (Crotty, 1998; Denzin & Lincoln, 1994, 2000; Lincoln & Guba, 2000; Murphy, Dingwall, Greatbatch, Parker, & Watson, 1998), a few examples are provided. Lincoln and Guba (2000) label the concepts positivism, constructivism, and critical theory as separate paradigms. Crotty uses the term theoretical perspectives to define these same concepts. Lincoln and Guba suggest that ontology, epistemology, methodology, and axiology define the research inquiry. Alternatively, Crotty suggests that the following four questions define the research inquiry: (1) How do we know what we know (i.e., theory of knowledge or epistemology)? (2) What philosophical stance addresses the assumptions the investigator brings to the process (i.e., theoretical perspective)? (3) What is the research plan and rationale that links choice of methods to outcomes desired (i.e., methodology)? and (4) How will data be collected and analyzed to answer the research questions (i.e., methods)? Similarly, while Crotty labels subjectivism, constructionism, and objectivism as epistemology, Lincoln and Guba use these terms to indicate how the investigator defines truth and reality or ontology. Nevertheless, while each may categorize them differently, all would agree that the elements underlying these concepts are inherent in any scientific inquiry process. They address the assumptions that underlie every research project and link the theoretical and pragmatic elements of the research process to their desired outcomes within the scientific inquiry process. Thus, before addressing the current state of research in physical therapy practice it is important for the reader to fully understand the ontological, epistemological, and methodological underpinnings of each paradigm, or theoretical perspective, as well as their underlying assumptions, purposes, and goals. In addition, given that rigor is critical to good research, this paper addresses the criteria for judging trustworthiness of each type of inquiry.

Positivism and Post-Positivism

Positivism, as a research paradigm, seeks to solve major practical problems, search for law-like generalizations, and discover precise causal relationships through statistical analysis (Candy, 1991; Crotty, 1998; Kim, 2003). Positivists strive to use valid and reliable methods to describe, predict, and control human behavior. They believe reality exists independent of social context and can be discovered through objectively designed and applied research. They use verification of a priori hypotheses as a means to discover the ultimate truth and immutable laws of nature (Kim, 2003). Positivists contend that research should be context-free, value-free, bias-free, and replicable. They rely on experimental and quasi-experimental research designs, most often requiring rigorously applied interventions or variable manipulations. Traditionally, positivism has been the "gold standard" of research, the "received view," the privileged paradigm (Denzin & Lincoln, 2000; Guba & Lincoln, 1994). Positivism has had a profound influence on the development of research traditions in education and the social sciences. Debates involving this paradigmatic orientation have been the basis for the development of other paradigms (Walker & Evers, 1988).

Early positivists based all knowledge on empirical observations and sense (or brute) data (Murphy et al., 1998). Some positivists, particularly the logical positivists, believe that the only real truths are based in scientific empiricism, math, and logic

(Crotty, 1998). While early positivists attempted to apply the methods of inquiry used in the natural and physical sciences to the social sciences, the logical positivists attempted to apply mathematical principles to philosophical thought. Thus logical positivists believe that brute data is the only data which can be measured, counted, and thereby quantified (Crotty, 1998). It is through the use of statistical analyses of quantified observations that theories are tested and truths are discovered (Kim, 2003). The attributes measured by logical positivists are devoid of opinions, beliefs, assumptions, and feelings, which exclude from knowledge such domains as morals, politics, and judgment (Crotty, 1998; Murphy et al., 1998; Schwandt, 1994; Walker & Evers, 1988). Logical positivism has formed the basis of modern scientific thought (Crotty, 1998).

Post-positivists have attempted to soften this approach and as a result show some significant philosophical distinctions from the positivists. The goal of the post-positivist, like the positivist, is to discover cause and effect relationships and to predict and control future behavior on the basis of present behavior (Guba & Lincoln, 1994; Walker & Evers, 1988). Unlike positivists, post-positivists do not ascribe to the concepts of verification and certitude. They accept that not all statements can be fully verified through direct observation and brute data: However, they do maintain the positivist stance on objective reality (Crotty, 1998).

Ontologically, positivists believe that logical deductive reasoning, scientific inquiry, and replicable findings will converge upon apprehendable objective truths. Post-positivists believe that an objective world does exist beyond the human mind, but that only "partially objective accounts of the world can be produced because all methods are flawed" (Denzin & Lincoln, 1994, p. 15). While truth can never be fully apprehended, the post-positivist believes that through research and statistical analysis you can state that there is a high probability that truth has been obtained. Rather than verification, post-positivists ascribe to the principle of falsification (Crotty, 1998; Guba & Lincoln, 1994). Post-positivist researchers begin with a priori research hypotheses and through an experimental or a quasi-experimental design (which may include both quantitative and qualitative research methods) the a priori hypothesis would either be supported or rejected (falsified).

Epistemologically, post-positivists believe that knowledge of an existing world can be approached or approximated through probable statistics, as noted. In addition, while positivists maintain that the inquirer should be a "distanced observer" and objectivity and neutrality of the researcher are essential: Post-positivists appreciate and strive for rigor and control in design yet acknowledge that in dealing with human nature total objectivity is unattainable (Candy, 1991; Crotty, 1998; Guba & Lincoln, 1981, 1994, p. 110). Therefore, the goal of the post-positivist is to both acknowledge the presence of human interactivity and control for it as much as possible.

Methodologically, both paradigms employ experimental and quasi-experimental designs, interventions, manipulations, and rigorously defined methods. Positivists rely primarily on quantitative research to verify truth whereas post-positivists employ "critical multiplism" or multiple methods as a way of falsifying the a priori hypotheses (Guba & Lincoln, 1994). Unlike the positivist, the post-positivist utilizes numerous approaches to inquiry including qualitative research in naturalistic settings to be able to discover cause and effect relationships in given contexts. This approach serves to discover not only the

etic viewpoint (the perspective of the observer or researcher), but the emic viewpoint (the perspective of the observed or participant) as well (Denzin & Lincoln, 2000).

Determining Trustworthiness in the Positivist and Post-Positivist Paradigms

In evaluating the trustworthiness of research and research findings, positivists and post-positivists look to traditional criteria for evaluation. The criteria shared by both include, internal validity, external validity, reliability, and objectivity. Internal validity relates to the truth-value or whether the findings of the research are consistent with reality. External validity relates to the generalizability of the results. Reliability is the consistency, sense of stability, or replicability of the research. Objectivity is the degree to which observer bias was controlled, or the level of distance or neutrality the observer achieved (Schwandt, 1994). To properly judge internal and external validity, the researcher must take into account content validity, predictive validity, concurrent validity, construct validity, and face validity (Creswell, 1994). By maintaining the above criteria for research, the research findings could be considered trustworthy.

Constructivism

Although the post-positivist paradigm sought to soften the positivistic approach to inquiry, some social scientists continued to find significant fault with this approach. Those who reject these paradigms do so on the grounds that they believe that one cannot define general inviolable laws that govern all human behavior. Instead, human behavior must be viewed and interpreted according to the individual's motives, intentions, or purposes for action as well as through rules that have been consensually agreed upon and validated by people in society. Not only is it important to discover external, observable human behavior, but also to understand the intentions, values, attitudes, and beliefs behind that behavior (Candy, 1991). To develop an understanding of the subjective and intersubjective meaning of human behavior required the development of another paradigm, the constructivist paradigm. Constructivists look not only at explicit and language-based propositional knowledge, but implicit and tacit knowledge as well (Guba & Lincoln, 1981).

Ontologically, the constructivist emphasizes the personal meaning made by the inquirer and the inquired. Constructivists do not believe an objective truth exists and deny the existence of one correct interpretation against which all research findings must be measured (Candy, 1991). Instead, constructivists believe in a relativist reality, which is constructed, socially and contextually specific, and which changes over time (Merriam & Associates, 2002; Schwandt, 1994). Reality is both individually constructed and intersubjectively negotiated within a given social context. It is socially constructed as individuals interact within the world. Constructivists believe that there can be multiple realities and no one is more privileged than the other (Merriam & Associates, 2002; Schwandt, 1994). Reality cannot be understood in terms of independent variables, instead it must be understood in terms of intersubjectively agreed upon patterns of truth (Guba & Lincoln, 1981).

Constructivists do not deny the existence of an outside reality. They acknowledge this possibility, but assert that we are only coming to fully understand it and the only way

to know reality is through experience and action (Candy, 1991) (Merriam & Associates, 2002). Underlying this paradigm is the presupposition that intentions, values, attitudes, and beliefs behind human behavior can be uncovered through inquiry and interpretation and that these interpretations can be validated through consensus.

Truth in the constructivist paradigm is "a matter of the best-informed and most sophisticated construction on which there is consensus at a given time" (Schwandt, 1994, p. 128). These socially constructed meanings of events occur over time and are influenced not only by the individual's actions, but also by history, society, and language (Schwandt, 1994). This ontological perspective is a major break from that of the previously accepted positivist and post-positivist paradigms.

Epistemologically, constructivists believe that knowledge is comprised of multiple interpretations that are context dependent and value-laden (Kim, 2003). Since knowledge is created through interactions and accepted through relative consensus, constructivists see the inquirer as intimately involved with the inquiry. The researcher is the primary research tool, not a "distanced observer" (Merriam & Associates, 2002). Focus is placed on the process by which the meaning of human behavior is created. This process includes how meanings are created, negotiated, sustained, and modified within a specific context of human action (Schwandt, 1994).

In discussing the epistemological claims of constructivists, Schwandt raises the question, "If knowledge is individually constructed how can it be extensively shared?" (Schwandt, 1994, p. 131). To counter this question, constructivists often emphasize the social construction of knowledge. Constructions are created not only by the individual, but by society as well. Thus, constructions are subjectively created and intersubjectively validated, which reinforces the need for the inquirer to be intimately involved in the inquiry.

The goals of the inquirer are to interpret and construct meaning from the individual and social constructions of those involved in the inquiry. Moreover, it is to attempt to understand subtle and unique differences in human behavior rather than make gross generalizations about similarities. Constructivist researchers are not necessarily interested in predicting the future, rather they are interested in understanding the meaning individuals make of their experiences (Merriam & Associates, 2002). Constructivists seek to understand phenomena from the emic perspective (Crotty, 1998). As understanding becomes more fully developed these constructions of truth may be altered to incorporate new levels of knowledge. Therefore, constructivists think of knowledge as a process, not a product or an essential given to be discovered (Schwandt, 1994). The interactivity of the inquirer in this process allows for learning to occur. This learning continually alters the inquirer's understanding of the phenomenon under study, which further informs each successive inquiry (Guba & Lincoln, 1981). In fact the ability of the inquirer to pick up subtle nuances, details, and multiple dimensions of the phenomenon under study often comes from the fact that the inquirer is intimately involved in the phenomenon being studied. Eisner calls this a "state of enlightenment" (Schwandt, 1994, p. 129).

Methodologically, Schwandt (1994) notes that constructivist inquiry begins with a question or concern as opposed to an a priori hypothesis from theory, as would be in the case of the positivists/post-positivists. Constructivists gather details and utilize inductive reasoning to develop hypotheses, theories and concepts (Creswell, 1994). Constructivists assume that reality is multifaceted and cannot be fragmented or studied in a laboratory,

rather it can only be studied as a unified whole within its natural context (Candy, 1991). This inquiry takes place in the natural setting, it is informal and interactive, and the research design evolves as the inquiry unfolds. The design is expansionistic in nature, not reductionistic as was seen in the positivists/post-positivists approach. The constructivist takes an open, exploratory stance with the goal of understanding the complexity of the phenomenon as a whole (Guba & Lincoln, 1981).

Throughout the emergent inquiry, working hypotheses are formulated and reformulated as data emerge and deeper understanding is developed. Idiographic statements, multiple realities, and complex interactions are recorded through "thick descriptions," which may include words, phrases, non-verbal descriptors, pictures of the participants, and the like (Merriam & Associates, 2002). Each step builds upon the previous one to develop a more in-depth understanding of the phenomenon in question. Continuous movement between parts of the phenomenon and the whole, along with dialogue and ongoing hermeneutics (i.e., interpretations and re-interpretations that help to make explicit what is implicit), result in the development of intersubjective consensus and validation of the joint constructions developed (Schwandt, 1994). Through this process constructs are re-framed and the inquirer reaches a more informed and complex understanding of human behavior. The level of sophistication and understanding will in part depend on the experiences, previous constructions, and interpretive abilities of the inquirer.

Determining Trustworthiness in the Constructivist Paradigm

There are many perspectives and much debate regarding the appropriate criteria and terminology to be used in judging trustworthiness within the constructivist paradigm (Denzin & Lincoln, 2000; Merriam & Associates, 2002; Murphy et al., 1998). Some constructivists, such as Merriam and Associates, utilize the post-positivist criteria of internal validity, external validity, reliability, and objectivity to judge the quality of constructivist research. Others, like Guba and Lincoln (1994), suggest that the paradigmatic differences between post-positivism and constructivism warrant the use of different criteria. They submit that the traditional evaluative concepts of internal validity, external validity, reliability, and objectivity do not hold because they do not believe in objectivism and essentialism. Still others, who hold to a relativist interpretation of constructivism where multiple realities exist, suggest that there is no way to distinguish between trustworthy and non-trustworthy results (Smith as cited in Murphy et al.).

As Merriam and Associates (2002) suggest, although the debate continues and no consensus has been reached as to the appropriate criteria and terminology to be used in judging trustworthiness of constructivist research, the issue of quality remains and must be addressed. This paper recognizes the ongoing debate and attempts to provide a framework for the reader to begin to judge trustworthiness of constructivist research.

Schwandt (1994) suggests that the most important criteria for judging trustworthiness of constructivist research is functional fit (i.e., whether the inquiry and its results allow you to achieve goals and how the findings fit into a given context or discourse). Guba and Lincoln (1994) offer the following criteria by which constructions themselves can be evaluated: "fit" or how the findings fit within current knowledge; "work" or the degree to which they develop a more sophisticated level of knowledge;

"relevance" or how applicable the inquiry is to the given context; and finally, "modifiability" or their ability to be modified as new data emerge. Eisner (as cited in Murphy et al., 1998) discussed trustworthiness from the perspective of perception and aesthetic knowledge, which yields criteria such as structural corroboration (i.e., do different parts of the data collected demonstrate coherence?); referential adequacy (i.e., are readers presented with data that enable them to see what the researcher saw?); and multiplicative replication (i.e., do the members of the community believe the findings?). Other criteria that have been suggested include thoroughness and comprehensiveness. These criteria would ultimately determine whether the findings reported show a more informed view, useful and worthy of adoption (Schwandt, 1994).

Two additional sets of criteria for judging inquiries have been proposed: (1) credibility, transferability, dependability, and confirmability; and (2) authenticity, which includes, fairness, ontological authenticity, educative authenticity, catalytic authenticity, and tactical authenticity (Guba & Lincoln, 1994; Robson, 1993).

The first bears resemblance to criteria used for positivist and post-positivist research being reinterpreted to reflect the basic assumptions of the constructivist paradigm (Guba & Lincoln, 1981). Credibility deals with truth-value, which is referred to in traditional research as internal validity. Given the underlying assumptions of constructivism, to test truth-value one would need to determine if the interpretations made were credible based on the subject's own interpretations (Guba & Lincoln, 1981; Murphy et al., 1998).

Guba and Lincoln (1994) also replaced the criteria for external validity or generalizability with transferability. Since the purpose of constructivist inquiry is to search for unique differences, emic views and idiographic statements, and generalizability is considered a context-free statement, generalizability in the traditional sense is not an issue. Instead, it is the applicability or degree of fit that is essential to the adoption of a given construct and thus an essential criterion from which to judge the inquiry. Transferability is the degree to which similarities exist between contexts that allow findings to be transferred from one situation to another (Murphy et al., 1998). Creswell (1994) discusses the use of thick descriptions to provide a solid framework for comparison from which transferability may occur. The responsibility of the researcher is to provide thick descriptions with sufficient detail so that the reader can make judgments regarding the transferability of the data obtained (Robson, 1993). Thus the onus of transferability is taken off the researcher and placed on the person who is attempting to generalize the information from one context to another.

The use of the concept of reliability is not adhered to by constructivists for reasons similar to those of generalizability, particularly since the constructivist researcher is often more interested in differences than similarities and the uniqueness of the event within a specific context. Instead, steps must be taken to ensure that the information obtained is dependable. What makes a study dependable is whether the researcher has taken into account the expected instability of the phenomenon in question, as well as the potential change that may have resulted from the study design itself (Murphy et al., 1998). Creswell (1994) notes that by having the researcher clearly state the central assumptions, the selections of the participants, and the biases and values of the researcher it may actually be possible to replicate the study in another context.

As noted, key to the concept of dependability is the use of thick descriptions. The thick descriptions allow for an inquiry audit, where the auditor can follow the process to determine if it was clear, systematic, well documented, and provided safeguards against bias (Altheide & Johnson, 1994; Robson, 1993). Thick descriptions allow the researcher to describe how problems encountered were addressed, which is key to evaluating the validity of a study. Thick descriptions include what is implicit as well as explicit. Emphasis is on the process, and thick descriptions provide a full account of the hermeneutic process involved in the interpretation of the situation. Altheide and Johnson note that it is this link between what the researcher knows and how it came to be known that allows one to truly assess the adequacy of the research. Additional steps to enhance dependability may include overlapping methods, stepwise replication, and auditing (Guba & Lincoln, 1981).

Finally, the concept of objectivity or neutrality is at odds with the assumptions underlying the constructivist paradigm since it clearly views the interactivity of the inquirer as being essential to the inquiry. Instead, constructivists would employ criteria of confirmability. What becomes critical is that the information obtained must be confirmable. Utilization of thick descriptions and audit trails are essential in allowing the reader to determine whether the conclusions clearly flow from the data (Murphy et al., 1998; Robson, 1993).

In looking at the authenticity of inquiry, Guba and Lincoln (1994) propose that the following issues be evaluated: fairness (i.e., the researcher must ensure that the range of realities were presented); ontological authenticity (i.e., constructions of the individual has become more sophisticated with respect to the phenomenon under study); educative authenticity (i.e., the constructions of others have become more sophisticated); catalytic authenticity (i.e., the outcomes of the inquiry have stimulated human action); and tactical authenticity (i.e., the inquiry increased the subjects' empowerment to act). The last two criteria were added most recently in response to criticism from those holding beliefs in the critical theory paradigm (Schwandt, 1994).

Regardless of the criteria and terminology used to judge quality of constructivist research all agree that care must be taken to prevent distortions resulting from the researcher's presence and bias on the part of either the inquirer or the subjects, including the manner in which the data were collected and interpreted. A number of strategies have been proposed to ensure quality of constructivist research including: member checks or asking participants to comment on the researcher's interpretations; triangulation or use of multiple investigators, theories, sources, and methods of data collection; clear exposition of methods and process or ensuring sufficient detail to allow the reader to view the context from which to judge the credibility of the research process and content; audit trail or use of an independent auditor to authenticate the findings by following the logic of the researcher; reflexivity or critically reflecting on the self as researcher; prolonged engagement in data collection and analysis to ensure in-depth understanding of the phenomenon; peer review such as the use of a devil's advocate to offer questions and raise alternative explanations throughout the process; search for negative cases or those cases that do not apparently fit the emergent conceptual framework; use of thick rich descriptions that enable the reader to judge whether the methods used and conclusions drawn by the inquirer were justifiable; and finally a commitment to fair dealings or

representing multiple perspectives in the research (Guba & Lincoln, 1981; Merriam & Associates, 2002; Murphy et al., 1998; Robson, 1993).

Critical Theory

Whereas constructivists believe that it is most important not only to discover and describe human behavior, but also to understand the intentions, values, attitudes and beliefs behind human action, critical theorists do not believe this philosophical stance goes far enough. Critical theorists believe that it is not enough to simply describe and understand human behavior; rather they seek to improve the well-being of humans in society by challenging oppression and questioning the status quo. Critical theorists believe it is essential to look beyond the perceptions of the individual to the factors that lead to the development of those perceptions, including the underlying assumptions, both of the individual and society. Critical theorists are particularly interested in understanding how power dynamics shape individual and social consciousness. They believe that one's interpretation of a situation is shaped by a number of external forces and struggles including societal norms, such as race, gender, political, social, historical, and economic ideologies (Candy, 1991; Crotty, 1998; Kincheloe & McLaren, 2000).

Critical theory is not a single paradigm, but rather a conglomeration of alternative paradigms including, feminism, neo-Marxism, materialism, social theorists, sociolinguists, participatory inquiry, racialized discourses, cultural studies, and queer theory (Denzin & Lincoln, 2000; Guba & Lincoln, 1994; Kincheloe & McLaren, 1994). Each of these alternatives is a study unto itself: However, they share certain fundamental beliefs. Critical theorists in general maintain the following: socially and historically situated power relations are the basis of all thought; all facts are value-laden and entrenched in ideology; supply and demand relationships in society cannot be separated from, and often mediate, social relationships; language underpins both our conscious and unconscious awareness; oppression is present in society and many interconnected oppressive forces are prevalent throughout society; and most orthodox research reinforces the hegemony of class, race, and gender oppression (Kincheloe & McLaren, 1994).

Kincheloe and McLaren (1994) describe critical theorists as those researchers who "use their work as a form of social or cultural criticism" (p. 139). They describe the goal of critical inquiry as being to expose the social injustices and inequities that occur in society as a result of uncritical or unquestioned acceptance of the dominant culture. Ultimately, through exposure of these previously taken-for-granted inequities, the goal of the critical theorist is to disrupt the status quo resulting in emancipatory action by the subjugated members of society. This action will ultimately result in a more egalitarian and democratic society for all. Therefore, the critical theorist is concerned with advocacy and the facilitation of social change, not simply generating new knowledge (Kim, 2003). The critical theorist aims to negate oppressive forces, raise consciousness, and invoke a call to action to aid emancipation that will potentially lead to empowerment and social change (Creswell, 1994; Kincheloe & McLaren, 2000).

Ontologically, critical theorists believe that knowledge or reality is essentially a historical reality. It has been shaped by social, political, cultural, economic, ethnic, racial, and gender factors, and it has been reified or crystallized over time into a taken-for-granted reality (i.e., a well accepted status quo) (Lincoln & Guba, 2000). According to

critical theorists this reality is inappropriately accepted as truth, both natural and immutable (Guba & Lincoln, 1994). Truth is arrived at through discourse and grounded subjectively, intersubjectively, or through some accepted norm. However, when these normed claims do not serve the entire population equally, power struggles and oppression occur (Kincheloe & McLaren, 2000).

Epistemologically, the critical inquirer cannot be distanced from the subject of the investigations, since the nature of the inquiry is completely value determined (Guba & Lincoln, 1994). These values include not only the values of the inquirer, but also the values of those participating in the investigation. Emphasis is placed on the interactions of individuals in society and the inquirer: The values of the inquirer will ultimately influence the inquiry itself and vice versa. Knowledge is created through the interaction of the inquirer and the participants. Since advocacy and activism are keys in critical inquiry, interactivity of the inquirer is essential (Guba & Lincoln, 1994). The inquirer and participants are partners in the process; both becoming more enlightened from the inquiry. Freire notes that they are "equally knowing" (1972, p. 131): However, very often the oppressed are not even aware of the presence of oppression. Giroux (as cited in Guba & Lincoln, 1994, p. 115) suggests that the voice of the inquirer is one of "transformative intellectual," meaning that the inquirer holds an "expanded" level of consciousness, which enables him/her to confront ignorance, oppression, and hegemonic practices. The researcher may be more aware of the presence of oppressive forces: However, researcher and participants work in concert throughout the inquiry process. The inquirer is expected to be involved with participants and to be instrumental in facilitating greater insight and therefore facilitating emancipatory action on the part of the participants to confront oppression within the social context (Crotty, 1998; Freire, 1972; Guba & Lincoln, 1994; Kincheloe & McLaren, 1994).

At the heart of critical theory methodology is dialectic dialogue, which uncovers the unconscious assumptions by which we interpret our everyday experiences (Kincheloe & McLaren, 1994, 2000). By uncovering these underlying assumptions and offering them up for critique and dialogue they can be brought into a larger historical framework. Reflection upon the assumptions underlying this taken-for-granted historical reality helps develop an understanding of the presence of, and origins of, these hegemonic and oppressive practices. Through rational discourse and critical reflection, incongruities and contradictions of everyday life are explored. Raising questions about social norms and values from cultural, social, political, economic, race, gender, and class perspectives allows for these reified beliefs to be challenged. As the participants in the inquiry begin to develop more informed insights, emancipatory action is facilitated to alleviate oppression, recreate the world, and develop a more egalitarian and democratic society (Freire, 1972). Critical reflection, critical discourse, and consensual validation are essential in the transformative or emancipatory process. (Cranton, 1994).

Determining Trustworthiness in the Critical Theory Paradigm

As in the constructivist paradigm, and unlike the post-positivist paradigm, the critical theory paradigm offers a number of alternative criteria for judgment of the inquiry and its findings. Research findings from the critical theorists' paradigm can initially be judged in a manner similar to that of the constructivists, particularly if you look to the

more recent concepts of authenticity proposed by Guba and Lincoln. Concepts of fit, rightness, work, relevance, and modifiability, are all criteria that can be useful in judging the trustworthiness of inquiry and outcomes in either paradigm (Guba & Lincoln, 1981).

As critical theorists move towards social action and emancipation, the judgment criteria incorporates not only the criteria noted above, but also evaluation of the findings based on their emancipatory implications. Evaluation of critical inquiry requires that value judgments be made. Concepts such as verisimilitude, emotionality, personal responsibility, ethic of caring, political praxis, multi-voiced texts, and dialogue with subjects become essential components of transformative and emancipatory learning and therefore, criteria for judging quality of the inquiry (Denzin & Lincoln, 1994).

Guba and Lincoln (1994) posit three additional criteria for judging inquiry. First, is the degree to which the inquiry has taken into account the cultural, political, social, economic, ethnic, race, and gender aspects of the context. Second, is the degree to which the inquiry has managed to "erode ignorance and misapprehensions" (p. 114). Third, is the degree to which emancipatory action was facilitated.

Kincheloe and McLaren (1994) discuss two criteria for determining trustworthiness, credibility, and anticipatory accommodation. Credibility is a more appropriate criterion than the traditional concept of internal validity, as previously discussed under constructivism, and anticipatory accommodation is a more appropriate criterion than the traditional concept of external validity. In describing their concept of anticipatory accommodation, Kinchloe and McLaren liken it to Piaget's cognitive process of accommodation; noting, that in order to generalize any findings from the critical theory paradigm, one must be quite informed about the similarities and differences within a given context. The researcher must be able to reshape the findings of the research from a given context to fit the nuances of the new context.

Finally, Walker and Evers (1988) sum up the difference between the criteria for judgment in critical theory versus constructivism by stating that it is not simply a matter of constructing an alternative paradigm, but to what degree the inquiry promotes human well being.

Research Paradigms in Physical Therapy Practice

Physical therapy is an outgrowth of medicine and science. There is intense pressure for academic health centers to obtain research grants and most of these grants are given to study designs that provide randomized controlled trials (Miller & Crabtree, 2000). For physical therapy faculty, dissemination of research findings has become an important component of the accreditation criteria for physical therapist education programs (Commission on Accreditation of Physical Therapy Education, 2004). Evidence-based practice has become part of the vision of the profession and there is a commitment to assist clinicians in becoming proficient at utilizing research findings in practice (American Physical Therapy Association, 2004a; Ciccone, 2004). This is evidenced by the addition of *Evidence in Practice*, now a regular feature in *Physical Therapy* since January 2002. Research has come to the forefront in the practice of physical therapy.

Published research in physical therapy has been approached primarily from a post-positivist perspective. Research evidence has become a critical element of the

clinical decision-making process and as a result, as in medicine, randomized controlled trials, systematic reviews, and meta-analyses have become the gold standard (Ciccone, 2004; Gibson & Martin, 2003; Kim, 2003; Maxwell, 2004; Miller, McKibbon, & Haynes, 2003; Miller & Crabtree, 2000; Sackett, Richardson, Rosenberg, & Haynes, 1997). Objectivity, validity, and reliability are essential to research in the field of physical therapy. Miller and Crabtree (2000) refer to this biomedical model as "patriarchal positivism" (p. 610); a "theoretical, hospital based, and disease oriented" model (p. 611).

As such, the primary goal of research has been to determine universalisms, outcomes, and cause and effect relationships for the purpose of controlling and predicting future outcomes, which will inform clinical decision-making and enhance physical therapy practice. A priori hypotheses, methods and designs based on theory have been encouraged. Overt human behaviors and brute data are most often employed to describe human nature. Inferential statistics and statistical analyses are used to make generalizations and to determine the degree to which the hypotheses have been supported or rejected. Research has been value free (or at least an attempt to control bias is paramount) and quantitative designs have been privileged over qualitative designs. Recent studies published on research trends in physical therapy show that published research has predominantly centered on the efficacy of various intervention strategies and support the fact that the vast majority of these studies have been post-positivistic in nature (Gibson & Martin, 2003; Klassen, Grzybowski, & Rosser, 2001; Miller et al., 2003; Robertson, 1995).

Having a strong post-positivistic predilection has its benefits and its limitations in the field of physical therapy. One of the major benefits of using this paradigmatic approach is the use of inferential statistics, which allows one to make generalizations from a sample to a population. The research can be performed on a more limited number of people while many may reap the benefits. This approach has the ultimate goal of predicting and controlling outcomes, which may help to predict what may work, while providing guidance to therapists in preventing negative outcomes. Hypotheses can be formulated from theory and then tested to determine the efficacy of certain treatment approaches. The use of statistics allows therapists to determine with a high level of probability what may be the most effective and efficient therapeutic approach to patient care.

While there are many benefits to this type of research, concern has been raised that the post-positivist approach has become the predominant paradigm in physical therapy literature. Miller et al. (2003) analyzed research in physical therapy between January 2000 and June 2001. They noted that of the 179 articles published, in six consecutive issues of the four major international journals of physical therapy *[Physical Therapy, Australian Journal of Physiotherapy, Physiotherapy Canada*, and *Physiotherapy]*, only 86 of them were categorized as being "concerned with the understanding of health care in humans, [and] will have an effect on the care of the patient/subject" (p. 131). In addition, only 19 demonstrated sufficient rigor to be of use by evidence-based practitioners in making clinical decisions. Even more disconcerting was that they found only one article that utilized a non-positivist research design. Gibson and Martin (2003) found a similar lack of representation of non-positivist research in the same journals between January 1996 and April 2001. They identified a total of 25 non-positivist studies out of a total of 584 (4.3%) studies published, with two of the four

journals having published only one qualitative study in the five-year span. While Gibson and Martin found a similar trend, they suggested that the groundwork that would allow researchers and clinicians to develop an appreciation for non-positivist methods in physical therapy literature had been laid and that "we need to continue this momentum in physiotherapy" (p. 356). A more recent review of the same four major journals by this author revealed that while some indication of change was present, the trend continued. Of the 112 articles reviewed between summer 2003 and summer 2004 (in the same four mainstream physical therapy journals), nine (8.04%) used methods such as interviews and focus groups that suggest a constructivist approach, while no articles were found that utilized a critical theorist approach.

Although the post-positivist approach has its benefits there is often a trade-off between rigor and relevance. The post-positivist paradigm is highly controlled and attempts to provide a great deal of rigor; however the research outcomes are often decontextualized, which sometimes limits their generalizability and clinical relevance. This runs counter to the *Clinical Research Agenda for Physical Therapy* formulated by the American Physical Therapy Association (2000), which emphasizes the importance of clinically relevant research (Jette, 2003). In addition, the post-positivist approach does not allow the inquirer to develop a thorough understanding of the complexity of human behavior, nor does it attempt to capture the lived experience of the patient who is receiving the intervention. Further, it assumes that all aspects of therapy can be fragmented and studied a few variables at a time.

Each patient is unique and brings a unique background (i.e., gender, race, ethnic, economic, political, social, and historical) to the treatment setting, which may have a tremendous impact on outcomes. Because of the uniqueness of each individual, outcomes can never be fully predicted nor controlled. Human behavior cannot be taken out of this context and can never be value-free, which are expectations of the post-positivist paradigm. In attempting to look objectively at outcomes and brute data, the impact of human nature and its subjective (including values, motives, and intentions) and intersubjective relationships are overlooked. Finally, emancipatory action, which may be essential in the current health care environment, has not been adequately addressed. Many patients lack access to medical care, others receive inadequate care, yet no studies were uncovered to date in mainstream physical therapy literature that seek to engage patients in systematic research that will empower them to improve their status within the health care system.

While the goal of research in physical therapy is to provide evidence that informs practice, the post-positivist approach seeks to predict outcomes providing only part of the evidence needed to make informed decisions in practice. A number of authors have suggested that privileging the positivist paradigm results in "missing evidence"— evidence that is critical to understanding human nature and its impact on health care (Gibson & Martin, 2003; Miller & Crabtree, 2000). While positivist research provides generalizable results, constructivist and critical theorist research provide context. While positivist research provides information about causality, it fails to provide a full description of the processes, events, and experiences integral to this cause and effect relationship. Without this, the causal mechanism cannot fully be understood (Miller & Crabtree, 2000). Physical therapists provide interventions, however healing most often occurs between physical therapy sessions. It is by capturing the patient's entire

therapeutic experience through constructivist research that this causal description may more fully be revealed. Further, non-positivist approaches to research can help explicate some of the factors beyond the biophysical (e.g., social, emotional, cognitive, spiritual) that may intervene as barriers, constraints, or supports to any given intervention. Understanding the full context of the patient's experiences with the intervention can provide additional evidence as to why the intervention may or may not have been successful. Further, physical therapy intervention is not simply about diminishing impairment or dysfunction, rather it is about improving function and reintegrating individuals into society, which cannot be studied out of context (Gibson & Martin, 2003).

Although post-positivism remains the dominant paradigm in physical therapy and research continues to emphasize interventions, outcomes, and cause and effect relationships, researchers have begun to seek a more thorough understanding of the humanistic aspects of physical therapy practice. Studies such as *The Physiotherapy Experience in Private Practice: The Patient's Perspective* (Potter, Gordon, & Hamer, 2003), *Individual and Societal Influences on Participation in Physical Therapy Activity Following Spinal Cord Injury: A Qualitative Study* (Levins, Redenbach, & Dyck, 2004), and *Qualitative Study of Clinical Decision Making in Recommending Discharge Placement from the Acute Care Setting* (Jette, 2003) that have appeared in mainstream physical therapy literature demonstrate that researchers and publishers are beginning to recognize the value of reporting the lived experiences of both patients and therapists.

While funding sources are beginning to recognize non-positivist research as a valuable source of information (Miller & Crabtree, 2000; Murphy et al., 1998), Gibson and Martin (2003) note that non-positivist research remains "misunderstood and possibly underrepresented in physiotherapy" (p. 350). They assert that non-positivist research is often not evaluated appropriately. Rather than being viewed as an alternative approach to research, with its own set of criteria for establishing credibility and trustworthiness, non-positivist designs are often held to the same criteria as positivist designs. Further, these studies are often viewed simply as non-experimental, which in the hierarchy of valued evidence, places it near the bottom.

Devaluation may, in part, account for the under-representation of non-positivist research in mainstream of physical therapy literature. However, additional questions can be raised as to why constructivist and critical theorist research remain under-represented. Is it that researchers are not interested in this type of research? Is it that post-positivist research questions are the primary interest of funding sources? Is it that physical therapists remain unaware of the credibility of non-positivist research? Is it that physical therapists remain unaware of the relevance of the information that can be gleaned from non-positivist research? Is it that editorial board members of the mainstream journals do not value these approaches? Is it that this type of research is often more time consuming and complex than post-positivist research? Regardless of the reason, physical therapy research generally falls short of moving towards utilization of either the constructivist or critical theorist paradigms: Exclusion of this research in mainstream literature limits the evidence that can be used by practitioners in making informed clinical decisions. Further, by not exploring and sharing the experiences of the very patients that we seek to serve their voices remain silenced in the scientific literature.

My Paradigmatic Assumptions

As a physical therapist, I believe in the field of science and that within this framework, rigor and objectivity are needed in applying research to discover cause and effect relationships that can predict future outcomes based on present behaviors. However, restricting research to one paradigm does an injustice to the entire field of study. Health care in general and physical therapy specifically, are not purely hard sciences where immutable, objective truths exist. While outcome measures and cause and effect research can enhance quality of care, health care should not be co-mmodified where research seeks to standardize care for the purposes of enhancing productivity and cost effectiveness. There are aspects of health care that are drawn from the hard sciences and have an objective reality in which randomized controlled trials, meta-analyses, and systematic reviews (i.e., post-positivist approach to inquiry) may be most appropriate and may enhance the quality of care. However, at the heart of practice in health care is the study of human nature and the impact that science may have on the human being as an individual within society and vice versa. While evidence-based practice is, and should be, valued by the profession, evidence is incomplete unless voice is given to the range of evidence needed to understand the complexity of the relationship with the patient.

Human nature cannot be fragmented into a few distinct variables for study. Of equal importance are the processes that connect these variables to the outcomes under study. Context cannot be negated. Each human being is unique, bringing to the therapeutic setting a unique historic, ethnic, cultural, social, economic, racial, political, and gender background. Two patients of the same diagnosis may react quite differently to the health care provided based on their backgrounds. Their understanding of the situation is uniquely constructed, as is that of their health care provider. Understanding the meaning that participants make of their experiences along with their values, beliefs, and intentions are of equal value in attempting to illuminate the processes that lead to cause and effect relationships. Further, it is important for the silenced voices to be heard. Disparities exist in health care. These are the voices that have not been heard in physical therapy. There is no research in physical therapy literature that addresses health care disparities (Harris, 2004). This is the missing evidence.

The profession of physical therapy strives to maintain client-centered care-recognizing the uniqueness of each individual. Sensitivity to individual and cultural differences is an expectation of all physical therapy education programs (Commission on Accreditation of Physical Therapy Education, 2004). This is the explicit message. However, I question the implicit message if these individual and cultural differences are not expressed in our mainstream literature. Klassen et al. (2001) noted that most physical therapy clinicians rely on the research provided in the four major international journals cited above, yet the overwhelming majority of studies reported in these journals are from the positivist paradigm and are intervention based. This leaves little available space in which clinicians are exposed to the valuable findings of non-positivist research. The net result is that the primary focus of research is on how the "total knee replacement" responds to a given intervention, with very little focus on how the "patient with the total knee replacement" has actually experienced that intervention or how that intervention has impacted the life of the individual with a "total knee replacement."

One paradigm should not be privileged over another. To fully understand the complex interaction of the individual within the therapeutic milieu requires complex and in-depth research from a variety of perspectives. Walker and Evers (1988) discussed the complementary nature of research paradigms; Creswell (1994) suggested mixing paradigms; and Miller and Crabtree (1994) proposed concurrent designs, nested designs, sequential designs, and combined designs to facilitate this process. More recently, Maxwell (2004) has argued that while positivist research can provide a description of the causal relationship, in the study of complex phenomena such as human behavior, only non-positivist research can truly provide explanations and perspectives for those relationships that consider the lived experience of the participants. No single paradigm or methodological approach can provide a full understanding of the complexity of human nature required in a health care setting. To date, with what is known in research, I believe we have not come so far as to develop one paradigm that can be utilized to approach all problems present in dealing with human nature. Therefore, I would suggest that all three research paradigms be utilized in a complementary fashion so that we can begin to capture the complexity of the therapeutic relationship.

What needs to drive the inquiry is the clinical question that is being asked: If this requires the use of mixed methods then researchers should be encouraged to use mixed methods rather than always seeking to explore phenomena from the traditionally privileged perspective of the post-positivist (Miller & Crabtree, 1994). If the question being raised is "How much?", "Does X cause Y?", or "Is X effective in treating Y?" then a post-positivist perspective is most appropriate. If the issue is "Why is it effective?", "How is it effective?", or "In what ways did X impact the participant's ability to function in society?" then a constructivist perspective is more appropriate. Finally, if the issue is, "In what ways do insurance practices constrain access of certain patients to treatment X?" or "Why do health disparities persist?" then it would make most sense to approach the inquiry from a critical theorist's perspective. As Miller and Crabtree (1994) suggested, "to evaluate the physical/behavioral, conceptual/historical, social/emotional, and spiritual features relevant to a particular clinical question, multiple paradigms and methods are necessary" (p. 343).

The following examples further illustrate how a multi-paradigmatic approach to research is essential to our understanding of human nature and its impact on physical therapy practice and vice versa. As a pediatric physical therapist I am always reminded that I am working with the child and his or her family, not the Cerebral Palsy. The child is both unique and complex. The child is also not alone, but a member of a family, and a society, and as such, the child, the family, and society each play important roles in the child's success with any given therapeutic intervention. Without exploring the impact of each component on the intervention, evidence and client-centered care are incomplete.

In working with a pediatric patient with a diagnosis of Cerebral Palsy, if the health care provider seeks to determine whether a given treatment approach is most likely to be effective, the post-positivist paradigm may be most appropriate. This approach will help to define some of the cause and effect relationships that may be employed in predicting outcomes of various treatment techniques. Using outcomes obtained from post-positivist research, the health care provider may choose to do further research, employing the constructivist paradigm, to see if the particular approach advocated in the research will actually fit within the lifestyles of some families with children diagnosed

with Cerebral Palsy. This health care provider/researcher may look to develop a better understanding of the values, intentions, goals, and motivations of both the children and their families to determine the impact that this particular treatment approach may have on the child in more holistic manner. Thus clinical decisions can be based not solely on the probable effect of the intervention, but also on the impact of the intervention on the child and the family as a unique unit. Finally, from a critical theorist's perspective, the health care provider may question whether the children and their families are getting their therapeutic needs met or whether potential oppression by the medical and insurance communities exists. The health care provider may use a critical theorist approach to empower the families to question the doctors and insurance companies; ultimately enable them to become better advocates for their children.

Conclusion

Human nature is a very complex phenomenon, requiring a pluralistic worldview. To approach any research dealing with human nature from a singular perspective is to limit the depth of understanding one can achieve. After exploring the underpinnings of the three major research paradigms vis-à-vis their place in history in general and within the physical therapy profession specifically, I suggest that if we as a profession are to embrace evidence-based practice and client-centered care, we must do so fully, both explicitly and implicitly. These concepts are explicit expectations both in the academic and clinical arenas. Evidence-based practice encourages clinicians to also consider the patient's goals and values, their own best judgment, societal and institutional constraints, and the unique relationship that the therapist has with the patient. However, privileging one paradigm over another within mainstream professional literature limits the evidence available with which to do so. This results in an implicit message that only certain evidence is valued; this evidence being the nomothetic perspective obtained from post-positivist research. However, equally important is the idiographic perspective of the clients themselves. Recognizing that a causal relationship exists with respect to certain variables does not fully describe the processes involved in that causal relationship, nor does it describe the unique context of the individuals involved in that relationship. Not presenting research from all three paradigmatic perspectives in mainstream professional literature limits the exposure of practicing clinicians to all types of evidence need to make informed clinical decisions.

To fully embrace client-centered care we must engage clinicians in understanding the patient as a whole and in considering the many factors that might impact patient care including perception, experience, social roles, culture, race, gender, ethnicity, issues of politics and power, etc. These personal and interpersonal dimensions of patient care may serve to enhance or diminish the outcomes predicted in post-positivist research. This does not privilege one paradigm over another rather it seeks to utilize information from all paradigms, to fully understand the multi-faceted nature of human behavior in the complex sociopolitical environment of health care.

Implications for Practice

To fully embrace evidence-based practice and client-centered care physical therapists must fully apprehend the relationship between human nature and the therapeutic milieu. For this to happen, the following are implicated within the profession: (1) To provide clinicians with the comprehensive evidence needed to make informed clinical decisions, all aspects of the therapeutic relationship must be explored and disseminated in mainstream professional literature; (2) To fully understand the causal relationships integral to effective care, including the processes involved in these relationships that might serve to mitigate the outcomes for any given patient, the lived experiences of the patients and their families must be explored and shared; and (3) Best practice and policy cannot be fully informed without both the voices of the many (i.e., nomothetic perspective) and the voices of the few (i.e., ideographic perspective): researchers and funding sources should seek both.

Concepts explored in this paper hold implications for all clinical researchers as well. To provide comprehensive evidence upon which to base clinical decisions, researchers must embrace a perspective of multiplicity: (1) Positivist researchers must be open to the perspective that alternative approaches to inquiry can add to the evidence base of the profession; (2) Non-positivist researchers must ensure rigor and a transparency of methods that enables the reader to fully appreciate the methods, analysis, and interpretations drawn from the research; and (3) All researchers must be open to multiple perspectives and cross disciplinary collaboration. Finally, for educators, this paper supports the premise that students and returning clinicians must be taught to understand, seek, critique, and value research from a number of different perspectives. Unless clinicians are exposed to rigorous research from alternative paradigms and new researchers are taught to seek, critique, and produce research from a variety of paradigms, the post-positivist perspective will remain the privileged paradigm, evidence will be incomplete, and the client will never fully be at the center of practice.

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Author Note

Margaret Plack, P.T., Ed.D., is the Director of the Program in Physical Therapy at The George Washington University, Washington, DC. Dr. Plack received her BA from

NYU in physical therapy and her MA from NYU in physical therapy with a specialty in developmental disabilities. Most recently Dr. Plack received her Ed.D. in Adult Education from the Department of Organization and Leadership at Teachers College, Columbia University, NY. She received her training in qualitative research while at Teachers College, where she completed a qualitative dissertation entitled *Learning Communication and Interpersonal Skills Essential for Physical Therapy Practice: A Study of Emergent Clinicians*. Over the past several years Dr. Plack's work has focused on reflective practice and educational outcomes. Her work includes the use of reflective essays and reflective journals both in the classroom and in the clinical setting. She has presented on this topic both locally and nationally. Dr. Plack views the classroom as a reciprocal learning environment and strives to use every classroom encounter as an opportunity for teaching, research, and lifelong learning.

Correspondence concerning this article should be addressed to Margaret M. Plack, 900 23rd Street, NW, Suite 6145, Washington, DC 20037; Email: mppt@aol.com

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