

Theory-Driven Science and Naive Empiricism in Counseling Psychology

Stanley R. Strong
Virginia Commonwealth University

Counseling psychologists' aversion to theory-driven science and their enthusiasm for naive empiricism impede scientific progress. For the scientist who endorses theory-driven science, causes are emergent entities that arise from the relations among the elements in events, all events are lawful, and the purpose of research is to test and evolve theories. For the scientist who endorses naive empiricism, the causes of events are the essences of the elements in events, only frequent events are lawful, and the purpose of research is to identify regularities from unbiased observations. The consequences of these differences are described in terms of the impossibility of unbiased observation, the importance of theory to give facts meaning, the role of research methods, and the way in which scientific products are applied. In theory-driven science, an unending cycle of discovery and testing creates and evolves theories of ever increasing scope that can guide counseling practice.

In the past few years, counseling psychologists have vigorously debated the question of what their science should be like. In 1984, the *Journal of Counseling Psychology* published a special section on the philosophy of science (Howard, 1984; Patton, 1984; Polkinghorne, 1984). Recently, Hoshmand (1989) presented a provocative review of alternative research methods, including ethnomethodology, textual analysis, hermeneutics, and participant observation. The debate is motivated by a growing dissatisfaction with the lack of fruitfulness of scientific work in counseling psychology. Many agree with Goldman (1976) that the scientific efforts of counseling psychologists have generated little of value to practice (Strong, 1987). Many argue that the slow pace of scientific progress is due to the inadequacy of the "received view" of science to the task of understanding human behavior and offer different approaches, which they believe hold more promise.

I agree that scientific progress in counseling psychology has been disappointing. However, I believe that the problem lies not in deficiencies of the received view but in the failure to apply it (Strong, 1984b, 1987). My purposes in this article are to identify the received view as theory-driven science, to point out symptoms and consequences of the failure to apply it, and to argue that greater scientific progress will result from moving toward, not away from, theory-driven science.

I take my definition of the received view from the writings of Ernst Cassirer (1923), Kurt Lewin (1935, 1938, 1951a) and

Karl Popper (1976, 1979). Ernst Cassirer was a neo-Kantian philosopher under whom Kurt Lewin studied at the University of Berlin. Cassirer was interested in the nature of thought, especially the effects of how people think on what they conclude. In an influential work, Cassirer explored the patterns of thought associated with progress in science (Cassirer, 1923). He argued that progress in science is associated with a change in thought from a mode that focuses on identifying the essential qualities of objects to a mode that focuses on constructing hypothetical models of underlying realities. Cassirer referred to this change in mode of thought as a transition from Aristotelian to Galilean science.

Kurt Lewin, impressed with Cassirer's (1923) analysis (Lewin, 1949), devoted his career to developing psychology as a Galilean science. In his first article published in English, Lewin (1935) identified the consequences of Cassirer's two modes of thought for psychology and argued that psychology was approaching the *Galilean turning point*, an issue to which he attended throughout his career (Lewin, 1951a). Following Cassirer (1923), Lewin (1935, 1938, 1951a), and Popper (1976, 1979), I take Galilean science to be the received view. I believe that the disappointing scientific progress in counseling psychology is a result of the allegiance of many counseling psychologists to Aristotelian thought. I begin my argument by defining the Galilean received view and contrasting it with Aristotelian thought.

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Correspondence concerning this article should be addressed to Stanley R. Strong, Department of Psychology, Virginia Commonwealth University, 808 West Franklin Street, Richmond, Virginia 23284.

The Galilean Received View Contrasted With Aristotelian Thought

The Aim of Science

The aim of Galilean science is to invent constructs of unseen realities that underlie and find expression in observed events (Cassirer, 1923; Lewin, 1935; Popper, 1979). An observed event is seen as a symptom of dynamic processes that arise from the interaction of the characteristics of the elements

in the event. The scientist represents this unseen reality with a network of constructs, construes how the constructs generate observed events, and identifies how symptoms of the underlying processes are to be measured. The scientist then designs methods to generate observations in order to evaluate the adequacy of the theoretical network.

In Galilean science, all events, whether frequent or infrequent, are assumed to be expressions of underlying lawful processes. To understand and predict an event, two sets of information are necessary. One is a theory, a representational model of the reality posited to underlie and cause the phenomenon of interest. The other consists of measures of the current state of the situation, that is, the current levels of the variables posited to arise from the interaction of the characteristics of the elements in the event.

In Galilean science, events are categorized on the basis of the similarity of the dynamics that underlie them. For example, events in social interactions between professor and student, counselor and client, supervisor and supervisee, subjects in a laboratory experiment, marital partners, parent and child, or casual acquaintances are seen as similar because of the similarity of the social influence dynamics that underlie them (Strong, 1991).

Lewin's (1938) topological and vector psychology is an example of how the Galilean scientist construes dynamic processes. Lewin began with the formula, $B = f(P,E)$: Behavior (B) is a function of the person's characteristics (P) and the environment's characteristics (E). By this, Lewin did not mean that behavior is a function of a list of person and environment characteristics, but rather that behavior is a function of emergent entities that arise from their interaction. He conceived of person characteristics as tensions (T) and environment characteristics as goals (g). The interaction of the characteristics of the elements of an event gives rise to valences (V): $V = f(Tg,g)$. A valence generates an inclination in the person to locomote toward the goal, an inclination Lewin construed as a psychological force (F). He perceived behavior as a result of the combination of the forces acting on the person (F^*), as indicated in the formula, $B = f(F^*)$. Thus, Lewin conceptualized the causes of behavior as psychological forces acting on the person that arise from the interaction of the characteristics of the person and the environment: $B = f(F^*) = f(P,E)$.

Lewin (1951b) constructed and evaluated the adequacy of his network of concepts in a series of studies carried out at the University of Berlin. These studies focused on a wide range of events, including the effects of intentions, incomplete tasks, and level of aspiration.

The aim of Aristotelian science, as construed by Cassirer (1923) and Lewin (1935), is to identify the essential properties of the elements of nature that cause regularities in observed events. In this view, regular or frequently occurring events are expressions of lawfulness. Thus, the scientist's first task is to identify frequently occurring events. These events are then categorized on the basis of their apparent (phenotypic) similarity. From these categories, the scientist identifies the attributes that the elements in the events have in common. These attributes are seen as the essential natures of the elements and as the causes of the appearance of the events.

Aristotelian science focuses on the phenotypic appearances of events. The causes of phenotypically similar events lie in

the essential properties that their elements have in common. These essences, examples of which are personality attributes, actualization tendencies, and environmental demand properties, cause the appearances of events. In this mode of thought, the essential properties of a person are the causes of the person's behavior. The extent to which the person behaves differently in different situations reflects the extent to which environmental factors distort the expression of the person's essences. Likewise, variations among peoples' response to a situation reflect the distorting effects of individual differences on the expression of the essence of the situation. Finding the essences of persons and situations requires sifting out the distorting effects of particular situations and persons, a statistical task.

Social psychological research on how people attribute causes for interpersonal events has shown that people are naive Aristotelian scientists (Heider, 1958; Jones & Davis, 1965; Kelley, 1967; Strong, 1978). People attribute frequent events to the essences of persons or situations. They dismiss atypical and infrequent events as the result of temporary factors that distort the expression of essences.

A major difference between Galilean and Aristotelian science is their concept of what constitutes a cause. In Galilean science, causes are emergent entities that arise from the relations among characteristics of elements in an event, whereas Aristotelian science identifies causes as the essential features of the elements themselves. Proponents of the two views differ in the extent to which they see lawfulness in events. In Galilean science, all events reflect the operation of underlying lawfulness. In Aristotelian science, only events that occur with a statistical frequency greater than chance reflect lawfulness. In Galilean science, events are categorized in terms of the similarity of their underlying dynamics. In Aristotelian science, events are categorized in terms of the apparent or phenotypic similarity of their elements.

The Purpose of Research

The purpose of research in Galilean science is to assess the assertions of theory, including assertions about how to measure the states of variables in situations. The events observed and the methods used to test theories are important only insofar as they allow assessment of the assertions of the theories. Laboratory experiments often are preferable in that they allow better control of factors that could be sources of competing explanations of the observed effects (Dominowski, 1989). In addition, infrequent events, which often provide the strongest tests of theoretical assertions, can be generated in the laboratory.

The purpose of research in Aristotelian science is to identify frequently occurring events. Identifying empirical regularities is the first step in the search for causal essences. In addition, the events observed must be similar to the events one wishes to explain. Because the causes of events are the natures of the elements of which they are composed, it is impossible to learn about an event from events with dissimilar elements. For example, if the elements of a laboratory experiment are not clients and counselors and their task does not resemble counseling processes, then the observations the experiment gener-

ates will be a result of different essences than those that occur in counseling. The study of an infrequent or unusual event, as might be generated in the laboratory, has no prospect of generating meaningful observations. Such study is simply "a scientifically unimportant bit of folly" (Lewin, 1935, p. 13).

Application

The purpose of a theory generated in Galilean science is to understand events and to accomplish objectives of practical importance. The theory may have been generated and refined from observations of events that on the surface appear to be very different from the events of interest. The crucial issue is whether the theory addresses the underlying dynamics of the events of interest. For example, in my 1968 article on social influence in counseling, I first attempted to establish that it was reasonable to believe that the social influence dynamics thought to underlie attitude and opinion change in social psychology also underlie behavior change in counseling (Strong, 1968). In addition, it is necessary to tailor measures of the symptoms of theoretical dynamics to the symptoms' appearance in the events of interest. Specific assertions about how practical objectives can be accomplished in an area of application require concrete knowledge of the current state of crucial variables.

Extension of a theory to a new area of application requires demonstrations that the theory increases understanding and predicts the course of events, the rationale behind many of the studies on social influence in counseling (Strong, 1982). When the applicability of a theory to counseling has been established, counselors can respond to clients from moment to moment on the basis of their understanding of underlying dynamics and ongoing assessments of the current state of the counseling relationship.

An example of this process of theory application comes from Carl Rogers. First, he developed a theory of the dynamic processes underlying behavior change through interpersonal relationships (Rogers, 1951). Then he specified the crucial variables in the process and developed methods of measuring them (Rogers, 1957). Finally, he generated a staggering amount of data showing the variables' practical consequences in counseling (Rogers, Gendlin, Kiesler, & Truax, 1967). His assertions about the dynamics underlying counseling are now integral to counseling practice.

In Aristotelian science, application is a matter of generalizing from one event to another. Generalization is based on the apparent similarity of the elements in two events. Generalizing from one event to another is inadvisable unless the similarity between elements is first established. This reasoning lies behind the practice in counseling psychology of calling laboratory experiments "analogues" of counseling and the doctrine of external validity. In Aristotelian science, facts drawn from one event inform us about another only to the extent that their elements are phenotypically similar. Observations of events dissimilar to counseling cannot be a source of understanding about counseling. Only facts generated in research on counseling events are clearly applicable to counseling practice.

Symptoms of Aristotelian Thought in Counseling Psychology

The vitality of Aristotelian thought in counseling psychology is seen in the allegiance of many leaders in the field to radical or naive empiricism. Naive empiricism is a loose collection of beliefs about science that conform closely to what Cassirer (1923) and Lewin (1935) described as Aristotelian science. Its basic tenets are that (a) we have direct contact with reality through observation, (b) the task of science is to identify empirical relationships that occur with sufficient regularity to be the basis of empirical generalizations, and (c) knowledge about counseling can be gained only by observing the social event labeled "counseling." From this perspective, counseling should be observed without preconceptions to allow unbiased facts to emerge. The scientist should accumulate observations and identify empirical generalizations from observed regularities. Adherents of naive empiricism reject the idea that observations of noncounseling events, such as those obtained in laboratory experiments, can provide knowledge about counseling. From this perspective, only field studies of counseling with counselors and clients can yield relevant observations (Goldman, 1976; Hill, 1984; Mahrer, 1988).

Naive empiricism has always been the dominant mode of thought in counseling and clinical psychology. Many counseling and clinical psychologists view counseling and therapy as unique processes that can be understood only with facts and ideas gleaned from observing the counseling and therapy processes. For two decades, the editors of the *Journal of Consulting and Clinical Psychology* have refused to review reports of studies that do not involve clients, therapists, and clinical settings. The *Journal of Counseling Psychology* has been more open to diverse ideas and methods, although the extent of openness has varied from editor to editor.

Commitment to naive empiricism was apparent in the opinions expressed by many members of the research section of the Third National Conference on Counseling Psychology. Although the final report of the section recommends a full range of research methods, it acknowledges the rising tide against laboratory methods and in favor of field studies that use "unbiased" observational methodologies (Gelso et al., 1988). Gelso and Fassinger (1990) noted the same trend in their review of scientific activity in the field in the 1990 *Annual Review of Psychology*.

I discuss symptoms and consequences of naive empiricism in counseling psychology in terms of the possibility of unbiased observation, collecting facts versus testing theories, fixation on methods, and external validity versus the theory bridge.

Unbiased Observation

A major flaw in naive empiricism is the assumption that observations can be unbiased. Research in social psychology and the findings of evolutionary biology (Radnitzky & Bartley, 1987) have established that human beings cannot passively observe reality. People are not passive recipients but active construers of reality. Every observation people make is

directed and constructed by their assumptions about reality. Constructions of reality are channeled by genetic inheritance, hypotheses gained from experience but outside of awareness, and hypotheses of which people are consciously aware. The concept of the mind as a tabula rasa is false. Thus, the objective of gathering observations untainted by preconceptions is not attainable.

The fact that observations are "theory-laden" has been recognized in the philosophy of science for some time (Bernstein, 1976; Popper, 1979; Thomas, 1979), but many scientists have not fully appreciated its implications. Recognition of the theory-laden nature of observation was responsible for the fall of positivistic science. The logical positivists believed that an objective description language was available to scientists such that "raw facts" independent of theory could be gathered and compared with expectations derived from theory. In this way, the truth or falsity of theories could be objectively assessed and compared. It is broadly accepted now that such a program for science is impossible. Any observation is intimately tied to the frame of reference out of which it springs. The frame of reference includes values and metaphysical beliefs about nature (such as the nature of humans), theoretical assertions that flow from the metaphysical frame of inquiry, and hypotheses and methods of measurement that flow from the theory (Thomas, 1979). Facts are objective only in the sense that reality is allowed to speak within the framework from which observation flows.

I am a realist. I believe that an external reality exists independent of my observation of it. Yet, I can access that reality only through the lens of my frame of reference. The implication is that any observation, no matter how unbiased the scientist claims to be, is conditioned by the scientist's metaphysical and theoretical beliefs. Naive empiricism does not result in unbiased observations but rather in ignorance about the biases embodied in observations. Recently championed approaches to scientific inquiry such as ethnomethodology (Hoshmand, 1989) and phenomenology (Patton, 1984), which claim access to others' realities without taint from the assumptions of the observer, are no more objective than any other approach. I believe that the only solution is to make every effort to uncover and make explicit the assumptions molding observations. Such efforts reveal the metaphysics, theories, and hypotheses guiding fact-finding and transform naive empiricism into theory-driven science.

Gathering Facts Versus Testing Theories

Naive empiricism emphasizes the accumulation of facts from which empirical generalizations can be drawn. Theory-driven science emphasizes the construction of theories and the generation of facts with which to test them. This difference in emphasis results in profoundly different scientific activities. In counseling psychology, the naive empiricism bias and its accompanying anti-theoretical stance has led to the generation of a multitude of unconnected facts, a state of affairs decried by Harmon (1982) in her committee's assessment of the state of science in counseling psychology in the early 1980s and by many reviewers of the state of the field in the volumes of the *Annual Review of Psychology*. In theory-driven science, scientific work cycles from constructing theory to generating

observations with which to test the theory and then returns to reconstructing theory in light of findings. Much of the research in counseling psychology has demonstrated that a focus on research (observation) without theory construction and testing does not result in the accumulation of coherent bodies of scientific knowledge.

In a penetrating review of progress in the social influence area, a theory-based approach to counseling, Heppner and Claiborn (1989) noted that many investigators have ignored the need to create and test theory. Many have used laboratory experiments to accumulate facts rather than to test theory. Not only is this a questionable use of the laboratory, but the results of such expeditions are devoid of meaning because of their lack of connection with theory. Theories are necessary to provide coherence and meaning to facts.

Fixation on Methods

The naive empiricism bias in counseling psychology has led to a preoccupation with research methods. The editors of the *Journal of Counseling Psychology* periodically solicit manuscripts on research and statistical methods but do not solicit manuscripts on theory. Professors in counseling psychology programs teach their students how to collect facts but not how to dream up and construct theory. Counseling psychologists call themselves scientist-practitioners, yet their emphasis is not on science in the Galilean sense but on research, the gathering of facts. Theory-driven science focuses on a circular and unending process of constructing theories and testing their assertions. Its purpose is to construct ever-expanding and increasingly robust theories that explain phenomena. Many counseling psychologists focus on generating increasingly sophisticated research and statistical methods and on arguing about the intrinsically superior qualities of one method over another.

I am not arguing that sophistication in methodology is unimportant. Rather, I am suggesting that the emphasis is in the wrong place. The importance of a method lies in its ability to assess the assertions of a theory. Dreaming up ways to assess theory is a creative task, and methods can always be improved. New theories require new methods, and creating new methods of measurement brings home the truth that all measures in social science are based on qualitative distinctions detected by the human observer (Lewin, 1951c).

Counseling psychology has become method bound. Instead of the assertions of theories determining the research methods that counseling psychologists use, the acceptability of methods determines how counseling psychologists theorize. In the final analysis, method is important only to the extent that it allows assessment of theoretical assertions, generates reproducible findings, and eliminates competing explanations. Whether the method is qualitative, quantitative, ethnomethodological, phenomenological, correlational, experimental, based on the field, or based on the laboratory is incidental.

External Validity Versus the Theory Bridge

Naive empiricism and theory-driven science differ dramatically in the way in which the products of scientific work are brought to bear on practical affairs. In naive empiricism,

whether the findings of an investigation are relevant to some other event such as counseling is a function of the similarity of the elements in the two events. This view has led to the notion of external validity and has resulted in a restriction in the application of the products of scientific work to counseling. In theory-driven science, the results of a study are never applied directly to another event. Rather, the results of a study affect confidence in the theory it was designed to test. The theory, not the study, is applied to events of interest. Theory is the bridge between research and practice (Strong, 1971).

Scientific work in the Galilean mode results in two bodies of knowledge, propositions about dynamic factors that cause observed events, and measures of the levels of the dynamic factors operative in a specific event. Theories about dynamic factors posited to underlie counseling processes can be construed from and assessed in studies carried out in noncounseling settings. Such studies are relevant to and affect counseling practice through the theory to which they contribute. On the other hand, knowledge of the specific settings or levels of dynamic factors in counseling can only be drawn from studies of counseling. As I outlined previously in this article, research on counseling is necessary in order to apply theories to counseling practice. In theory-driven science, research provides observations from which theories are created and with which they are tested. The theories in turn inform practice. Theories are bridges that pass knowledge gained from specific research events to efforts to achieve objectives in the specific events of practical endeavors.

The Cycle of Scientific Work

For the reasons I have tried to explain, I believe that the disappointing progress of science in counseling psychology is a result of the failure to apply the received view of science, defined as theory-driven Galilean science, rather than the result of inadequacies in the received view. I believe that widespread adherence to naive empiricism, with its many similarities to what Cassirer (1923) and Lewin (1935) called the Aristotelian mode of thought, has inhibited scientific progress in counseling psychology. I believe that concerted efforts to apply theory-driven science to the subject matter in counseling psychology will result in coherent bodies of scientific knowledge that are relevant to counseling processes and of help to practitioners.

Scientific work in the Galilean mode cycles between a context of discovery and a context of testing. In the context of discovery, the scientist invents and constructs concepts of the dynamics that underlie and are expressed in observed events. In this task, the scientist draws on all of the ideas, observations, hunches, and creativity he or she can muster. As concepts emerge, the scientist invents ways to tie them to observable events and specifies how symptoms of the dynamics are to be measured. Equipped with a theory, the scientist enters the context of testing. In this context, the scientist generates observations with which to test the assertions of the theory. Observations inevitably reveal inadequacies in constructs and measures. Armed with more observations, ideas, and hunches, the scientist returns to the context of discovery to alter the theory or invent a new one.

To illustrate this cycle of building theory and observing, I briefly describe four of my many rounds of conjecture and refutation (Popper, 1976) in pursuit of a robust theory of the social-influence dynamics of counseling (presented in greater detail in Strong, 1982). I do so with trepidation, for I am painfully aware of the inadequacy of my efforts.

As a graduate student, I was dissatisfied with the accounts I was presented of how change is achieved in counseling. From my study of social psychology under Elliot Aronson and Karl Weick, I dimly perceived that counseling could be conceived of as a social group and therapeutic change as a product of its structure and process. I cast about for ways to conceptualize the counseling group and its processes and hit upon the idea that dissonance theory, as applied to attitude and opinion change, provided such a model. The result was my 1968 article (Strong, 1968), in which I proposed that counseling is an interpersonal influence process, the dynamics of which are revealed in Festinger's theory of cognitive dissonance.

Lyle Schmidt and I set about the task of demonstrating the applicability of this model to counseling. The results of our studies generally supported the model (Schmidt & Strong, 1971; Strong & Schmidt, 1970a, 1970b). However, aspects of the results led me to conclude that it was inadequate. If the dissonance explanation had been correct, subjects who were not influenced by our expert, trustworthy, and attractive interviewers would have derogated the interviewers. They did not. In addition, subjects in the study of perceived trustworthiness and influence (Strong & Schmidt, 1970b) explained their perceptions of the experimental situation in a way that did not fit the theory.

As a result of these disquieting and, in my mind, disconfirming findings, I began searching the social psychology literature for concepts that could account for our positive findings as well as the anomalies I observed. The search led to the discovery of attribution theory (Heider, 1958; Jones & Davis, 1965; Kelley, 1967), Cartwright's seminal work on social power (Cartwright, 1959; 1965), and, through Cartwright, Lewin's (1935, 1938, 1951a) topological and vector psychology. These ideas led to an article in which I applied attribution theory to counseling (Strong, 1970), a reformulation of the theory of social influence in counseling in terms of social power dynamics (Strong & Matross, 1973), and an article exploring the application of Lewin's (1935) notions of systematic (Galilean) causality to counseling (Strong, 1973).

In the late 1970s, Allen Bergin invited me to write a chapter for the *Handbook of Psychotherapy and Behavior Change* on social psychological approaches to psychotherapy research. I set about the task of reviewing the progress of social psychology in the intervening years and discovered a vast literature on causal attribution. I attempted to build a theory that integrated the notions of social power and causal attribution and to apply the theory to psychotherapy (Strong, 1978). The theory proposed that interpretations that attributed problems to personal factors that clients could control would facilitate therapeutic change, whereas those that attributed problems to uncontrollable factors would not. Several colleagues and I (Strong, Wambach, Lopez, & Cooper, 1979) set about the task of testing this assertion. Our results showed the predicted differences between subject-clients who received controllable

as opposed to those who received uncontrollable interpretations. However, I noted that some of the subjects who received the uncontrollable interpretations dramatically reduced their problem (procrastination). If the theory's assertion had been right, they would not have changed.

This disquieting result stimulated a search for concepts that could account for the positive results as well as the anomalies. Through Fred Lopez's scholarship, I found Watzlawick, Beavin, and Jackson's (1967) work on communication systems theory. They proposed a radical idea: Interpersonal behavior should be viewed in terms of its intended effects on interactants rather than in terms of its assertions about internal states. I also found the emerging theory of impression management in social psychology, which proposed the same reorientation about the meaning of social behavior (Tedeschi, Schlenker, & Bonoma, 1971). Charles Claiborn and I molded communication systems, social power, attribution, and impression management ideas into a theory of change through interaction (Strong & Claiborn, 1982).

I then turned to the task of testing the assertion that paradoxical interventions stimulate therapeutic change (Beck & Strong, 1982; Hills, Gruzskos, & Strong, 1985; Strong, 1984a; Wright & Strong, 1982). In these studies, I began to suspect that paradox is a special case of some general principle of how the information people communicate in responses to each other interacts to influence their definitions of social reality and thus their subsequent behavior. I was convinced that people use social responses as tools with which to influence another person's definition of social reality and thus to influence the other person to behave in ways that fulfill their personal objectives. This would be possible only if people in a social community agreed on the interpersonal meanings of different social responses. Thus, I reasoned, an understanding of social influence was dependent on the development of a systematic classification of social responses in terms of their agreed upon values in defining social reality.

I threw my energies into the task of generating such a classification system. In the midst of this effort, Donald Kiesler introduced me to Timothy Leary's interpersonal circle (Leary, 1957). Leary's classification scheme was similar to but better than the one I was struggling to develop. In collaboration with Hope Hills, Blair Nelson, and others, I developed a way to classify the responses people use in social interactions in terms of their values in defining social reality (Strong, Hills, & Nelson, 1988).

My colleagues and I then set about the task of testing interpersonal theory's principle of complementarity (Carson, 1969). The report of our initial studies purports to support the principle (Strong, Hills, Kilmartin et al., 1988). However, many of the results did not. Most pointedly, the effect on interpersonal behavior of responses in one category (self-effacing) was opposite to what the principle posited. The anomalies set off another effort to find and develop concepts that would account for our positive results as well as the anomalies. The resulting theory posits that the pattern of responses participants exchange in a social interaction is a function of the mesh of or relationship between the participants' motives operative in the relationship. The theory, a theory of interdependence, draws heavily on Lewin (1935, 1938, 1951a) and incorporates concepts from social power,

attribution, impression management, self-presentation, communication systems, interpersonal theory, and William Swann Jr.'s (1987) concept of identity negotiation (Strong, 1991). I am currently designing studies to test this theory.

I note in the previous account that theories are generated from all the observations, hunches, and ideas at hand, both those that fit current understandings and those that do not. Anomalies, observations that do not fit current theory, are especially important. They set off searches for ideas that can account for them and for observations that comfortably fit current thought. I note also that I identified many anomalies only because I reject the notion that statistical significance defines lawfulness. I believe that all events, no matter how apparently trivial or infrequent, reflect underlying lawfulness.

I believe that scientific progress in counseling psychology is dependent on the application of the Galilean cycle of theory building and observation, a cycle that generates increasingly robust theories that incorporate an increasingly wide range of phenomena. Creative and vigorous application of this cycle, combined with a readiness to abandon and reform ideas that prove inadequate, will result in scientific progress in counseling psychology (Forsyth & Strong, 1987).

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