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Chaos and Fractal: A New Paradigm for a Scientist-Practitioner Model of Counseling

Seong-In Choi
Westminster College

In the current process model of counseling, a geometric notion of a fractal (Mandelbrot, 1983) was employed as a framework for a counseling process. A fractal is any pattern that reveals a greater complexity as it is enlarged. As Euclidean geometry is an overly simplified representation of the shapes of the real world, traditional process models may not be sufficient to represent the complexity of real counseling processes. The purpose of the proposed model is to more accurately and effectively represent the counseling process and the isomorphic relationship between a scientist's and a practitioner's work. Main principles of fractals (self-similarity, recursiveness, and unpredictability) will be reviewed and their applications to the counseling process are discussed.

Keywords: chaos theory, fractal, process model, scientist-practitioner, scientist-professional, counseling process, psychotherapy

The process of therapy has been described by a variety of metaphors (for example, the "journey" or "dance" metaphors). For the present study, the metaphor of *scientific research* will be examined.This does not mean that the author underestimates the artistic, emotional, or interpersonal characteristics of the counseling relationship. Still, the emphasis in this paper will be on the scientific aspects of counseling as this author believes that a counselor should think like a scientist. The notion of the clinician as a thinking scientist originated from an earlier report by the first APA committee. Commonly known as the Shakow report (after the committee chairman David Shakow; APA Committee on Training in Clinical Psychology, 1947), the report emphasized systematic knowledge, psychological theories, and questioning attitudes in their definition of the scientist-practitioner.

Applying the scientist-practitioner model to the counseling process, however, seems to raise several limitations as indicated by many researchers. For example, Peterson (1991) indicated that there are areas of incompatibility between science and practice. He regarded the direct linear application of science to practice--where practice is limited by the bounds of science--as having originated in the pre-professional phase of the development of the field. In addition, Stricker (1992) also criticized some scientist-practitioner programs that neglect the contextual factors which make their application so complex. Seemingly, the incompatibility between science and practice is not limited to psychology but ubiquitous in any kind of scientific discipline (Beutler, Clarkin, &

Seong-In Choi, Department of Psychology, Westminster College.

Correspondence concerning this article should be addressed to Seong-In Choi, Department of Psychology, Westminster College, Salt Lake City, UT 84105, U.S.A. E-mail: schoi@westminstercollege.edu

Bongar, 2000).

Stricker (1992) also attempted to reduce the gap between science and practice and to build an effective scientist-practitioner counseling model when he suggested a Local Clinical Scientist Model (LCSM), in which he used the term “local” in contrast to the universal or the general. In this model, a clinician is encouraged to consider a particular application of general data during his or her counseling process. In addition, Spengler, Strohmer, Dixon, and Shivy (1995) suggested that all clinicians must have a metacognitive process through which they should be continually examining their clinical work.

Each of these theories, though unique, is the result of an effort to connect clinical practice to science, which is based on the premise of a science-practice dichotomy. By admitting that a scientific model is different from the real world, those theories based on a science-practice dichotomy imposed upon clinicians the great responsibility of connecting practice (the real world) to science (a model). However, there is an alternative to the science-practitioner paradigm which lies beyond the traditional dichotomy.

Thus far, researchers have regarded science as a linear system and have discussed how to apply this linear system to non-linear phenomena. In this paper, the author will introduce a non-linear scientific model, a new paradigm in natural science. In the fields of fundamental science (e.g., mathematics, physics, and engineering), recent improvements in the understanding of inherently nonlinear phenomena has presented challenges to the use of a linear model in analysis (Pascale, Millemann, & Gioja, 2000). This new paradigm, named “chaos theory,” is now being applied to a variety of other areas of science such as philosophy, economics, and sociology (Ding, Grebogi, & Yorke, 1997). This paper will discuss the applicability of chaos theory, especially fractal theory, to the counseling process model. Fractals, which are geometric shapes characterized by nonlinearity, indicate an alternative to traditional Euclidian geometry (Mandelbrot, 1983).

One potential implication of this perspective is that science may be better able to capture the unique and fluid phenomena in the real world than ever before. Through this rethinking of the scientific process, Stricker’s (1992) proposition that clinicians should not just apply science to their practice, but to become scientists themselves, is more likely to be actualized.

Although chaos theory and fractals are different concepts, understanding chaos theory is useful in understanding how fractals function and their implications for clinical practice (Ding et al., 1997). Subsequently, the following sections will include a brief overview of chaos theory followed by an exploration of the potential application of the theory to the counseling model.

Chaos Theory

Over the past several decades, the attention of the natural sciences has increasingly turned to phenomena that defy analysis. That is, there are events that the traditional physical worldview, with its assumptions of linearity and reversibility, cannot fully comprehend (Mayntz, 1997). After the recognition of the stochastic nature of many processes, attention paid to nonlinear processes has resulted in a further step away from a traditional mechanistic worldview. Poincaré (1950) analyzed and named many of the qualitative features displayed by dynamic systems and integrated them into chaos theory. The label “chaos theory” is presently being used in two ways, one narrower and one more comprehensive. The narrow interpretation of the term equates it with the mathematical theory of deterministic chaos, and hence with the preconditions of a phase transition from order to disorder in nonlinear systems. In a wider sense, chaos theory refers to the field of research into nonlinear dynamics of any non-equilibrium systems (Ding et al., 1997).

More specifically, chaos theory assumes nonlinearity, unpredictability, and sensitivity to initial conditions as its basic principles. Nonlinear systems display a number of characteristics that can be widely observed in the natural and social worlds. Essentially, all organic systems are “complex adaptive systems” (Bussolari & Goodell, 2009, p. 88), which are fluid and ever changing. The dynamic nature of chaos theory, then, makes the possibility of prediction obsolete. Because of the unpredictable nature, chaos may be misinterpreted as mere randomness. In actuality, it is a deterministic system based on mathematical theory. It is not randomness the sensitivity to preconditions and contextual factors that make the chaos system extremely hard to predict in terms of its long term consequences (Ding et al., 1997).

Although chaos theory had its beginnings in the natural sciences, the theory can also be effectively applied to the social sciences (Mayntz, 1997). Obviously, human societies display all the characteristic features of nonlinear, non-equilibrium systems. Essentially, chaos theory is one aspect of systems theory (Von Bertalanffy, 1968); thus, it can be used to understand various social systems such as family, school, vocation and more. For this reason, there have been recent attempts to adopt chaos theory in some fields of counseling such as career and life transition counseling. For example, Bussolari and Goodell (2009) suggested a model for life transitions counseling based on chaos theory. Also, Pryor and Bright (2003) proposed the Chaos Theory of Careers and identified four crucial elements in career development and choice, which are complexity, change, constructiveness, and chance.

While these previous researchers attempted to apply chaos theory to career counseling, the current paper aims at extending its application to the more general counseling process. This task may not be easy, however. Although chaos theory can be a useful tool for understanding social phenomena, the nature of social reality appears to limit the potential applicability of natural science models of nonlinear dynamics (Mayntz, 1997). One of the reasons for this limitation may be that human beings have will; intentions to direct their dynamic systems to a certain end. As a result, social phenomena do not merely follow spontaneous rules of mathematics and physics but are affected by these intentions. Therefore, when applying chaos theory to a counseling process model, it would be more appropriate to consider phenomena using the wider lens of chaos theory as a tool for understanding the non-linear dynamics of non-equilibrium systems. How then does one utilize the basic principles of chaos theory (such as nonlinearity, unpredictability and determinism) to understand the general counseling process? This will be explored further in the following sections.

Nonlinearity

In counseling psychology, the limitations of the traditional linear model have been revealed in two ways: in the counseling process and in the outcome assessment. The linearity of a counseling process refers to a traditional process model following a temporal order from beginning to end (Blocher, 1987). Although a process model which is based on traditional research methodologies is valuable, it should be noted that a counseling process continues recursiveness and divergence, which will be further discussed later in this paper.

The greatest limitation of the linearity model in outcome assessment is that nomothetic data from a linear research model is not applicable in many individual cases. This limitation has an implication for researchers and clinicians. Researchers can utilize non-linear scientific models rather than the traditional linear model when conducting outcomes assessments. This can be done by considering a variety of variables which supposedly affect outcome. While specific aspects of complex issues have been treated as errors or “noise” in a linear model, they are considered important variables in a non-linear model. Consistent with this observation, Campbell and Mayer-Kress (1997) state that while non-experts can hardly expect – nor be expected – to be aware of the subtle details surrounding the technical modeling of specific aspects of these complex issues, it is vital that those responsible for making decisions on possible courses of action be aware of these general constraints and characteristics that affect the applicability and reliability of the models. Emphasis on this sensitive awareness is also found in counseling psychology. For example, in their psychotherapy assessment model, Spengler and his colleagues (1995) elaborated Pepinsky and Pepinsky’s (1954) model by including counselor self-awareness, openness, and curiosity, which are characteristics that they consider to be prerequisites to a scientific attitude

(Spengler et al., 1995).

Unpredictability

The nonlinearity of chaos imposes fundamental limitations on our ability to predict behavior even when precisely defined mathematical models exist (Campbell & Mayer-Kress, 1997). Readers who remember that chaos is a deterministic system following mathematical rules may be confused since determinism has usually been regarded as synonymous with predictability. The reason why chaos is hard to predict, although it follows a deterministic system, is found in two characteristics of this system: sensitivity of preconditions and limitations of their exact assessment. In the 18th century, the physicist Laplace argued that from knowledge of the initial state of the universe comes an exact knowledge of the final state of the universe. Indeed, in Newtonian mechanics, this belief is in principle true. However, in the real world, exact knowledge of the initial state is not achievable. No matter how accurately the velocity of a particular particle is measured, it can still be measured more accurately (Campbell & Mayer-Kress, 1997). In terms of precondition sensitivity, as early as in the middle of the 19th century, it was already known that physical systems could be sensitive to initial data (Campbell & Carnett, 1969). In other words, small differences in the initial conditions would produce enormous differences in the later outcomes.

Therefore, this notion of unpredictability stimulated researchers as well as clinicians to try to make an assessment as accurately as possible by thoroughly considering contextual factors and to be careful when predicting a result or making a judgment in order to avoid various biases or prejudices. These careful attitudes have also been discussed in counseling research. Spengler et al. (1995) asserted that delaying final judgments allows a counselor to reflect on and extend the assessment process, test alternative hypotheses, and invoke a self-correcting model open to new client data and explanations. He suggested that counselors should reduce overconfidence since confidence appears to narrow the scope of a counselor's perceptual field. Confidence also interferes with testing alternative explanations and maintaining a tentative set of client assumptions.

Stricker (1992) also included a notion of chaotic unpredictability in his Local-Clinician Scientist Model (LCSM). LCSM emphasizes the space-time conception of the "local," which at the most specific level draws attention to the particulars of the observation itself for both the patient and clinician. He explained that even when properly identified in a scientific manner, the same event may signify different things on different days, as the ever-changing nature of events creates more instability than is comfortable for a fixed and predictable world.

Deterministic System

In the early part of this paper, it was mentioned that chaos is not merely a random system, but a deterministic one. Although phenomenologically chaos appears to be an infinitely complex set of immeasurable coincidences—as chaos is by definition unstable and unpredictable—the results, in effect, are productions of a dynamic system following the law of causality. This fact provides a counselor with hope for building a counseling process model. If the counseling process were a totally unpredictable, random phenomenon, counselors would grow overwhelmingly frustrated, never knowing what would come of an intervention or, subsequently, what course should be followed. Fortunately, a chaos model of counseling implies that counseling processes are subject to the law of causality. Even errors and exceptions are regarded as necessary outcomes in the chaos model, whereas they have been regarded as uncontrollable coincidences in traditional linear models. Therefore, a chaos model enables counselors and researchers to predict consequences more accurately than linear models by having them consider a variety of factors.

The fact that chaos theory is a precondition-sensitive, deterministic system leads to the implication that this theory requires counselors and researchers to become more sophisticated scientists. Empirical findings have not achieved the level of sophistication necessary to guide the multitude of intervention choices that counseling psychologists make. For example, Paul's (1967, p.111) questions for psychotherapy research--"What treatment, by whom, is most effective for this individual with that specific problem, under which set of circumstances?"--has been regarded as an impossible task for researchers thus far because a linear model only provides an approximate estimate which usually produces discrepancies in each individual case due to uncontrollable factors. Chaos theory, however, suggests that researchers and clinicians can acquire a more accurate estimate by taking into consideration these variables including "what treatment," "by whom," "to whom," "for what problem," and "under which set of circumstances" in their formula.

Another hopeful aspect of chaos theory is that chaos does not always move from disorder to order, but may also move in the reverse direction. Given this view (a possibly dreaded proposition for many mental health professionals), another reason that counseling processes can be understood as chaos is that they are processes to help clients in a disordered state move to an ordered one. The ordered states achieved through counseling can revert back to disordered states which are also supposed to be produced by deterministic causality. Therefore, chaos theory can effectively explain relapse, rupture, and premature termination in the counseling process which have not been given enough attention in linear models.

Thus far, basic principles of chaos theory have been reviewed in relation to their implications for the counseling process. In the next section, a geometric model will be proposed to illustrate the counseling process for the purpose of enhancing readers' understanding and facilitating practitioners' application of the model to their clinical works. Ideas derived from chaos theory include fractals (Mandelbrot, 1983), fuzzy logic (Zadeh, 1965), and the butterfly effect (Lorenz, 1993). All these ideas, in turn, illustrate chaotic phenomena in the real world. For example, Lorenz (1993) used the famous metaphor -of a butterfly flapping its wings in the Andes as contributing to the emergence of a hurricane in Montana, to illustrate the concept of the "sensitivity to initial conditions" in chaos theory. Among many useful frameworks that illustrate chaotic phenomena, fractals will be used in this paper to illustrate the counseling process. Fractals contain most of the characteristics of chaos, such as nonlinearity, divergence, unpredictability, and deterministic systems. This is a relatively new paradigm of geometry that overcomes the limitations of the linear Euclidean geometry. Fractal properties will be explored in more detail in the next section, followed by a suggestion of a geometric mode of the counseling process.

Fractals

A fractal is a special pattern of features characterized by self-similarity and recursiveness. The word "fractal" was coined by Mandelbrot (1983) in his seminal work *The*

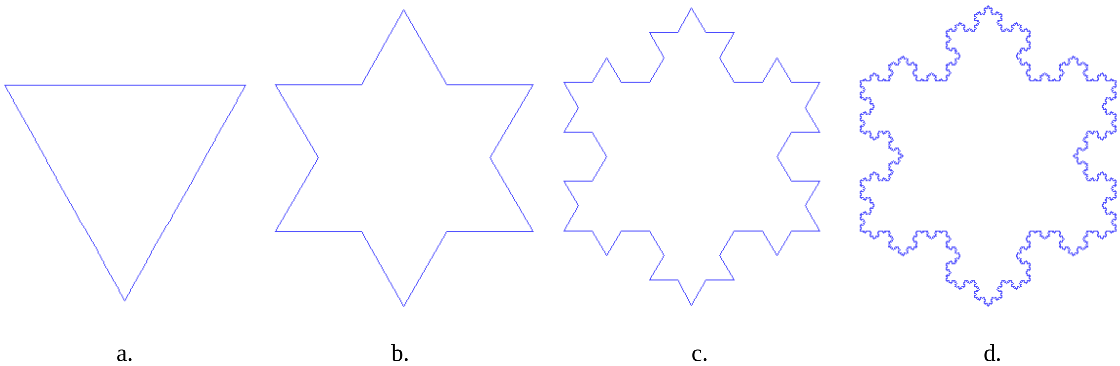

Figure 1. Fractals

Fractal Geometry of Nature. At its most basic level, a fractal is any pattern that reveals greater complexity when it is enlarged. Thus, fractals graphically portray the notion of "worlds within worlds," as can be seen in Figure 1:

The triangle (a) of Figure 1 represents an example of Euclidean geometry. When one spot is magnified, Euclidean patterns appear simple and seem to be composed of straight lines. In the language of calculus, such curves are differentiable. On the contrary, fractals, such as the last figure (d) of Figure 1, are not differentiable: the closer one looks, the more detail is seen. Infinity is implicit and invisible in the computations of calculus, but explicit and graphically manifest in fractals. The following description of fractals from Mandelbrot (1983) compares Euclidian geometry to Nature:

> Why is geometry often described as "cold" and "dry?" One reason lies in its inability to describe the shape of a cloud, a mountain, a coastline, or a tree. Clouds are not spheres, mountains are not cones, and coastlines are not circles… [M]any patterns of Nature are so irregular and fragmented, that compared with *Euclid* – a term used in this work to denote all of standard geometry – Nature exhibits not simply a higher degree but an altogether different level of complexity. […] The existence of these patterns challenges us to study those forms that Euclid leaves aside as being "formless," to investigate the morphology of the "amorphous" (Mandelbrot, 1983, p. 1).

Responding to this challenge Mandelbrot conceived and developed an alternative geometry of nature that describes many of the irregular and fragmented patterns. These apparently irregular and fragmented patterns have in fact certain laws or principles in the fractal model: self-similarity and recursiveness.

Self-similarity

A fractal invariant under ordinary geometric similarity is called self-similar. When each piece of a shape is geometrically similar to the whole, both the shape and the cascade that generate it are called self-similar (Mandelbrot, 1983). To explain the notion of self-similarity, Mandelbrot (1983) took an example of the geometry of Great Britain's coastlines. He found that although the coastlines' geometry is complicated, there is a great degree of order in their structure. Although maps drawn at different scales differ in their specific details, they have the same generic features. In a rough approximation, the small and large details of coastlines are geometrically identical except for scale. The process and conclusion of clinical or social research represents a simplified ideal model of what happens in the real world. The world of nature, on the other hand, is characterized by complexity.

The advantage of using fractals instead of Euclidean geometry in illustrating natural phenomena can be found in self-similarity. Nature has many self-similar characteristics: branches look like trees and rocks may look like mountains; weather patterns during a short-term period are similar to those during a long-term cycle. The fractal model enables researchers to analyze diverse fields of science as well as nature more accurately than the Euclidean model.

A counseling process has self-similar characteristics, too. Although a practitioner's work process is nearly identical to that of a scientist's in the laboratory, the difference of the two processes is that a psychotherapist juggles multiple levels of such processes whereas a scientist usually manages only one. Scientific researchers, especially quantitative researchers, rarely change their initial goals and hypotheses throughout the process of their studies. Their work follows a single pathway to assess the hypotheses. Psychotherapists, on the other hand, have numerous micro levels of working processes within their macro levels of process. A therapist not only sets general hypotheses and makes a macroscopic plan, but also formulates hypotheses and attempts to test them in the moment-to-moment, decision-making process during sessions (Spengler et al., 1995). This process differs from research decision-making in its immediacy.

Micro levels of analysis occur during moment-to-moment interactions between the counselor and the client and include counselor impression formulation, hypothesis testing, evaluation of in-session change following a therapeutic technique, and other cognitions. Macroscopic levels of analysis include evaluation of session outcome, diagnostic and treatment judgments, data from tests and inventories, and ultimately, final treatment and follow-up outcomes. In essence, the judgment processes that constitute psychological assessment are ubiquitous in counseling and therefore require careful scrutiny and evaluation.

Recursiveness

Recursiveness emphasizes the complex, divergent, and cyclical aspects of fractals. In nature, some quantity that is commonly expected to be positive and finite turns out either to be infinite or to vanish. At first sight, such misbehavior looks most bizarre and even terrifying, but a careful reexamination shows it to be quite acceptable as long as one is willing to use new methods of thought (Mandelbrot, 1983).

Spengler (1995) acknowledged this complicated and cyclical aspect of the counseling process. Consistent with Pepinsky and Pepinsky's (1954) model of the counselor-as-scientist, Spengler suggested a psychotherapy process model that involves an ongoing and cyclical process of observation, inference, and hypothesis-testing, with the goal of building an accurate but tentative and fluid counseling model. Further, he expended Pepinskys' model so that it can be most parsimoniously represented by a reciprocal interaction between assessment and intervention decisions or judgments.

Thus far, the author has argued that the counseling process is more like fractals than Euclidean geometry. It should be clarified, however, that the counseling process itself is not a fractal. A counseling process has even freer and irregular forms since it is a natural phenomenon while a fractal is a mathematical model. What the author aims to show is that a fractal can model the counseling process – a natural phenomenon – better than the Euclidean geometrical theory.

The gap between a scientific model and nature is inevitable. Consistent with this awareness, Persons (1991) used the term "*scientist-practitioner gap*" to describe the fact that psychotherapy, as practiced in the community today, does not reflect the findings published by scientists' research. The author believes that this scientist-practitioner gap can be effectively reduced by using a fractal model. To understand the difference in the sizes of the gaps, it will be beneficial to revisit Figure 1. Supposing shapes *a*, *b*, *c* and *d* in Figure 1 are geometric representations of shapes of clouds, one can see that the gap between shape d and the shape of a real cloud is smaller than the gap between shape *a* and the cloud.

Counseling Implications of a Fractal Model

Before discussing a fractal process model, it will be helpful to review traditional linear models of psychotherapy. In most literature, counseling processes have been illustrated in a linear order. For instance, Blocher's (1987) General Process Model suggests nine steps from defining goals to evaluating outcomes. Applying a scientific research process model, most counseling process models can be reduced as shown in Figure 2.

The model exemplified in Figure 2 illustrates the isomorphic relationship between scientific research and psychotherapy. In the beginning phase, both a scientist and a psychotherapist observe phenomena, build hypotheses, set goals, and design their methods. In the working phase, they thoroughly commit to conducting studies or psychotherapy by means of their designed methodology to resolve their research or therapeutic

Beginning Phase	→	Working Phase	→	Ending Phase

Figure 2. Traditional process model of scientific research and counseling

problems. Finally, in the ending phase, they reach conclusions and evaluate the overall progress of their work.

Although this model effectively illustrates the scientific aspects of counseling, the limitations, as explored above, are too great to ignore. Thus, the present author suggests a fractal process model of psychotherapy as in Figure 3.

The model illustrated in Figure 3 includes several principles of fractal and chaos theories which were discussed in the early part of this paper: self-similarity, recursiveness, and unpredictability.

The first principle is the self-similarity. Figure 3 has basically the same structure as Figure 2. Both models consist of beginning, working, and ending phases. The difference between the two models is that the fractal model portrays the notion of “worlds within worlds.” Each phase consists of beginning, working, and ending phases, and each of which again consists of the three phases on a more micro level. Although Figure 3 illustrates only three levels of the phases due to the limitations of space, each of the micro level phases can be analyzed at consecutively smaller and identical micro levels. It has been argued that a counselor takes these microscopic steps during every moment of the therapeutic endeavor (Spengler et al., 1995).

The beginning stage of therapy is considered important for the outcome of therapy because it marks the beginning of the therapeutic relationship (Clark, 2010). This is probably the most important process in psychotherapy, as it provides a foundation for subsequent therapeutic activities. This is especially true from the perspective of chaos theory which emphasizes accurate assessments of initial conditions. During the beginning stage of therapy it is important to consider how one will assess client data and form hypotheses about client problems.

During the working phase of treatment it may be important to help the client reach a place where they are emotionally connected to their own conflicting themes (Mergenthaler, 1996). It is in this phase that a therapist reassesses his or her hypothesis and tests against the new data in an attempt to confirm or disconfirm the working hypothesis (Spengler et al., 1995). The attempt to maintain a skeptical frame of mind or to disconfirm the current hypothesis is isomorphic with the process that the scientist undertakes, but they differ in the level of thinking that occurs. A therapist needs to engage in converting the macro-hypothesis created by the scientist doing research into a micro-hypothesis.

Finally, an ending phase is to look back, look forward, and say good-bye (Quintana & Holahan, 1992). During this phase, both the therapist and the patient summarize the work done in therapy and the extent to which they have achieved the therapy goals. Moreover, during this phase, the client shares what he or she liked and/or disliked about the therapy, and they examine the client’s plans for the future. In a fractal process model, this step occurs not only at the end of the whole counseling relationship but also at the end of every phase (beginning,

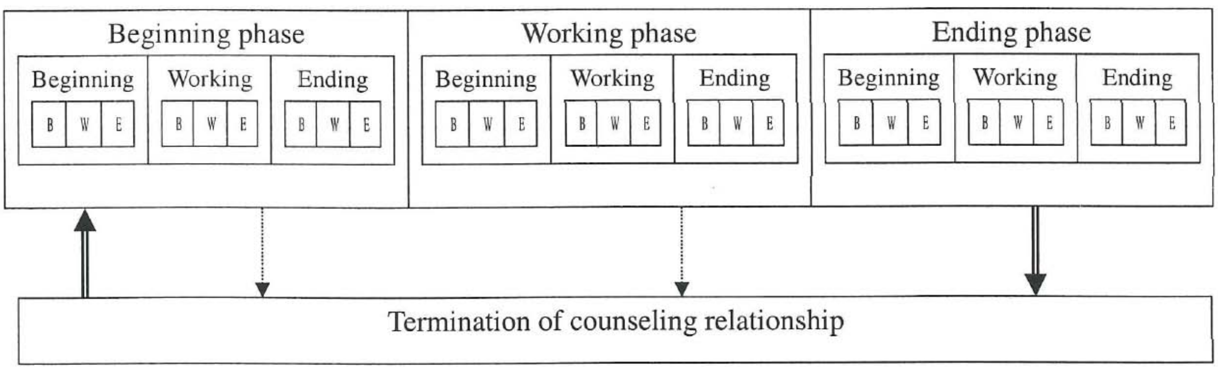

Figure 3. Fractal process model of psychotherapy

working, and ending), every session, and even every moment.

A second principle is recursiveness. This recursiveness occurs both in micro and macro levels. From a microscopic view, a counselor continually takes these three steps: beginning, working, and ending, and again beginning, working, and ending, and so on. The implication of the recursiveness on a macro level is illustrated by the inversely directed arrow (starting from the termination of counseling and pointing to the beginning phase) on the left side in Figure 3. The fractal process model can effectively anticipate and explain events like relapse, the reinitiation of counseling relationships, and follow-ups after terminations. Some counselors who would base their work on a traditional process model (beginning, working, and ending) may easily neglect a follow-up. A follow-up is, however, an important step because it reinforces the gains clients have made in counseling and helps both the counselor and the client reevaluate the experience. It also emphasizes the counselor's genuine care and concern for the client.

The final principle is unpredictability—a core tenet of chaos theory. Ironically, the advantage of chaos or fractal theories is a prediction of unpredictability. Traditional linear models assume predictable consequences in their formula which eventually leads to inaccuracy in predicting what actually happens. As a result, such models usually fail to effectively deal with errors. Chaos models, in contrast, assume that unpredictability and their formulas are designed to be sensitively affected by initial conditions and a variety of contextual factors. In Figure 3, the arrows with dotted lines illustrate this unpredictability in the counseling process.

Counselors are not able to help everyone who seeks assistance. When a counselor realizes that a situation is unproductive, it is important to know whether to terminate the relationship or to make a referral. Recycling is an alternative when the counselor thinks the counseling process has not yet worked but can be made to do so. By reexamining the counseling process, counselor and client can decide how or whether to revise and reinvest in the counseling process.

Failure is also an important part of a progress since it occurs very commonly. Many clients drop out, prematurely terminate, fail to respond to therapeutic interventions, or deteriorate or relapse following successful therapy (Glick, 1987). Although there is increasing evidence for the efficacy of psychotherapy, research indicates that some patients do not benefit from psychotherapy or even become worse off as a result of psychotherapy (Lambert & Ogles, 2003). Traditional process models, however, have hardly considered such unexpected events. The fractal model may enable counselors to anticipate these unpredictable events, to prevent them by thoroughly assessing various factors, and/or to effectively deal with them when they encounter these events.

Summary

The process of psychotherapy is a complex, non-linear, dynamic system. It is a deterministic system affected by a variety of factors. The current process model, based on chaos theory and fractals, will also provide practitioners and scientists with a flexible perspective in their work. As Stricker (1992) has stated, there is no room for unbending rigidity. On the other hand, acknowledging that the fractal process model is based on a scientist-practitioner perspective will also provide counselors with a framework to recognize that all that he or she does within the therapeutic space is not random, but rooted in scientific laws. An awareness of major principles of fractals, including the self-similarity, recursiveness, and unpredictability, will enable counselors and researchers to better understand and be prepared for what actually happens during their work.

It has been said that each client becomes a new case study (Spengler et al., 1995). When regarding the therapeutic relationship as a case study, the practitioner's work becomes identical to that of a scientist's. A major difference, however, between psychotherapy and scientific research exists in the purpose and focus of their work. In research, it is the scientist, not the subject, who primarily benefits from the research. The subject is there to help the scientist to discover new knowledge. In counseling, it is the client who is supposed to benefit from the process. The client is not there to help the therapist but to receive help. In this sense, a counselor should ironically be *more* scientific than a scientist.

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