The Psychology Research Handbook: A Guide for Graduate Students and Research Assistants

Applying Theories to Research: The Interplay of Theory and Research in Science

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Book Title: The Psychology Research Handbook: A Guide for Graduate Students and Research Assistants
Chapter Title: "Applying Theories to Research: The Interplay of Theory and Research in Science"

Pub. Date: 2006
Access Date: June 17, 2015
Publishing Company: SAGE Publications, Inc.
City: Thousand Oaks
Print ISBN: 9780761930228
Online ISBN: 9781412976626
DOI: http://dx.doi.org/10.4135/9781412976626.n32
Print pages: 455-465

http://dx.doi.org/10.4135/9781412976626.n32

Chapter 32: Applying Theories to Research: *The Interplay of Theory and Research in Science*

The interplay of theory and research in science
Charles J.Gelso

Ask your typical undergraduate psychology major (who tends to be a good student) what constitutes psychological science, and the reply will almost always include a bottom-line reference to controlled research. Few if any will mention theory. In fact, I must confess that when I was a graduate student, research and science were pretty much the same thing for me. My only consolation in this wrong-headedness is that I was not alone. Buttressed by the radical behaviorism that was ruling the roost in American psychology in the 1960s, many students and even seasoned scholars equated research and science and, implicitly if not explicitly, viewed theory as unnecessary, even impeding, in our search for laws of behavior.

Although things are quite different in the 21st century in psychology, there still tends to be a residue of belief that theory is a second-class citizen in the scientific process. By contrast, in this chapter I shall argue that there is a profound and inevitable connection between theory and research and that science would be impoverished if either were to be relegated to the back seat. Both theory and research are vital and necessary elements of science. Science without controlled, empirical research would consist of only untested ideas and biases, and it would be hard even to think of the result as scientific any more than, for example, witchcraft or astrology. At the same time, science without theory would consist of an array of disconnected observations (which some might call facts) rather than meaningful understandings of the psychological world. To use an example from psychotherapy research, suppose a series of studies has consistently uncovered that therapists' use of interpretations and reflections of clients'

feelings (two therapist verbal techniques) are related positively to each other and to therapists' level of experience, but inversely to clients' ratings of their therapy sessions in terms of the depth of their explorations and the rapport they felt with their therapists. Without a theory of how and why therapist techniques, therapist experience level, and clients' experience of the sessions are related to one another, these findings (or facts) are not especially meaningful. They may indeed seem bewildering. Thus, we need theory to explain the findings, **[p. 456 ↓]** and in fact, if no theory exists prior to the research, we must begin to create a theory once the findings have emerged.

Not only is the role of theory in psychological science too often minimized, but what actually constitutes theory is often misunderstood. Because of this misunderstanding, in this chapter I first summarize what I believe to be a useful way of thinking about theory: its definition, its elements, and just what constitutes good scientific theory. Then I examine how theory and research are used in science, how each draws on the other, and how they reciprocally relate to each other (cf. Tzeng & Jackson, 1993, for a useful article on this topic).

What is a Scientific Theory?

One of the greatest impediments to appreciating the research-theory link in science is the tendency to misunderstand what constitutes theory itself. Many students equate theory with the grand theoretical systems that have been present in psychology for many years, such as psychoanalysis, behaviorism, and humanism. Also, in practice-oriented fields of psychology, theories are often equated with broad therapy systems, such as person-centered therapy, cognitive therapy, and psychoanalytic therapy. As I have elsewhere discussed, these large-scale theories of therapy and the personality theories to which they are wedded are all too often “broad concatenations of (untestable) philosophies of life and humankind, statements of faith, and in some cases loosely stated propositions that were not developed with testability in mind” (Gelso, 1991, p. 212). Such extraordinarily comprehensive theories can probably never be disproved; aspects of them may be disconfirmed, but never the entire theory. Overall, these extremely broad theories are not very scientifically useful. They do not generate research that, in turn, tests their validity.

More useful are what tend to be labeled *minitheories*. These may be parts of the broader systems, or they may be theoretical statements that are separate from existing systems. An example of a theory embedded in a broader system is Carl Rogers' famous statement of the necessary and sufficient conditions for effective counseling and therapy: After years of research and practice, Rogers made a bold, even audacious, theoretical statement that subsequently proved to have enormous heuristic value. He posited that there were certain client and therapist conditions that were both necessary and sufficient for constructive client change. Three of these conditions pertained to the therapist attitudes of empathic understanding toward the client, unconditional positive regard for the client, and congruence with the client. Rogers' theoretical propositions about these three attitudes generated scores of studies over nearly five decades, and recent research syntheses continue to support their importance in therapy (see separate chapters on these attitudes in Norcross, 2002). Rogers' theory was embedded in his theory of client-centered therapy, which in turn was embedded within the even broader humanistic approach to conceptualizing human behavior and counseling.

As I have noted, such minitheories need not be embedded in larger systems. They can stand on their own. A theory emerging from my research program on therapist countertransference management is an example of such a minitheory, and I shall discuss this particular theory later in the chapter. Currently in the field of therapy, Bordin's (1979) minitheory of the components and role of the working alliance in therapy has generated a great deal of research, thus displaying the heuristic value that is so central to good scientific theories (see below). It should be noted, however, that even minitheories appearing to stand alone often are connected at a general level to broader theories. Our countertransference management theory and Bordin's theory of the working alliance are, at a very general level, embedded in psychodynamic theory.

So what is a theory? According to Rychlak (1968), at the most liberal definitional level,

> A theory may be thought of as a series of two or more constructions (abstractions), which have been hypothesized, assumed, or even factually demonstrated to bear a certain relationship, one with the other. A theoretical proposition, which defines the relationship between constructions (now termed “variables”), becomes a fact when that proposition is no longer contested by those **[p. 457 ↓]** individuals best

> informed on the nature of the theory, and dedicated to study in the area of knowledge for which the theory has relevance. Theories vary in their levels of abstraction, objectivity-subjectivity, realism-idealism, perspective, and formality-informality. (p. 42)

Note that by the term, *constructions*, Rychlak is simply referring to constructs or variables.

In essence, then, a theory is a statement of the suspected relationship between and among variables. From this viewpoint, there is a theory behind virtually all of what we do, all of our research. That is, there is some expectation of how the variables in our research ought to relate to each other. As indicated in the above quote, however, theories vary in their degree of formality or informality. Informal theories are those that are not stated explicitly and do not have as a goal “the formulation of a logically consistent and mutually interdependent body of knowledge” (Rychlak, 1968, p. 35). Our goal as scientists ought to be to make our theories explicit, to put them to the test of empirical research, and thus to stimulate research.

Functions and Qualities of Theories

I suggest that for a theory to have much value scientifically, it must go beyond the simple propositional level just described. A theory ought to tell us *why* the variables or constructs are expected to relate to or influence one another. There must be good reasoning, so to speak, behind the expectation of how variables will be interrelated.

It is also useful to think of any theory as serving certain functions, more or less effectively. Rychlak suggests four such functions: descriptive, delimiting, generative, and integrative. It is worth taking at least a brief look at each of these. Regarding the *descriptive function*, most fundamentally any theory will serve to describe phenomena. The fuller the description of the conditions under which the phenomena are said to occur, the closer we get to what is called *explanation* in science. Good theories explain the *why* of things, what causes what. Indeed, full description may be seen as tantamount to a causal explanation. Good theories appear to explain effectively. They have a high degree of what may be termed *explanatory power*.

Theories also *delimit*. In effect, they place limits on what is looked at and seen. To limit is to place boundaries, which also means that there are certain things that any theory will not allow us to see. Limits are necessary, however, for they serve as guides to what may be examined. Perhaps most important, theories serve to *generate* further ideas and examination. Highly generative theories are given the venerable label, *heuristic*. Such theories stimulate investigation; they stimulate research aimed at testing them. Bordin's (1979) aforementioned theory of the working alliance in therapy is an excellent example of a theory with strong heuristic value. Bordin clearly and precisely specified the elements of a sound working alliance, and he offered clear propositions about the role of working alliance in the process and outcome of virtually all forms of therapy. Bordin's propositions were so clear that they allowed for the development of a measure of the working alliance and for the development of clear, testable hypotheses. His statement has generated nearly three decades of research, and because of that, the working alliance is one of the most validated and useful constructs in the field of psychotherapy. Theories that do not have heuristic value tend to stagnate. They essentially have no scientific value. This point, of course, underscores the integral relationship of theory to empirical research.

Finally, theories have an *integrative function*. By this we mean that the theory seeks to bring together propositions and constructs in a consistent, unified picture. In other words, good theories pull together diverse and at times seemingly disparate, even contradictory, facts into a picture that has coherence and a high degree of *internal consistency*.

One type of integration is particularly worthy of note, both because of its importance and because it is all too often forgotten in the current scene. *Parsimony*, a type of theoretical integration, may be seen as an effort by the theorist to introduce *only* as many constructs and propositions as are necessary to explain the phenomena under consideration. In a recent discussion of the concept of parsimony, I asked a group of counseling psychology graduate students how many had heard of “Ockham's razor.” None of the six who were present responded affirmatively. This term, dating back to William of **[p. 458 ↓]** Ockham in the 14th century, implies that the constructs and propositions within a theory that go beyond what is needed to explain the phenomena the theory seeks to explain are “excess baggage.” We need to take the razor to them, shaving away the needless excess. Modern-day psychologists would do well to keep

Ockham's razor in hand as they construct theories. For further discussion of parsimony in theory development and evaluation, see Nowak (2004) and Fiske (2004).

Ingredient	Definition
Descriptive ability	Fully describes the phenomena being theorized about.
Explanatory power	Clarifies the “why” of things—what causes what.
Heuristic value	Generates scientific research.
Testability	Contains propositions that can be tested and disconfirmed through research.
Integration	Organizes ideas into coherent and logically consistent picture.
Parsimony	Includes only the constructs and ideas that are necessary to explain the phenomena in the theory. No excess baggage.
Clarity	States its ideas clearly, explicitly, and precisely.
Comprehensiveness	Thoroughly specifies the relationships within its domain.
Delimitation	Contains clear boundaries as to what is included and studied.

The Good Scientific Theory

Within the above discussion of the functions of a scientific theory appear several of what may be seen as the necessary ingredients of a good theory. These are now summarized, and a few additional ingredients are also noted.

As implied, the good scientific theory might be said to be *internally consistent, integrative*, and *parsimonious*. It possesses a high degree of *explanatory power*. Within

a domain that is *clearly delimited*, a good theory ought to be *comprehensive*. That is, it should thoroughly specify the important relationships within its domain of inquiry. Furthermore, for a theory to be of optimum value scientifically, it should be stated *explicitly* and *clearly* so that its propositions are high in *testability*. A theory that is testable is capable of disconfirmation. If you cannot disconfirm a theory, its scientific value is severely limited. In fact, each and every empirical study that tests the theory ought to place it in grave danger. In this sense, an endangered theory is a good one! Referring back to a point made earlier, one of the major limitations of the large-scale theories of personality and therapy is that they are not endangered. As Mahrer (1988) noted, this makes theory-testing efforts in relation to such theories next to useless.

Finally, as we have discussed, a bottom line for a good theory is *heuristic value*. The good scientific theory must stimulate inquiry, in the form of both empirical research and further theory. In Table 32.1, I list the ingredients of a good scientific theory and provide a brief definition of each. I should note at this point that, in addition to these ingredients, for a theory to be relevant to the *practice of psychology* (e.g., counseling), it must also be able to guide clinical practice. Thus, the counseling practitioner must be able to use the theory in his or her practice. In this sense, a good clinical theory has an added burden. It must benefit practice as well as science.

As you can see, when we discuss the parameters of theory and the qualities of a good theory, the inherent importance of research to theory becomes evident. As a way of clarifying the roles of these two elements, theory and research, I shall address the question of where scientific ideas come from. Then I shall examine the *cycle of science* — the synergistic relationship of theory and research. In the final section, I shall discuss and exemplify how theories are **[p. 459 ↓]** used early and late in the life of a research piece—in generating ideas and hypotheses and in seeking to explain and interpret findings.

Throughout much of what follows, as a way of personalizing the discussion, I shall use examples drawn from my own research and theory construction in the area of therapist countertransference. As used in this chapter, *countertransference* refers to a counselor or psychotherapist's emotional reaction to a client or patient, which is based on the therapist's issues, often tied to earlier, unresolved conflicts, for example, with parents.

The Origin of Ideas

To begin, let us examine where research ideas come from. In the first study of our counter-transference research program at the University of Maryland, Ann Peabody, a graduate student at the time, became interested in the connection of counselor empathy to countertransference, defined as emotional withdrawal from the client. We had examined psychoanalytic theories about these two constructs, and on the basis of the theories, along with our own impressions as counselors, we reasoned that the more empathic the therapist, the less likely that he (male counselor) would withdraw from or avoid the material presented by a female client who behaved in an aggressive or seductive manner (which theoretically ought to be threatening to the counselor). We expected that the more empathic counselor would also experience countertransference feelings, but the key difference was that he was expected to be more aware of them and consequently to act them out less with the client. When we used taped actresses playing the role of client, with counselors responding to the “client” at certain stopping points on the tape, our hypotheses were generally confirmed (see Peabody & Gelso, 1982). The main point, however, is that the hypotheses came from theory (as well as clinical experience). Although no theory stated the precise hypotheses of our research, these hypotheses were logically derived from theory. The hypotheses would not have been possible if it were not for theories of empathy and theories of countertransference.

We may also ask where theoretical ideas come from. Several years after the Peabody and Gelso (1982) study, my collaborators and I reasoned that although all counselors experienced what could be called countertransference feelings, the most important thing in therapy was how effectively counselors were able to control or manage those feelings. Countertransference feelings could help therapy if managed effectively or hinder therapy if managed poorly. On the basis of this conception, we constructed a theory of the components of therapists' ability to manage their countertransference reactions to clients effectively (Hayes, Gelso, VanWagoner, & Diemer, 1991; VanWagoner, Gelso, Hayes, & Diemer, 1991). The theory drew substantially from the Peabody and Gelso study as described above, studies that built on that initial one, and other studies that were not connected to this program. Our theory posited that countertransference management ability consisted of five interrelated factors

(empirical research informing each factor is cited): counselor self-insight (Peabody & Gelso, 1982; Robbins & Jolkovski, 1987), counselor empathic ability (Peabody & Gelso, 1982), counselor anxiety management (Hayes & Gelso, 1991), counselor self-integration (McClure & Hodge, 1987), and counselor conceptualizing ability (Robbins & Jolkovski, 1987). The five factors were described, as was their role in countertransference management. I would be remiss if I did not also note that this theory of countertransference management drew heavily from the authors' experiences in working with clients and how we were best able to manage effectively our own countertransference reactions. When we construct theory, as when we examine where research comes from, we not only rely centrally on research but also make use of our own personal or clinical experiences. This personal part is inevitable and forms a fundamental link in the theory-research-theory-research chain.

The Cycle of Scientific Work

Thus far I have examined how theory generates research and how research generates and refines theory. Further, theory has been defined, and the **[p. 460 ↓]** qualities of a good theory have been discussed. We can now explore what I would suggest is the heart of science: how theory and research reciprocally relate to one another. The relationship of theory and research in science is deeply synergistic. The two go hand in hand, working together to create an optimal product, namely, good science. This synergistic relationship was described nicely by Stanley Strong (1991) in his discussion of “the cycle of scientific work” (p. 208). Strong, like many before him (e.g., Meehl, 1954; Reichenbach, 1938), considered two contexts in which science occurs: the context of discovery and the context of testing. (Others call the latter the context of justification.) He suggested that scientific work cycles between these two contexts. Strong's comments are worth noting:

> 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. (p. 208)

(I should note that Strong's observations were directed at science from one particular philosophical position, what he calls the “Galilean mode,” which he contrasts to the “Aristotelian mode.” This accounts for his emphasis on theorizing about underlying dynamics. Strong's views, however, are applicable to science more generally.)

Above I discussed how our theory of countertransference management was spawned by several research studies, as well as other theories and ideas. The cycle of science continued in the sense that this theory of countertransference management has itself stimulated a number of investigations aimed at testing the theory and refining the theory. For example, Friedman and Gelso (2000) found that counter-transference management ability was negatively related to therapists' undesirable countertransference behavior with clients. In other words, therapists who were good at countertransference management were less likely to behave in ineffective ways with their clients as a result of countertransference. In addition, when this undesirable behavior occurred, we discovered that the client-therapist working alliance was hindered (Ligiero & Gelso, 2002). Finally, we found a beginning link of countertransference to treatment success in that therapists in training who were rated by their clinical supervisors as effectively managing countertransference were most likely to have good treatment outcomes with these clients (Gelso, Latts, Gomez, & Fassinger, 2001). Based on these studies and others, the theory itself has been refined and expanded (Gelso & Hayes, in press).

As suggested by the discussion of our research program, the cycle of science may be seen as unending. Theories become modified based on research, and they eventually give way to other theories. These new theories, in turn, guide research, are tested repeatedly, modified, and so on. The cycle continues.

Some researchers, it should be added, do not appear to believe that an inevitable link and cycle exist between theory and research. For example, in a thoughtful analysis, Mahrer (1988) suggested that hypothesis-testing research (which derives from and tests theory) has not proven to be very fruitful in the area of psychotherapy research. Hypothesis-testing research has been predominant in psychology, according to Mahrer, and has impeded discovery. What is needed is a discovery-oriented approach in which the researcher approaches his or her data free from the biases and constraints caused by hypotheses. Mahrer believes that this “relaxation” will allow fresh understandings to emerge. Much of the current thought about the value of qualitative research in therapy stems from this viewpoint (e.g., Heppner, Kivlighan, & Wampold, 1999, ch. 10).

The scientist is, of course, free to do research that does not seek to test hypotheses. There is nothing about science that dictates the statement and testing of hypotheses derived from theory.

[p. 461 ↓] In addition, discovery-oriented approaches may indeed be very fruitful at this point in the history of therapy research. At the same time, I would suggest that the researcher cannot be freed from theory. His or her theories, at times informal rather than formal, about the phenomena being studied will guide the researcher at each and every step in the research process. Discovery-oriented research is probably best at certain points in the scientific process. For example, when theory and hypothesis testing seem to bring us to a dead end and no fresh insights seem forthcoming in an area, discovery-oriented research may be just what is needed. Yet even in this situation, as the findings from discovery-oriented research accrue, they will inevitably be used to create and refine theories about the phenomena under investigation, and these theories will then serve to generate subsequent hypotheses to be tested. In this way, discovery-oriented research may be seen as part of the context of discovery: It discovers relationships that help form theory, which then becomes examined within the context of testing or justification.

further Comments on Applying Theories in Research

In this chapter, I have focused mostly on the interplay of theory and research in science. Given scientific psychology's historical tendency to neglect the role of theory in science, I would like to make a few additional comments on how theory is applied in research.

Generally speaking, theories are used at each and every step in the research process (see Hershey, Jacobs-Lawson, and Wilson's discussion of script-based research in Chapter 1 of this book). Theories come into play most centrally, however, at three points: (a) idea generation, (b) hypothesis generation, and (c) interpretation of results. The initial steps in an empirical study involve the first two, generating the idea to be studied and forming hypotheses, or at least research questions. An example of idea and hypothesis generation may be seen in two of the studies in our countertransference research program (Gelso, Fassinger, Gomez, & Latts, 1995; Hayes & Gelso, 1993). In these experiments, we examined the impact of the sexual orientation of filmed client-actors and actresses on counter-transference reactions of therapists in training. On the basis of theory suggesting that people, including counselors, tend to react more negatively to gay and lesbian individuals than heterosexuals (which, in turn, may be seen as based on the broader theory that people react more negatively to those who are different from themselves), we hypothesized that there would be greater countertransference reactions at behavioral, affective, and cognitive levels to gays (Hayes & Gelso, 1993) and lesbians (Gelso et al., 1995) than to heterosexual clients. Theory also suggested the hypothesis that a theoretical construct called homophobia, defined as prejudicial attitudes and negative stereotypes toward gay and lesbian individuals, would mediate counselors' countertransference reactions to gay and lesbian client-actors and actresses in the two studies. When counselors responded to the filmed clients at certain stopping points on the films, the results indicated no difference in counselor-trainees' countertransference reactions to filmed gay and lesbian clients than to heterosexual clients, but we did find a significant relationship between counselor homophobia and the behavioral indication of countertransference (i.e., avoidance of the

client's feelings involving relationships and sexual problems). The higher the measured homophobia, the greater was the counselor avoidance in both studies.

In the Gelso et al. (1995) study, we also hypothesized that female counselor-trainees would exhibit greater countertransference than male counselor-trainees in response to a filmed lesbian client-actress, whereas we did not hypothesize a difference between female and male counselors toward the heterosexual client-actress. (Male client-actors were not used in this study, but if they had been, we would have expected male counselors to have greater countertransference than female counselors to gay male client-actors.) This hypothesis was based on the theory that people will respond more negatively to homosexuality when it involves members of their own sex than when it involves members of the opposite sex, partly because same-sexed interactions are more likely to stir up subconscious fears in counselors of same-sexed attractions. Our hypothesis was supported for the cognitive measure of countertransference: **[p. 462 ↓]** errors in recall of the number of sexual words used by the client actress. Female counselors made more recall errors than males with the lesbian client-actress, whereas males and females did not differ in response to the heterosexual client.

You can see that, as is most often the case in psychological research, some of our hypotheses were supported and others were not. The “failed” hypotheses required that we revise our minitheory of the relationship between client sexual orientation, counselor gender, counselor homophobia, and counselor countertransference. The revised theory then stimulated hypotheses for our subsequent studies.

At this point, it might be useful to clarify how the terms *theory* and *theoretical proposition* may be distinguished from the term *hypothesis*. Although there are no absolute distinctions (in fact, in the earlier quote, Rychlak, 1968, appeared to use the terms synonymously), generally theories contain theoretical propositions, and hypotheses are derived from these propositions. Hypotheses tend to be more specific than the propositions, and, as can be seen in the above examples drawn from countertransference research, are the statements that are directly tested in empirical research.

As indicated at the beginning of this section, theory also comes into play most centrally when the experimenter seeks to interpret or explain his or her findings. Findings

consistent with hypotheses that were in turn derived from a given theory are, of course, explained by that theory: When unexpected findings occur, however, the researcher tends to search for an existing theory to make sense out of them or create a theory of his or her own to explain the results. This new theory may be embedded in a larger theoretical system. An example of creating a theory to explain unexpected findings occurred with two countertransference studies (Latts & Gelso, 1995; Robbins & Jolkovski, 1987). In both these studies, a classic crisscross interaction was found between therapist-trainees' (a) awareness of countertransference feelings and (b) use of a counseling theory in their work in affecting a measure of countertransference behavior with filmed client-actresses and actors. Both teams of researchers found that countertransference behavior (avoidance of and withdrawal from the client's material) was least when therapists were high on awareness of countertransference feelings and high in the use of a theory in their counseling. This finding was expected and made theoretical sense to the researchers. If the therapist is sharply aware of his or her feelings and has a theoretical context into which those feelings may be placed, the therapist is less likely to act out countertransference behaviors with the client.

The surprising finding was that high use of theory combined with low awareness of countertransference feelings resulted in the greatest amount of countertransference behavior. In reflecting on these findings, the researchers theorized that when counselors are unaware of countertransference feelings, their use of counseling theory may serve a defensive function. They may intellectualize about the client and the relationship, but there is a lack of emotional understanding. The use of a counseling theory in the absence of emotional self-understanding is ineffective in deterring counselors from enacting countertransference behavior with clients. Although the researchers created this theory, you can see where it is, in turn, based on a broader theory, namely, psychodynamic theory.

As I have suggested earlier in this chapter, we should not forget the role of personal or clinical experience in guiding the theoretician and researcher. Our experiences in the world, and with clients if we are in practice fields (and/or, as clients ourselves, if we are theorizing about and studying therapeutic interventions), guide us in a profound way in our selection of theories to generate hypotheses and explain findings. Although these experiences must be guided by reason and managed (not unlike countertransference

management!) if they are to most effectively lead us, they are an inevitable part of the process.

Conclusion

In this chapter, I claimed that there is an inevitable, profound, and synergistic link between theory and research in psychological science. The definition and elements of theory, as well as the characteristics of “good theory” **[p. 463 ↓]** were noted. The cycle of science was discussed to exemplify how theory and research interrelate. Finally, the use of theory in early and later stages of the research process was examined, and my research on therapist countertransference was used to exemplify the uses of theory.

Exercises

- 1. Go on the Web and search for sites about scientific theory. Review the various descriptions of what is considered a theory, as well as how to evaluate theories. If you find a particular theory interesting, try to search for a history of the development of that theory. What was the original theory and how did it change over time? What modifications were made and why?
- 2. Go the library and locate the journal, *New Ideas in Psychology*. Select one of the articles that interest you in that journal and critique that theory in terms of what you have learned from this chapter. In addition, try to devise a study to test the model or theory outlined in the article that you have selected.

Recommended Readings

If the student is interested in reading further examples of the theory-research cycle, four references might be most helpful. Strong (1991, pp. 208–209) presents a vivid personal example of his use of theory in research, demonstrating how his research findings required him to modify and at times even scrap his theories. Rotter (1990) clearly displays how a theoretical construct, in this case internal versus external locus of control, is most scientifically useful when embedded in a broader theoretical construct

and programmatically studied. McClelland (1993) gives a fascinating summary of the interaction of research and theory in examining the construct of need for achievement and adding to that a second construct, need for power, in an attempt to explain certain behavior patterns. Goldfried (2000), a leading psychotherapy researcher and theoretician, presents some needed cautions about the use of theory in research. Goldfried clarifies the dangers that exist when theoreticians seek to prove their theories through research rather than use research to test, refine, and modify their theories, with the understanding that at some point these theories will be superseded by other, more robust ones. Finally, Kruglanski (2001) has thoughtfully explored social psychology's uneasiness about theorizing and has examined both the reasons for this uneasiness and costs to the field of not being sufficiently theoretical. Although Kruglanski's focus is social psychology, his comments are readily applicable to essentially all areas of psychology. Like few others, Kruglanski explores the question of whether students can be taught to be theoreticians. He answers this affirmatively and examines how this might happen.

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