Did the Buddha Define a Natural System Theory?

Insights from Bowen's Natural System Theory of the Family

by

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Chapter 1: Introduction

Murray Bowen defined what he saw as a new way of integrating empirical research with clinical practice by rooting a theory of human behavior in the philosophy of *natural systems*. Bowen's novel contribution stems from the assumption that all living systems, from the most complex vertebrate to single-celled organisms to protoplasm, arise as a function of mutual-causal, reciprocal relationships which organize an emotive, or *emotional* character. By emotive, he means that systems are defined by their dynamic processes, a temporal dimension, an ongoingness, and exist as e-motion. Abandoning essentialist notions, the natural systems paradigm views elements of living systems as a part of their context yet simultaneously defining their context by virtue of symbiotic interdependence (Laszlo, 1973; Macy, 1991; Gilbert, Sapp, & Tauber, 2012). This assumption is the basis of Bowen's *emotional system* concept which defines living systems in terms of the emotive relationships which regulate them. As a result, Bowen's *family systems theory* views human behavior more as a function of what humans have in common with other living things than of psychological factors which pertain to humans alone. As with natural system theories pertaining to other species, *Bowen theory* is the product of the direct observation of human behavior as it is in nature as opposed to a superimposing *a priori* concepts from *general systems* (Bertalanffy, 1968/2015) or *cybernetics* (Wiener, 1961) which deduce natural laws from pre-existing ideas (Kerr & Bowen, 1988; Caskie, 1994).

Michael Kerr, a close colleague of Bowen, describes the potential importance of the emotional system concept as "comparable to the significance of Darwin's theory of evolution by natural selection" (Kerr & Bowen, 1988, p. 27). He writes that while "Darwin established this *physical* link between man and the lower forms, Bowen's concept of the emotional system has provided a basis for establishing a *behavioral link* between humans and other animals" (p. 27). The concept is rooted in *natural systems thinking* as "the ability to be aware of the process of nature as opposed to

simply the content of nature" (p. 14). Similarly, the application of Bowen theory involves an individual developing the ability to observe the processes that define one's most sensitive relationships as opposed to simply the people and issues in those relationships (Papero, 1990). A fixation on issues and ignorance of the processes leading to those issues is seen to lead to linear, cause-and-effect thinking which loses the systems view. By studying the movement of processes and relationships, thinking systems aims to overcome the polarization generated by essentialist thinking in the natural and human sciences (Laszlo, 1973). Thus, Bowen theory represents a broad paradigmatic departure from mainstream perspectives on human suffering toward the development of a viable science of human behavior (Noone & Papero, 2015; Noone, 2016).

It is possible that the historical Buddha may have also defined a theory of human suffering that is better understood through natural systems thinking than through analogical comparison with psychological theory. This theory, known as *paṭiccasamuppāda*, [In the west known as] Dependent Origination, the *Second Noble Truth*, or "the cause of suffering," defines life as an interaction of universal processes, for example, consciousness, perception, sensation, and reaction (Goenka, 1987/2012). The most important aspect of this theory is the reciprocally interdependent nature of the elements in these processes, which implies a non-essentialist system of *mutual-causality* (Macy, 1991). This process is said to be a universal part of life itself. Thus, the Buddha saw suffering as a function of a deeper process that is universal to all of life, and that predates homo sapiens and will exist long after them. Though described as the "truth" of suffering, the theory is taught as a falsifiable hypothesis which stands to be disproven through rigorous experiment (Hart, 1987). The experiment consists of becoming aware of universal laws of nature by observing those laws as they play out in one's own body and mind (Fleischman, 2016; Young, 1994). This experiment represents the core of the Buddha's teaching and is called vipassanā meditation (Goenka, 2015).

This study proposes that the Buddha's approach to understanding human suffering may share a degree of conceptual and paradigmatic compatibility with the natural systems approach reflected in Bowen theory. Together, these approaches may further support a viable science of human behavior by virtue of their *consilience* (Wilson, 1998). Consilience occurs when findings in one scientific domain support findings from a different scientific domain, and significantly contributes to a findings' validity. A natural systems science which accounts for the complexity of the human phenomenon may lessen the compartmentalization of mainstream psychology, for example between academic and professional psychology. This study examines that potential by asking the question, "To what extent did the Buddha define a natural system theory?

Statement of the Problem or Issue at Hand

If Bowen's attempt at creating a science of human behavior represents a significant departure from the mainstream, and "at least as bold a conceptual leap as that made by Freud 60 years earlier" (Kerr & Bowen, 1988, p. 23), then it was not successful in his lifetime. The potential implications of his work as suggested by current researchers of Bowen theory remains largely unknown to both academic and professional psychology. Today, family therapy textbooks rightfully locate Bowen as a father of family therapy (Nichols, 2016), and some also describe his unique empirical contribution to family therapy and connections to the natural sciences (Goldenberg & Goldenberg, 2013). But it is rare to find a text outside of the *Bowen network* (the name for the professional association of psychologists and others who study and extend Bowen's research: thebowencenter.org) which connects the theory so deeply with the broader natural sciences instead of only with psychology and its clinical interventions. Existing family therapy literature describes Bowen's work almost exclusively in terms of humans and psychotherapy, but fails to address the paradigmatic uniqueness of the emotional system concept and its potential contribution to the understanding of "all animal behavior, including man's" (Kerr & Bowen, 1988, p. 27) through a

theory that "would connect living matter with the universe, the sun, the earth, and all living things" (Bowen, 1988, p. 383).

The emotional system in Bowen's terms is a deep concept which touches many domains. Conversely, combining or confusing it with concepts that are less precise can erode the scope of the theory which contains it and confuse Bowen's ideas with similar sounding concepts from other theories and research areas. For example, the McGoldrick and Guerin augmented Bowen's "family diagram" (Guerin & Fogerty, 1972; McGoldrick, Gerson, & Shellenberger, 1999) to capture variables such as "ethnicity, religion, race, migration, class, sexual orientation of family members. Today, the genogram which captures sociocultural and genealogical data is easily confused with Bowen's "family diagram" which is organized around the more precise construct of *differentiation of self* (Butler, 2008, p. 173). One of Bowen's goals was to use variables that participate in processes which could be observed and defined (Bowen, 1978). *Differentiation* is a biological concept which describes a process of specialization in a unit such as a single cell, and adaptability as a function of specialization plus coordination in a system of such units (Cammack, et al., 2006). Within-species social concepts such ethnicity, race, cultural expression, and religion are not ignored but are not considered integral to differentiation of self as a function of the universal reciprocal organizing processes in the emotional system, which predates homo sapiens. For example, within-species concepts may be seen as superficial expressions of deeper laws that define the emotional system. An increasing emphasis on psychological variables and decreasing emphasis on the emotional system reflects a departure from Bowen theory. As a mature and substantive theory, small changes in the nomological network (Kuhn, 2000) tend to change the trajectory from a theory of vast scope to a theory of narrowing scope.

It is also common for family therapy authors to describe the application of Bowen theory using terms identical to those used to describe other psychologically oriented "schools" of family or

individual psychotherapy. As family therapy literature (Hecker & Wetchler, 2013; Goldenberg & Goldenberg, 2013; Nichols, 2016) aims to educate family therapists being trained outside of a natural systems view, it does not cover the applicability of Bowen's work to other species or the emphasis on communication with other scientific disciplines implied in his view. Nor does it address the fundamental assumptions about human behavior which underpin Bowen's theoretical concepts. These descriptions might include sections on "therapeutic technique" in "Bowenian family therapy" (Nichols, 2016, p. 87) where Bowen specifically avoided associating any technique with the theory in favor of learning theory well enough for therapy to come naturally. Of course, this is only possible to the degree that the theory itself is scientifically valid. Daniel Papero (1990) writes, "In this framework, theoretical understanding leads to technique" (p. 3). Developing "understanding" at this level inevitably involves going back to one's family of origin to observe the theoretical principles occurring in their own emotional system.

Kerr (1998/2013) warns of the dangers of picking and choosing technique from theory at a superficial level in a forward to Titelman's edited volume *Clinical Applications of Bowen Theory*, a rare publication topic for Bowen researchers:

> Another reason Bowen emphasized theory over therapy was his observation that therapists entering the family field were liable to adopt a therapeutic technique they had heard or read about without examining the basic assumptions about human behavior held by the person espousing that technique. Consequently, trainees were not challenged to examine their own preexisting assumptions about the forces governing human behavior; they would simply incorporate the technique into their preexisting assumptions.
>
> Common examples of family therapy trainees incorporating a technique without examining its underlying assumptions were the trainees that attempted to "differentiate a self" in their families of origin by "getting the feelings out." These trainees felt compelled to express their hurts, angers, and disappointments to the family and pressured their parents and other family members to do the same. The effort, sometimes planned to be accomplished over a weekend or in a large family meeting, often involved confrontations with parents and other family members over emotionally charged issues. Not surprisingly, the confrontations could precipitate a major relationship cutoff with one or both parents. Another outcome was a catharsis

> of feelings that generated a temporary surface calm, but invariably, the trainees and their families would revert to old patterns. (pp. xvii-xviii)

Bowen saw confrontation through blame as a product of linear, cause-and-effect thinking and counter to systems thinking where the reciprocal nature of relationship transcends cause-and-effect and blame (Bowen, 1978, p. 127).

Understandably, this phenomenon of misrepresentation is only reflected in literature from authors in the Bowen network. Even the National Institute of Mental Health, who housed Bowen's groundbreaking inpatient family study, reported his research in terms of individual and "sociological" variables but failed to recognize the unique importance of the new family variables discovered in the study (Rakow, 2016, pp. 159-160). Perhaps this tendency to ignore the importance of scientific theory as well as the family as a unit of study is due to therapists and researchers being more interested in clinical technique than deep philosophical discourse. Or, this tendency might have something to do with the financial resources which can be gained for scientific experiments organized around linear cause-and-effect thinking which dominates mainstream health care (Diez Roux, 2011; Kapp, Simones, DeBiasi, & Kravet, 2016). Or, it might have something to do with the novelty and difficulty of adopting the natural systems perspective (Bowen, 1980). Or further, perhaps it is due to *incommensurability* (Kuhn, 2000) of conventional thinking and the natural systems paradigm.

For Kuhn (1962/2012), a philosopher of paradigm change in science, the effort of differentiating a truly new way of thinking that cannot be compared to an old way is by definition an exceptional challenge. This effort is made more difficult when the new view contains terms that are similar to the old view but with different meanings, creating the trap of superficial analogy. Analogy becomes especially problematic when terms in the new view relate to each other through a different taxonomy than the old view (Kuhn, 2000). For Kuhn, this *taxonomic* difference is a marker of

incommensurability. He gives the example of a term like "force" that must be learned together with terms from the same level of the taxonomy such as "mass" and "weight," but that this is not possible "without recourse to Hooke's law and either Newton's three laws of motion or else his first and third laws together with the law of gravity" (p. 231). Learning the latter laws represents a shift to the parent taxon containing various laws which define how theoretical concepts in a child taxon relate to one another.

One cannot accurately explain Bowen's *triangle* term in a clinical case presentation with psychodynamically trained clinicians without also explaining the closely related concept of differentiation of self, the counterbalancing forces of *individuality and togetherness*, the parent concept of the emotional system, and so on. An adequate distinction of those terms then requires a description of systems thinking, which subsequently requires a dive in to systems philosophy, a project seldom undertaken even in literature from Bowen researchers.

Without these explanations, it is too easy for a psychodynamic clinician to equate the triangle to Oedipus, differentiation to individuation, and the emotional system to Freud's drive theory, all of which rearrange the natural systems conceptual taxonomy into the psychological conceptual taxonomy. The original natural systems view is then lost (Noone, 2016). Does the relationship between the Oedipus complex and individuation accurately reflect the relationship between the triangle and differentiation? Does the relationship between individuation and drive accurately reflect the relationship between differentiation and the emotional system? Probably not. The relationships between the concepts must also be preserved to maintain their meaning, regardless of the degree of analogy that can be drawn between any two concepts in isolation. The new view cannot be explained in old terms without one paradigm first collapsing into the other (Kuhn, 1962/2012).

This taxonomic incommensurability may in part explain what Bowen meant when he said that one must "unlearn conventional thinking" before they can begin "thinking systems" (Bowen,

1980). Bowen assumed that this kind of essentialist, cause-and-effect thinking is so engrained in our biology and sociology that it is a lifelong undertaking. He confessed that in 35 years he was still "not sure how far I have come toward systems thinking," and speculated that it takes "three generations for an idea like this to evolve" (Bowen, 1980). Kerr (1988) argues that conventional thinking as historically rooted: "Historically, theories about human behavior have reflected this individual emphasis in that they have usually defined the 'cause' of behavior and clinical problems as existing *inside* the person" (p. 19). Similarly, Bowen and Bowen theory researchers (Papero, 2014; Titelman, 1998/2013) equate progress in therapy as a family starting to think systems about the processes leading to their problems instead of getting fixated on specific issues and how to make them go away. A fixation on issues and loss of process is seen as a marker of instinctual regression (Papero, 2014). Bowen saw the surging popularity of family therapy techniques as opposed to the development of scientific theory a reflection of this kind of regression at the societal level (Bowen, 1978).

While the potential implications of Bowen's work remain unrecognized in clinical psychology training programs, Bowen researchers continue to develop the theory in communication with other natural sciences as reflected in the tradition of inviting speakers from other scientific fields to keynote their bi-annual meetings (The Bowen Center, 2017). If Bowen theory represents such a paradigmatic "quantum leap" (Kerr, 1981), then theoretical-philosophical studies which address the leap will be of use to Bowen researchers. However, this problem of completely distinguishing the conventional and natural systems paradigm is a considerable one and beyond the scope of this study. In lieu of those distinctions, and to avoid simply describing the new view in old terms, this study will begin to triangulate this new paradigm by describing important limitations of current views of science and clinical psychology. These problems will be covered in more detail in Chapter 2 of this document.

Historical Context and Present Status of the Topics to be Considered

Murray Bowen's *family systems theory* represents a major paradigmatic departure from mainstream approaches to understanding human behavior. Organized by the philosophy of natural systems, Bowen was interested in developing the concept of the emotional system as a process governed by fundamental laws guiding the entire universe. Kerr (1988) describes this assumption,

> Family theory, in contrast, assumes that the functioning and behavior of all organisms are significantly influenced by an emotional system that is anchored in the life process at a level probably more basic than genes. This system is assumed to have its roots in protoplasm itself and it may even influence the functioning of genes. The concept assumes that there are some universal characteristics of relationship systems. The relationship processes that operate between intracellular components, between cells, between organ systems, and between individual members of a species possibly are organized based on some common principles. (p. 48)

This view recognizes psychological variables as playing a role in determining human behavior but assumes that relationship processes play a much more significant role at all organismic levels. (Kerr & Bowen, 1988). This view of human behavior is a drastic departure from a view (Baumeister & Bushman, 2017) which investigates uniquely human psychological concepts such as *anger*, *desire*, *meaning*, *motivation*, *attitudes*, and *self-concept*. As Kerr points out, Bowen theory simultaneously points to a way of explaining human behavior and potentially a way of thinking about the behavior of all of life. Further, because Bowen theory compares observations in human relationship variables with observations in other species, it has the potential to become an accepted science of human behavior.

While Bowen's goal was moving toward a science of human behavior, his effort was to play an important part in a larger movement to connecting all of nature in one integrative systems theory. Pioneered by a wave of thinkers such Bertalanffy, Laszlo, Wiener, and others, systems philosophy is a paradigm of science which assumes and investigates isomorphic organizational forms and processes across systems (Bertalanffy, 1968/2015; Laszlo, 1971/2003). The systems paradigm assumes that all phenomena occur as a function of reciprocal relationship processes. This most basic

assumption plays a part in the synthesis of knowledge across scientific domains by transcending conceptual polarities which tend to divide knowledge domains into poles.

One important polarity which has existed in psychology from the beginning is the difference in goals and values between the natural science and human science perspectives (Walsh, Teo, & Baydala, 2014). Bowen was one researcher who worked to resolve this polarity. He created a theory based on direct observation of families living in an inpatient setting over extended periods of time (i.e. up to one year of family residence in a hospital; Bowen, 2015). Bowen believed that if a theory of human behavior was sufficiently valid and predictive then it would automatically be useful in the clinic. The product of his research is a theory of the natural sciences that is rooted in systems philosophy. This type of theory is known as a natural system theory. Bowen believed that a natural system theory would be the best way to share findings with research in other natural systems found throughout the natural world (Kerr & Bowen, 1988), and by virtue of the systems paradigm would help overcome the polarity of reductionism and holism (M'Pherson, 1974) in clinical work.

During the family therapy movement of the 70's and 80's, clinical psychologists and marriage and family therapists misunderstood Bowen's theory to fall exclusively on the side of the human sciences. The result was a wave of therapists claiming to use Bowen's new ideas while separating highly interdependent concepts from their natural systems context and turned them into techniques for therapy devoid of natural theory (Kerr & Bowen, 1988; Papero, 1990). Bowen claimed that this wave was a reflection of the field's interest in what was popular, i.e. the human potential movement, counter-cultural group methods over what was scientific (Bowen, 1978), and that the decline in the focus on the family as an emotional unit was also due to this interest. Bowen accounted for this with his concept of *societal regression*, which attributed a decline in overall societal functioning as a result of a decline in overall functioning of the family unit (Gilbert, 2006). The concept defines a society in regression as one which responds to "chronic, sustained anxiety" in similar ways as a family in

regression. Some examples are losing contact with "intellectually determined principles and [resorting] to more and more emotionally determined decisions to allay the anxiety of the moment. . . this results in more band-aid legislation, which increases the problem; and that cycle keeps repeating, just as the family goes through similar cycles to the state we call emotional illness" (p. 386).

It has been said that the Buddha created a science of emotion and cognition which also transcends the debate between reductionism and holism (Macy, 1991). Coincidentally, this science, known as vipassanā meditation, shares many conceptual similarities with Bowen theory which set these two schools apart from constructivist clinical theories. Examples are: reducing human suffering through the understanding of problems instead of simply trying to make the problems go away; the primacy of relationship in human funtioning; a single construct for systemic health; the tempering of emotions and development of objectivity; increased awareness of one's self and surroundings; the absolute interdependence of all of life; the importance of becoming an ardent researcher; and that progress for the whole begins and ends with progress for oneself (Bowen, 1978; Goenka, 1987/2012; Kerr & Bowen, 1988; Goenka, 2000). In particular, the formulation of vipassanā taught by S. N. Goenka may share a degree of compatibility with the assumptions of systems philosophy that made it possible for Bowen to integrate the natural and human sciences in clinical practice.

This possibility stems from Goenka's particular effort to teach vipassanā in a way that is compatible with the scientific world view. This includes carefully emphasizing bare observation of concrete natural phenomena free of blind belief and dogma, describing the theory of vipassanā as natural and refutable laws which each meditator should put to the test, and choosing terminology which illustrate the non-sectarian nature of the practice. This special emphasis on vipassanā as science is reflected in the writings and talks from students of Goenka (Fleischman, 2016), who tend

to focus on what a meditator can learn about nature as opposed to drawing analogies with constructivist psychological theory.

Gaps in the Literature or Need for the Study

Existing literature reviews the paradigmatic assumptions of Buddhist concepts in general and compares those concepts with concepts from systems philosophy. In *Buddhism and General Systems Theory*, Macy (1991) provides the most comprehensive analysis of the system of causality in *paṭiccasamuppāda* (The Law of Dependent Origination, known as The Second Noble Truth) with Bertalanffy's General Systems Theory (Bertalanffy, 1968/2015) and Wiener's Cybernetics (Wiener, 1961). Macy offers the most in-depth look at key passages from the original *pāli* scriptural tradition (of Theravada Buddhism) available. However, while an important step in the marriage of systems philosophy and Buddhist theory, her review is mostly conceptual and does not address the practical essence of vipassanā meditation. Macy's review also pertains to General Systems Theory which assumes a deductive, pure mathematical basis for natural laws and differs from a natural systems theory in this regard. A comparison with the natural systems approach might amplify the Buddha's empirical approach to researching phenomena as they exist in nature.

Gerald Midgley, prominent systems researcher and editor of the 2003 4-volume *Systems Philosophy*, developed a systems model for problem solving in Taiwanese Buddhist organizations with Chao-Ying Shen (Shen & Midgley, 2007a, 2007b, Midgley & Shen, 2007). This model appears to have achieved some success organizing the development, deployment, and ongoing coordination of interventions designed to reach pre-existing goals for a particular Buddhist organization. Like Macy, Midgley & Shen provide a rare in-depth integration of systems concepts and some Buddhist concepts as defined by a target ethnic group and demonstrates potential philosophical compatibility of systems philosophy with "Buddhist Philosophy" (Midgley & Shen, 2007, p. 196).

Midgley & Shen succeed in acknowledging the importance of clearly stating the traditional context for his work and is clear that he draws from what he calls a branch of "Humanistic Buddhism" in China (Shen & Midgley, 2007a, p. 176). The resulting *Buddhist Systems Methodology* is reported to draw its efficacy from its cultural sensitivity to the Taiwanese Buddhist organization in which it was deployed. That is, it is effective by organizing interventions using principles from systems philosophy and their Humanistic Buddhist correlates. Midgley's ongoing work to understand the relationship between some forms of Buddhism and systems philosophy (Shen & Midgley, 2015) is important in the broader effort of understanding how Western and Eastern modes of thinking deal with problems of complexity.

However, the choice of ethnic Chinese "Humanistic Buddhism" (Shen & Midgley, 2007a, p. 175) for the traditional context of his work is apparent in the emphasis on concepts apart from the essential practical component of vipassanā meditation, which comprises the traditional context chosen by this study. As described in Chapter 4 of this document on vipassanā meditation, taking concepts from the theory of vipassanā prior to, or excluding, the practical component would be antithetical to the theoretical-practical system for various technical reasons. In fact, the practical component in vipassanā as naturalistic observation represents the entirety of the historical Buddha's teachings in this traditional context. This difference is reflected in Midgely & Shen's focus on designing interventions for what is assumed to be ideal markers of change prior to naturalistic study of the phenomenon of human organizations with limited *a priori* assumptions.

In *Reasoning into Reality,* Fenner (1995) thoroughly reviews and attempts to integrate concepts from the Middle Path Philosophy in Mahāyāna Buddhism with "systems-cybernetics theory" (1995, p. xviii) in an attempt to create a computer simulation model for use in philosophy, psychology, and information processing. Fenner's compelling intellectual work was inspired by the "mind-only" teaching style of Mahāyāna Buddhism (Williams, 2009), mostly associated with the ethnic religion of

Asia and Japan which generates concepts and teaching styles at odds with the philosophy of bare empiricism in the earliest known vipassanā traditions. These later schools also do not emphasize the practice of vipassanā as highly as social work and cognitive-conceptual frameworks for working through paradox, recitation of mantra or visualization, devotion to deities, etc.

While Macy's comparison of the Buddha's system of causality with assumptions about causality in General Systems Theory is vital to this study, what is needed is an examination of the etiological utility and theory of change in vipassanā meditation as a natural system theory. That is, if the Buddha described natural laws which pertain to all living things and taught a method of investigating them through the bare observation of nature with as few *a priori* assumptions as possible, then literature is needed which outlines the relationship between his teachings and the natural systems paradigm in particular.

Goals of the Study

This study proposes a systematic theoretical comparison of Bowen's natural system theory of the human family with vipassanā meditation as taught by S. N. Goenka in the tradition of Sayagyi U Ba Khin. This theoretical comparison will ask the question "To what extent did the Buddha define a natural system theory?" It hypothesizes that the Buddha might have discovered much more than just a theory of the body and mind, but a theory of what the body and mind have in common with the rest of the natural world. Fleischman (2015) writes,

> One of the most important insights of ancient India, where the Buddha first taught Vipassana meditation, was that the microcosm contains the macrocosm. Our sciences today have documented this truism in much more finely grained detail, but the truths that animate our focus on sensations in Vipassana meditation are ancient and modern. (p. 10)

If the Buddha's insight that "the microcosm contains the macrocosm" is compatible with systems philosophy, then it is possible that a degree of conceptual portability may exist between a natural systems perspective on vipassanā meditation and Bowen's theory of the human family.

A systematic comparison of these two bodies of literature may offer a new way of looking at change in the human body and mind for clinical as well as research psychology. This new perspective might not reduce a human or any other living being into isolated biological variables but could provide a way of thinking about the interactions and contributions of isolated variables to problems of complexity in the domain of the human sciences (Laszlo, 1971/2003). This comparison will not expect conceptual equivalence but begin to frame a way in which Bowen theory might relate to vipassanā meditation. For example, there is little evidence that the Buddha taught a theory of the human family as an emotional unit. Rather, if the Buddha's discoveries could translate into something like a natural system theory which relates to human suffering, then it may contribute something within, or compatible with, Bowen theory.

Rationale/Reason for a Theoretical Integration as the Best Approach

This is a single philosophical-theoretical study which has two levels. The first is the conceptual level which asks questions about the relationships between specific concepts in Bowen's family theory and Goenka's formulation of vipassanā meditation. The second is the paradigmatic level which asks questions about the relationships between the philosophical position of each theory or theorist, and how these assumptions relate to the natural sciences or human sciences. A theoretical integration is required in order to conduct a comparison on both levels.

What Literatures Will be Drawn on and Why

There is a collection of authors with in the Bowen network who are agreed to represent Bowen theory. The Bowen Center for the Study of the Family in Washington D.C. was founded by Murray Bowen in 1990, the year of his death. The mission of the Center "is to lead the development of Bowen family systems theory into a science of human behavior and to assist individuals, families, communities, and organizations in addressing major life challenges through understanding and improving human relationships" (The Bowen Center for the Study of the Family, 2017).

Though Bowen theory is an open theory which seeks refinement through experiment, the eight concepts have remained stable since Bowen's death in 1990. Primary sources by Murray Bowen (1978; 2015) and his colleagues, such as Michael Kerr (1988), Daniel Papero (Papero, 1990), Roberta Gilbert (2006), and some edited volumes by Peter Titelman (2003; Titelman, 2008; Titelman, 2014) will be used to represent the theory. Choosing authors within the Bowen network is important to demarcate the sources which understand the theory in the original context (Bowen, 1978; Kerr & Bowen, 1988; Papero, 2016) as opposed to the non-research context which emerged in the family therapy movement (Nichols, 2016; Goldenberg & Goldenberg, 2013).

This study will rely on Vipassanā meditation as taught by S. N. Goenka in the Tradition of Sayagyi U Ba Khin (Hart, 1987). The reason for this choice is two-fold. First, a deep theoretical study such as this requires in-depth knowledge of at least one vipassanā tradition. The author has made an exclusive commitment to dedicated practice within this particular tradition over the last seven years. Second, Goenka put forth significant effort to formulate the teachings for his Western students in a way that appears to be uniquely compatible with the scientific world view (Fleischman, 2016). Goenka only teaches new students within the context of highly-structured, 10-day silent meditation courses. The purpose of this is to provide an ideal environment for serious meditation, for example one where a student has little opportunity for unethical conduct or distractions from life pressures and other meditation or devotional systems. During the courses, Goenka makes every effort to reiterate the importance of the practice as a non-sectarian technique and way of life which is compatible with science and has "nothing to do with organized religion" (Goenka, 1987/2012). To this end, the courses are structured to provide students with enough time to develop the personal experience needed before introducing subtle concepts that might otherwise be misunderstood as a "high philosophy" (Goenka as cited in Melnikova, 2014, p. 15). Goenka (1987/2012) writes in the Forward to his *Discourse Summaries*,

> None of this can be attained just by thinking about it or wishing for it. One must take steps to reach the goal. For this reason, in a Vipassana course the emphasis is always on actual practice. No philosophical debates are permitted, no theoretical arguments, no questions that are unrelated to one's own experience. As far as possible, meditators are encouraged to find the answers to their questions within themselves.

While a theoretical review of any extant Buddhist tradition with systems philosophy would likely produce compelling results, there are aspects of Mr. Goenka's formulation which may produce a unique compatibility with the philosophy of natural systems in general and Bowen's natural system theory of human behavior in particular.

Definition of Important Concepts as Understood in the Present Study

This study will be relying on Mr. Goenka's opinion of what is and is not part of the Buddha's teaching. This will no doubt generate statements and concepts which are in philosophical conflict with other traditions, especially the reformist Mahāyāna traditions. However, a hermeneutic-historiographic analysis of the validity of the traditions is a task for only the most experienced meditators and falls outside the scope of this study. As such, the term "vipassanā" will refer to the non-sectarian style of satipaṭṭhāna as taught by Mr. Goenka. This tradition teaches that satipaṭṭhāna, which is also called vipassanā meditation, comprises the entirety of the teachings. Therefore, if the practice of vipassanā meditation is said to be scientific in nature, or that vipassanā operates on something like a natural system theory, then it is assumed that the entirety of the Buddha discovery and teachings are scientific in nature and operates on something like a natural system theory. Subsequent research which specifies a different traditional context may therefore define the scope of the Buddha's teachings differently, and statements within this study should then be interpreted accordingly. The terms Buddhist and Buddhism will be assumed to indicate either the ethnic Asiatic religions claiming allegiance the same historical figure as vipassanā, or the Western conception of the non-sectarian practices as a religion. Instead, we will use the terms dhamma, and vipassanā for the

"law of nature," and the practical teachings to develop an understanding of the law of nature, respectively.

Systems thinking.

> While the application of systems thinking to human behavior is new, systems thinking itself is very old. In fact, if one equates systems thinking with the ability to be aware of the process of nature as opposed to simply the content of nature, then there is evidence that systems thinking dates back at least 2,500 years. Carl Sagan's description of the ideas of the Greeks living in Ionia during the sixth century B.C. suggests that a fairly sophisticated level of systems thinking existed at that time:
> Suddenly there were people who believed that everything was made of atoms; that human beings and other animals had sprung from simpler forms; that diseases were not caused by demons or the gods; that the Earth was only a planet going around the Sun. And that the stars were very far away.
> While the emergence of these ideas in Ionia appears to reflect the fact that man was thinking "systems" or "process" in reference to the natural world in that ancient time, systems thinking was largely ignored for the next 2,000 years. (Kerr & Bowen, 1988, p. 15)
> Some people refer to Newton's theory as a cause-and-effect theory because he postulated that bodies, such as planets, consist of corpuscles which act instantaneously upon each other from a distance. It is being referred to as a "systems theory" here because it deals with process and defines an organizing principle, namely, gravity. (Kerr & Bowen, 1988, p. 17)

Differentiation.

A biological term which can be thought of as a quantitative degree of adaptability as a combination of complexity and coordination. Something can be complex but poorly coordinated, as with an anxious mob. Similarly, something can be highly coordinated but inflexible, such as a stapling machine which only fits one thickness of paper. In general life is seen to evolve in the direction of increased adaptability through increased differentiation, either within a single cell, organism, or social structure.

In developmental biology, differentiation may be "The normal process by which a less specialized cell develops or matures to become more distinct in form and function" (2017).

> "For example, a single-celled zygote develops into a multicellular embryo that further develops into a more complex multisystem of various cell types of a fetus. The cell size, shape, polarity, metabolism and responsiveness to signals change dramatically

such that the less specialized cell becomes more specialized and acquires a more specific role." (2017)

Natural system.

If one uses the figure 15,000,000,000 (15 billion) years for the period since the cosmic "big bang" and the figure 35,000 years for the time since CroMagnon has been on Earth, then Cro-Magnon has existed only 0.0002% of cosmic time. On the scale of one year for the time since the "big bang," CroMagnon has been here just a little over one minute. It is clear that there was a very great deal "written in nature" long before man, as we know him, was even a tiny glint in evolution's eye. There is, obviously, a great deal "written in nature" right now, regardless of our ability to define it. It exists independent of anything we know or say about it. It is not a creation of the human brain, nor is it changed by what we imagine it to be. Theories are created in the minds of man and written in books. Scientific theories are only as valid as they are consistent with what is "written in nature."
Bowen chose to anchor his theory on the assumption that the human and the human family are driven and guided by processes that are "written in nature." In this sense, the human family is a natural system. (Kerr & Bowen, 1988, p. 26)

Objective V.S. subjective.

This emphasis on the distinction between an objective and a subjective view of human behavior requires some clarification. Objective means that what is being defined belongs to the object of perception or thought and is not affected by personal feelings or prejudice. Subjective means that what is being defined belongs to the thinking subject rather than to the object of thought and that it relies on one's personal feelings or opinions. This distinction does not imply that a theory of human behavior that strives to be objective and to keep the influence of subjectivity at a minimum is a theory that is about the way the world really is. While we can attempt to develop theories that are consistent with all available observations about nature, we can never be sure what nature is really like. We can only say that nature, operates "as if" a particular theory is accurate. In addition, this distinction between objectivity and subjectivity is not to imply that one is "good" and the other "bad." It only implies that recognition of the distinction between the two is important. (Kerr & Bowen, 1988, p. 18)

Content V.S. process.

The term "process" refers to a continuous series of actions or changes that result in a given set of circumstances or phenomena; the term "content" refers to the circumstances or phenomena out of the context of those actions or changes. It is analogous to a movie being equivalent to process and an individual frame of the movie being equivalent to content. Darwin's theory of evolution, for example, is concerned with a process in nature and falls, therefore, in the realm of this very general definition of systems thinking. (Kerr & Bowen, 1988, p. 14)

Overview of the remainder of the dissertation, Chapter by chapter

Chapter 2 will provide a more in-depth look at the many philosophical and practical problems addressed in this study. The first section, Complexity in Science, reviews the purpose of reductionism along with its limitations when applied to problems of increasing complexity. The second section, Compartmentalization in Science and Society, reviews the problems of fragmentation and isolation as the result of a reductionistic world view. The third section, Challenges to Psychology as a Science, reviews the paradigmatic polarity between the human and natural sciences in clinical and research psychology. The fourth section, Challenges to the Study of Vipassanā Meditation, reviews how limitations in popular and academic understanding of the Buddha's essential teaching may be limiting its potential contributions to clinical and research psychology. The fifth section will offer a discussion and conclusion of the preceding four sections and hypothesis of the study.

Chapter 3 will provide an overview of Bowen theory beginning with the philosophical assumptions which differentiate Bowen's thinking from other clinical theories. Because general systems concepts can be difficult to grasp to a new reader, a brief overview will be given of other well-known systems theories in order to differentiate them from Bowen's natural system theory.

Chapter 4 will provide an overview of Vipassanā meditation as taught by S. N. Goenka in the Tradition of Sayagyi U Ba Khin. This overview will include the theoretical basis for the Buddha's teaching of satipaṭ ṭ hāna, otherwise known as vipassanā meditation, as well as the particular principles and organization of Goenka's vipassanā courses. Emphasis will be placed on how Goenka's formulation of satipaṭ ṭ hāna is particularly suited for the scientific worldview.

Chapter 5 will outline how the meta-ethnography method will be employed to organize a systematic review of each body of literature's theoretical stance on human behavior.

Chapter 6 will review the literature on Bowen theory as part of the theoretical comparison.

Chapter 7 will review the literature on Vipassanā meditation as the second part of the theoretical comparison.

Chapter 8 will present the findings of the comparison as a theoretical synthesis.

Chapter 9 will offer a discussion of the findings and suggestions for future research.

Chapter 2: Philosophical and Scientific Context of the Study

A comparison of vipassanā theory with the natural systems paradigm requires a sufficient description of the natural systems paradigm. It is simple enough to say that the natural systems paradigm is one which studies natural systems, and that a natural system is simply a system that occurs in nature. However, in practice it can actually be quite difficult to adopt and maintain a mode of thinking that is line with the natural systems paradigm. This is difficult because the differences between *natural systems thinking* and conventional thinking are subtle and can be difficult to describe. This chapter will begin to triangulate on the natural systems paradigm by examining the limitations of conventional scientific and psychological paradigms, and their implications for the study of vipassanā meditation.

First, we will look at the reductionistic paradigm of science and its limitations for problems of complexity. Second, we will look at the related problem of compartmentalization in science and in thinking about nature. Third, we will look at some challenges for psychology as a science of human behavior. And finally, we will look at how these problems in science and psychology impact the study of vipassanā meditation.

The Problem of Complexity in Science and Responses to It

Kuhn (1962/2012) used the term *paradigm* to describe a collection of assumptions, or "club" (p. xxiv) or network of researchers who agree on those assumptions and use them to guide and communicate their research. From Descartes to Popper, the philosophical debate over paradigmatic assumptions that guide the study of nature has been boiling for centuries. Guba and Lincoln (*Handbook of Qualitative Research*, 1994) suggest that "Paradigm issues are crucial; no inquirer, we maintain, ought to go about the business of inquiry without being clear about just what paradigm informs and guides his or her approach" (p. 116). Yet at present, all that is commonly agreed is that

science is defined by the assumptions that define whatever paradigm the scientist builds their research upon (Kuhn, 2012).

One important and popular assumption in science today is that which defines the *reductionist* paradigm (Laszlo, 1971; M'Pherson, 1974; Tuan, 2012; Wilson, 1998). The reductionist paradigm assumes that problems are best solved by dividing and dissecting pertinent variables to their essential and measureable components in order to determine the cause of the phenomenon in question. The strength in this view is that it makes simple what was once complex, makes clear what was once mysterious, and produces straightforward solutions to important problems. The treatment of physical trauma in an emergency room, the correct nail to use for the frame of a housing structure, and the determination of wire gauge to compensate for D.C. voltage drop over long distances are all techniques which are made possible by reductionistic thinking. They tackle problems that have been solved with laborious and delicate analysis, and the resulting formulae produce predictable results specific to the problem domains from which they are derived.

Reductionism has flourished as the paradigm of science since the industrial revolution and is responsible for the explosive growth in technical engineering that so visibly impacts the life of *homo sapiens* today (Harari, 2015). As of this writing an estimated 62.9% of people in the world own a mobile phone (Statista, 2017), a device so complex that it is impossible to tally the orders of magnitude above that which a single human mind can contain. This remarkable feat of engineering was accomplished through the innovative combination of small solutions to countless isolated problems such as battery storage capacity, computational power versus heat generation, sound quality over digital lines, wireless digital networking, GPS, camera quality, and of course, transistor-based computational horsepower measured in billions of mathematical floating-point operations per second called *gigaflops* (and one day the unit will be one-thousand-million-million flops, or *petaflops*) (Eicker & Lippert, 2017). Each of these engineering problems was reduced to a manageable size in

order to produce a deterministic solution with 99.9% or 100% accuracy, and the combined result is an inanimate object so dynamic that its very creators cannot seem to find the limit of its novel uses.

But amidst the success there remain problems which cannot be solved or even posed within the reductionist paradigm. These are problems of *complexity*. Reductionism assumes, or at least strives, for a quantitative world view where discrete variables are used to create predictable solutions to problems (Tuan, 2012; Terra & Passador, 2015; Khisty, 2006). As any meteorologist who has tried to predict the weather or digital animator who has tried to model the movement of a human hair in the wind understands: predictability in nature is not linear or unitized. There is evidence that problems of complexity behave more like an ocean of variable-particles flowing into each other simultaneously to produce results that cannot be easily quantified, let alone predicted (Gleick, 2011). A reductionist thinker faced with a problem of complexity may assert that all that is required is more computational power applied to more comprehensive analytical data. But it is possible that problems of complexity cannot be accurately modeled at all, because the *period-buffer*, a computational version of a single frame in a motion picture film, is a conceptual device imposed on nature through reductionistic thinking. It did not arise from nature itself. The trajectory and impact location of the proverbial cue ball determining the resulting vector and acceleration of a second billiard ball may be a great example for teaching the basic laws of physics to primary school students, but in nature countless particles interact with other particles simultaneously and without interval. Material and information flow in nature constantly and on an order of interdependence that no deterministic discrete model can capture, no matter how sophisticated (Sayama, 2015).

While reductionism works wonders in problems of engineering which can be reduced to simple causal rules like the elementary billiard table example, it can create problems of massive scale when it alone provides the dominant world view (Bell & Morse, 2005). When assessment

approaches to health care are founded on the assumptions of reductionism, they have the potential to ignore complexity. Kerr (1988) writes:

> A physician can repeatedly prescribe a diuretic for a patient with leg edema, but fail to recognize that the patient is in chronic heart failure. As a consequence, the edema keeps recurring. A psychiatrist can hospitalize a schizophrenic patient, but not appreciate how the problematic relationship between the patient and his parents has contributed to the hospitalization. The patient may improve and be discharged, but be rehospitalized a few months later. A family therapist may treat two parents and their schizophrenic son, but not attach importance to the fact that the parents are emotionally cut off from their families of origin. The parents' cut off from the past undermines their ability to stop focusing on their son's problems; once again, the therapy will be ineffective" (p. vii)

The type of thinking that assumes a single, *essential* solution to every problem will miss variables beyond the scope of the assessment framework used. This assumption also comes with a second and more fundamental implicit assumption, that each single effect has a single cause, a paradigmatic marker of 17th century *mechanistic* thinking (Godfrey-Smith, 2013; Hamdani, Jetha, & Norman, 2011; Puhakka, 2015). Russel's view (as cited by Tuan, 2012) of mechanistic "causal law is employed to infer the existence of one thing or event from the existence of another or a number of others. . .we can plausibly claim that when some earlier events are given, only one act or acts within some well-marked character are related to these earlier events" (p. 200). A facet of reductionism, mechanistic thinking is at the heart of the randomized controlled trial (RCT), a methodology for sifting through non-essential variables in order to determine an essential variable. The RCT is now the gold standard research methodology in clinical research (APA, 2006; Lilienfeld, Lynn, & Lohr, 2015; Puhakka, 2015) and relies on the statistical value of a reliably direct, moderated, or meditated correlation between two variables.

However, models based on mechanistic thinking can fail quickly when applied to problems of complexity (Gibson & Wilson, 2013; Gleick, 2011). For example, researchers in the 1950's were tasked with predicting the weather. At first glance, the weather appears to have some degree of

patterned phases of sunshine, rainfall, and wind speeds. Once reliable relationships are found between meteorological variables (e.g. air pressure and precipitation) it is assumed that accurate prediction would require the analysis of these and other variables observed throughout an array of weather stations. These data may be then analyzed over time to tease out patterns in the relationships of the variables across the geographical area. A theory of the weather would be devised and then a model constructed to determine a forecasted state based on the current state. The model would then be refined over time until it reaches an acceptable degree of accuracy.

However, while resulting theories were capable of accounting for past weather data they were not capable of predicting future weather data. Eventually a time came when it was decided that the problem was unsolvable, and weather prediction remained an intuitive art. In fact, "virtually all serious meteorologists," and indeed most "serious" scientists in the 1960's rejected the prospect of predictive models, and indeed altogether mistrusted the computers that ran them (Gleick, 2011, p. 22).

While precise prediction was not possible, it was eventually observed that there was some regularity in the *way* that the weather changed. That is, a weather system possessed a pattern of ordered disorder at higher levels of analysis and over a longer period of time. This observation came when one researcher stumbled across the fact that small changes in the inputs of the simulations would produce more erratic changes in the outputs over time. The more times the outputs of one simulation run were fed back as inputs to the next simulation run, the less the outputs resembled what would be expected given such a small change in the original inputs[1]. This sort of imbalance

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[1] This is the above-mentioned step-wise method of computation used in a simulation whenever something needs to be modeled fairly smoothly through time, similar to how a cartoon

between inputs and outputs points to the dramatic failing of pure mechanistic thinking: that while variables derived from reductionistic analysis may accurately account for past data, they may not always account for future results. The relationships between the variables are simple, the computer algorithms are deterministic, and yet the outputs become more difficult to predict the longer the simulation is left to feed back into itself (Gleick, 2011).

The researcher was Edward Lorenz, and his discovery led to the study of *chaos*. He observed that his computerized weather simulations showed islands of coherence amidst the turbulence, and his discovery was that the two could exist together. This ordered-disorder is most simply conceptualized by understanding how a simple non-linear equation can produce predictable results when run once, but the results become more unpredictable when the output is fed back into the equation as input. This reflects the requirement that the state of a weather system in one moment determines the state in the next moment. Complex problems like these seem to be creative in their unpredictability; they appear to be *alive* (Fleischman, 2012).

Lorenz had unwittingly made a discovery that would lead to the study of complexity and terms like *complex systems*, *dynamical systems*, and *chaos theory*. The concept of complexity challenged the paradigmatic assumptions of the time and opened the door to new ways of looking at extremely complex problems like variations in population levels, financial economy, and global climate, and most recently the functioning of the human body and mind (Siegel, 2012). Yet the assumptions of complexity have not permeated mainstream medical care in the United States, which remains mostly

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animator draws one frame at a time on a fresh piece of paper. The simulation program is actually written to run just once per step, just as the cartoon animator only draws the character on one frame at a time. Weather prediction would also rely on this sort of step-wise simulation, as the simulation for one moment relies on knowing the result of the simulation of the previous moment.

fixed in reductionistic thinking (Diez Roux, 2011; Kapp, Simones, DeBiasi, & Kravet, 2016; Peters, 2014; Trochim, Cabrera, Milstein, Gallagher, & Leischow, 2006). The reigning reductionistic assumptions drive, for example, research into essentially genetic causes of disease and pharmacological remedies to those causes, but do not provide the flexibility to tackle problems of great complexity or reciprocation such as the influence of interpersonal relationship anxiety on autoimmune inflammation, or epigenetic relationships between genes and the environment.

Reductionistic thinking in this way looks for a direct, linear relationship between two variables, such as gene X and disease Y. Sometimes X is said to cause Y as mediated through Z. Or X correlates with Y as moderated by Z. In any case, the causal relationship is sought to move in one direction, from X to Y. This type of thinking, which this study will term *linear thinking* after Macy's (1991) term *linear causality*, works well for problems of engineering but fails for problems of complexity where there are sometimes uncountable variables with incomprehensibly complex relationships.

Linear thinking cannot solve every problem, but it certainly can solve many problems as evidenced throughout the span of the industrial revolution (Frodeman, 2013). Therefore, in the search for a type of thinking that is better suited to problems of complexity it may be beneficial first to speculate as to the *function* of linear thinking in order to understand what limitations must be surpassed. After all, linear thinking is so prevalent in *homo sapiens* and our "lower" animal cousins that we seem to be hard-wired for it (Harari, 2015).

Drawing on the descriptions above, we can assume that the function of linear thinking may be to execute a single, precisely defined goal. Complexity is managed in linear thinking by executing many precisely defined goals as in the engineering of the mobile phone. Linear thinking often (or maybe always?) produces solutions conceptually organized in hierarchy, and hierarchy most visibly functions to optimize the execution of a precisely defined goal. Today hierarchy remains the most

intuitive and popular way to organize a commercial kitchen, military, or government. Though there are attempts to organize government with less hierarchy or without hierarchy such as the system of "checks and balances" in the United States, pure democracy, or pure socialism, any group will fall back on hierarchy given a crisis that is intense enough to require specialized focus and execution. Goal-directed focus then becomes quite clear; as an attendant of the opera would observe in the transition from the multi-dimensional heights of the imagination while experiencing the performance to the singular need for a toilet when nature calls; or happy reflection after the show followed by a focused search for food when the stomach growls in protest. Seen in this way, simple linear solutions to important problems prove vital to survival.

Linear thinking in modern medicine.

Linear thinking is prevalent in modern medicine where singular solutions for all sorts of ailments can at times appear magical, and hospitals and their governing agencies are organized in hierarchy to administer these solutions via specialized providers working in their appropriately divided departments. But this type of thinking and the resulting style of organization has its limitations. The complex series of events leading to the 1964 US surgeon general's report on smoking triggered wide-scale positive societal changes like increased taxation of tobacco at the state level and the Tobacco Master Settlement Agreement in (1998), but there were many unforeseen negative effects such as changes to the marketing and covert lobbying strategies from the tobacco companies (Trochim, Cabrera, Milstein, Gallagher, & Leischow, 2006). The Affordable Care Act in the United States includes a focus on "population health" as the result of "collective impact" efforts across government agencies but lacks the coordination to accomplish their goals (Kapp, Simones, DeBiasi, & Kravet, 2016). The British National Health Service (NHS) is charged with the enormously complex task of managing more than a million employees, which includes "a wider range of professions (in this case clinical, allied health and managerial) than any other sector of

activity in the UK" (Cramp & Carson, 2009, p. 71). The current model of NHS management views each profession sector of the system as a tool used to *engineer* the organization as if the professions and components were as related as bricks in a wall. The reality is of course that a change in one area can greatly affect the other, and the result is the famously ineffective NHS model.

Similarly, existing research on the transition to adulthood for youth with disabilities focuses on identifying the variables that influence the problem of healthcare transition including "health, personal and environmental factors," but does not consider the complexity of the relationships between the variables which limits and can even harm transition outcomes (Hamdani, Jetha, & Norman, 2011). Much like weather simulations, these variables can account for past data but the complexity of the problem of healthcare transition for this population makes a thoughtful effort to coordinate them for future development a separate task altogether. Ignoring the relationships between the variables through a mechanistic, atheoretical perspective can lead to unexpected consequences.

A 2014 survey of Eastern-Mediterranean health care officials (El-Jardali, Adam, Ataya, Jamal, & Jaafar) around the world revealed that costliness, political inertia, and a lack of the basic conceptual capacity in the individuals involved pose significant barriers to coordinating larger-scale, complex analysis of health care systems. A related problem was a lack of sufficient health care information systems to produce the amount of data required for more comprehensive systemic evaluation. It was concluded that change within individual agencies was not sufficient to create the large-scale effect that government health care agencies are tasked with creating, and that political endorsement would be critical in coordinating the agencies into a cohesive whole. The consensus was that current ways of problems solving are more reactive than proactive, as explained by a policy-maker from Iraq: "The current thinking depends on reactively finding solutions to health systems problems and usually the mechanisms set are unclear and imprecise" (p. 402). Another policy-maker

from Jordan reported that "Although steps [related to] evaluation are undertaken, they are mostly superficial and non-scientific" (p. 403). One effect of this kind of superficial strategy is that it often does not think all the way through the problem from interventions to effects of those interventions beyond the effects that are desired. A researcher from Palestine reported that,

> At the national level, the health plan utilized steps 1 to 4 [on the design of interventions] but not in a systematic way. Stakeholders were convened and they brainstormed; however, they did not map and conceptualize effects of the intervention in the health system [in Palestine]. They also did not apply the ST approach systematically to examine relationships across components of the health system (p. 403).

This Band-Aid style of thinking fails to evaluate the assumptions that are used in the decision-making process, and so does not consider or prepare for the wider ramifications of the interventions used.

The function and limits of linear thinking.

Linear thinking in health care is not so different from the type of thinking that fuels heated political debates on industry and the environment. The world Commission for Environment and Development (WCED) defines the term *sustainability* as "Development that meets the needs of current generations without compromising the ability of future generations to meet their needs and aspirations" (WCED, 1987, as cited by Bell & Morse, 2005, p. 409). By this definition, the idea of "sustainability" may be linked to overcoming linear thinking by looking beyond the desired immediate effects of any particular strategy and on to a wider or widest range of effects. That is to suggest that an "unsustainable" practice is one that insufficiently accounts for its effects. Whether one is pro-industry or pro-environment, a stagnating debate will remain until at least one side can escape the lure of linear thinking enough to produce evidence from multiple levels of analysis into the problems common to all sides. Industrialists and conservationists alike may benefit from a wider-scoped and longer-termed perspective on their chosen context that includes an understanding

of the relationships between their most valued resources. If a business is organized for high output but depends on high employee turnover to accomodate the associated grueling working conditions, then the management may benefit from reorganizing to eliminate the HR overhead of firing and resolving personnel conflicts by retaining more employees. If a conservationist argues the importance of protecting a forest that is also critical to maintaining the ecological stability of the region, they may choose to strengthen their argument by developing a more comprehensive understanding of the complex *ecological* relationship between the environment and the resources that the imposing industry, and they themselves, may depend on. If the function of linear thinking is to solve specific problems, is visible in the persuance of our most basic needs like hunger and safety, and is prevalent in the organization of human groups, then we may assume that we are primarily wired for linear thinking.

It has been found that people tend to evaluate situations in terms of unidirectional cause-and-effect (i.e. linear thinking) even when exposed to evidence that the situations involve variables in complex relationship with one another (White, 2008). This tendency is attributed in part to a limited capacity of the number of variables and/or relationships that human working memory can hold at once when analyzing a problem. This limitation may influence the assumptions of experimental psychology as well as laypeople by supporting quasi-experimental causal judgements, for example about the factors related to forest ecosystems and climate change (White, 2015; White, 2017). In fact, people can typically only hold two or three relationships between variables in mind at once which contributes to a sort of "naïve ecology" (White, 2008, p. 560) based on linear thinking.

If linear thinking functions to solve problems critical for survival, is limited by the capacity to handle problems of complexity, better problem-solvers are those who can move beyond linear thinking (Ying, Kang, Hiong, & Lim, 2014), and organisms tend overall to evolve toward greater complexity and adaptability (Kerr & Bowen, 1988), then it is possible to assume that moving beyond

linear thinking may be a basic evolutionary challenge. That is to say that linear thinking is necessary for survival and is built into our neorucognitive architecture but it may also be an important barrier to overcome if we are to progress toward a way of life more in line with the natural laws and environs that we, and all organisms, are subject to.

The Problem of Compartmentalization in Science and Society

A tendency of linear thinking is to isolate aspects of complex problems. As this can make complexity manageable, it can also lead to ignorance of the relationships between what is being isolated. This section will provide a philosophical look at the problem of coordination when linear, isolationist thinking dominates in solutions for problems of complexity.

The strength of reductionism is in isolating important information from information that is unimportant for the current focus of attention. A correlation which accounts for partial variance implies that an unspoken variable or variables account for the remaining variance. This haystack of unaccounted-for variance is reduced through *controlled* experiment to discover the one variable which accounts for a meaningful and reliable amount of the variance. The needle is *isolated* from the haystack, and so on. Isolation, then, is an effect of reductionism and of linear thinking. As illustrated in the above section, one weakness of pervasive isolation is poor coordination between isolated entities, whether it is in the sciences, government agencies, or the body and mind system.

Researching the self-organization of social movements, Fuchs (2006) writes that "searching for singular laws of the emergence of movements is an expression of one-dimensional, linear, and deterministic thinking" (p. 101). Instead, many interdependent factors from multiple levels must be combined to understand the overall social climate leading up to the movement. As described above, a fragmented approach to the holistic concept of "population health" in the US (Kapp, Simones, DeBiasi, & Kravet, 2016) and management of the NHS in the UK have failed to achieve stated outcomes as a result of poor coordination between both internal systems with internal systems and

internal systems with external systems. It is now common clinical knowledge that social isolation increases risk of suicide for those with suicidal ideation (Kaori, Ando, Shimodera, Yamasaki, & Usami, 2017). Bowen found in his research on the family as an emotional unit that the degree of emotional cutoff from family is one of the most reliable markers of poor differentiation of self, as it reduces the resources available to cope with crisis through emotional inflexibility in the individual (Bowen, 1978). Fragmentation or complete isolation of functional networks in the brain has been found to be a pattern in patients with schizophrenia (Nelson, Bassett, Chamchong, Bullmore, & Lim, 2017).

Specialization in science began in the early Enlightenment when certain regions of the world were found to possess special advantages for certain experiments. For example, experiments with heat were easy to come by in most populated areas, but it was not yet possible to produce colder temperatures needed for experiments that required them. After increased European interest in the Aurora Borealis (Northern Lights) during the 1710's and 1720's when a surge in solar activity made them visible in southern areas, it became apparent that northern countries had a special advantage not afforded in southern climates (Pihlaja, 2012). A debate about the very idea of scientific specialization ensued, oscillating between the old idea of science as the learning from existing knowledge (deduction) by the few and scrutinized by the church and religious authorities, all of whom were amateurs and the new idea of the accumulation of new knowledge by the specialized many who eventually became professionals. Experimentalists and observers of nature began collecting data from particular areas (literally and figuratively) of expertise and reporting back to emerging scientific organizations who would aggregate and discuss the findings. These organizations, such as the *Royal Society* in Britain and *Académie des Sciences* in France, began aggregating and publishing the work in journals, which also gave opportunity to amateurs to become known in the field (Pihlaja, 2012).

Astronomy was the first field to collectively organize scientific observation from many places around the globe. This ideal of cooperation was integral to the original idea of specialization, and drew life from the value in diversity in the sciences, not only from geographical specialties but from the sheer size of data produced through collaborative effort (Pihlaja, 2012). The French *Académie of Sciences*, precursor to the National Institute of the Sciences, has written in their *Historie:*

> . . . not only because the spirits need to enrich each other's views, but because the different Countries have different conveniences and different benefits for the sciences. The Nature reveals itself in varying ways for the various inhabitants of the World; she provides ones with objects for deliberation which others do not have, and announces herself sometimes more or less, depending on the region. (Académie des Sciences, 1733: 8-9, as cited in Pihlaja, 2012)

But the spirit of synthesis did not grow with the spirit of analysis. Nowhere is this more clearly seen than in the explosion of the field of professional physics following World War II. The number of article abstracts in *Physical Review*, an internationally published British journal founded in 1898 which aggregated abstracts from many scientific journals, grew from 4090 abstracts in 1948, to 7500 abstracts in 1949, over 10,000 in 1954, and 84,000 in 1971 before stabilizing (Kaiser, 2012). The prominent American journal *Physics Review* had to constantly update its index of subjects to keep up with the increased level of specialization throughout the 1950's. "By 1955, major fields like nuclear physics, separated into six subcategories, had been added to the list. Ten years later, nuclear physics had been carved up into thirty-five distinct subcategories, and solid-state physics into thirty-eight" (Kaiser, 2012, p. 296). Unfortunately, the unprecedented explosion and specialization did not come with a complimentary degree of coordination. Samuel Goudsmit, the editor of the *Physical Review,* explained the increased isolation of specialists in 1966,

> the journal "is no longer similar to the neighborhood grocery store where old customers get personal attention." Instead it had become "more like a supermarket where the manager is hidden in an office on the top floor. As a result, lots of things are just done by routine rather than by human judgment. (Kaiser, 2012)

In *Consilience*, E. O. Wilson (1998) writes of the compartmentalization of the sciences as an artifact of scholarship and not of nature. Our current social structure is simply not prepared to handle problems which require communication across disciplines, such as environmental policy, ethics, biology, and social science, as the disciplines are not united in a common language or set of principles through which to base a collaborative effort. Wilson writes, "Each has its own practitioners, language, modes of analysis, and standards of validation. . .There has never been a better time for collaboration between scientists and philosophers, especially where they meet in the borderlands between biology, the social sciences, and the humanities." Wilson argues that "We are approaching a new age of synthesis, when the testing of consilience is the greatest of all intellectual challenges" (pp. 11-12), and that this change will only occur when a shift is made toward the early enlightenment ideal of the synthesis knowledge.

> Win or lose, true reform will aim at the consilience of science with the social sciences and humanities in scholarship and teaching. *Every college student should be able to answer the following question: What is the relation between science and the humanities, and how is it important for human welfare?* [italics added] Every public intellectual and political leader should be able to answer that question as well. Already half the legislation coming before the United States Congress contains important scientific and technological components. Most of the issues that vex humanity daily—ethnic conflict, arms escalation, overpopulation, abortion, environment, endemic poverty, to cite several most persistently before us—cannot be solved without integrating knowledge from the natural sciences with that of the social sciences and humanities. Only fluency across the boundaries will provide a clear view of the world as it really is, not as seen through the lens of ideologies and religious dogmas or commanded by myopic response to immediate need. Yet the vast majority of our political leaders are trained exclusively in the social sciences and humanities, and have little or no knowledge of the natural sciences. The same is true of the public intellectuals, the columnists, the media interrogators, and think-tank gurus. The best of their analyses are careful and responsible, and sometimes correct, but the substantive base of their wisdom is fragmented and lopsided. (Wilson, 1998, p. 13)

In his writing on systems philosophy, Erwin Laszlo (1971/2003) argued for the return of philosophy to the most important problems of the day, in that philosophy has lost its grounding in substantive questions about nature and the sciences through increased specialization of science:

"Lest philosophers analyze themselves out of philosophy, a return must be effected to synthesis. . . . Synthesis can mean the conjoining various sets of non-philosophically researched data, to furnish new avenues toward the constructive discussion of substantive philosophical issues" (p. 55). Frodeman (2013) writes "The institutional status of philosophy—e.g., its functioning as a discipline—was the great blind spot of twentieth (and now twenty-first) century philosophy. This is part of what has led philosophy, potentially the most relevant of subjects, to become a synonym for irrelevance" (p. 1918). It is uncoordinated specialization which detracts from the meaning-making which can occur through synthesis. Laszlo suggests that reductionism is the new nihilism. People need to feel as though they have a purpose, as though their existence plays some role in the big picture. Laszlo (1971/2003) writes,

> In earlier epochs they were guided by synthetic modes of thought which rested in part on faith and imagination; but the great myths of former ages and the religions of our immediate heritage have lost their cogency to millions. According to "ideologues," they are capable of being replaced by action-oriented ideologies, like Nazism and Communism, which present a total world-view with explicit directives for action. (p. 112)

Laszlo argues that the obsession with analysis and subsequent loss of meaning partially accounts for the surging popularity of "Eastern sacred texts, astrology, reincarnation, states of consciousness, and the like" (p. 112). Thus, science, the humanities, and spirituality are intimate bedfellows through the common "demand to 'see things whole'" (Laszlo, 1971/2003, p. 112). "All this requires the resuscitation of a mode of rational and systematic thinking which has fallen into disrepute through overinsistence on detailed investigation and specialization" (Laszlo, 1971/2003, p. 113).

This dilemma was as alive in the 19th century as it is today, when Nietzsche (1886, as cited in Frodeman, 2013) wrote,

> The dangers for a philosopher's development are indeed so manifold today that one may doubt whether this fruit can still ripen at all. The scope and the tower-building of the sciences has grown to be enormous, and with this the probability that the philosopher grows weary while still learning or allows himself to be detained

> somewhere to become a 'specialist':–so he never attains his proper level, the height for a comprehensive look, for looking around, for looking down. Or he attains it too late, when his best time and strength are spent—or impaired, coarsened, degenerated, so that his overall value judgment does not mean much anymore. It may be precisely the sensitivity of his intellectual conscience that leads him to delay somewhere along the way and to be late: he is afraid of the seduction to become a dilettante… (Nietzsche 1886, p. 134)

"The world has problems, but universities have departments" (Brewer, 1999, p. 328, as cited in Cronin, 2008). All propose the solution of philosophy's return as a binding force in the application of science to human life. "Philosophers need to get out of the study, and into the field," Frodeman writes, (2013, p. 1918), and begin to combine the fruits of analytical science for the good of human life. Wilson believes that the thinkers of the enlightenment "got it mostly right the first time" assuming a "unity of knowledge" (Wilson, 1998, p. 8) as in Sir Francis Bacon's utopian *Solomon's House*, a loom weaving together the threads of knowledge contributed by different scholars of different problems (Pihlaja, 2012).

That early Enlightenment ideal resulted in an explosion of curiosity about the natural world that became "the West's greatest contribution to civilization" (Wilson, 1998, p. 14). The result of an effected synthesis could be an evolutionary leap for science's ability to handle the pressing problems of today. If reductionism implies *atomism*, then the above may appear a case for its opposite, *holism*. But holism in itself, which holds the entire problem in view providing the opportunity for properties of the whole not evident in the parts to emerge, is still a branch too far from the trunk (Bunge, 1977). Barring claims of omniscience from sages of the ancient past, no human possesses nor can make use of all there is to know of the natural world. And yet, progress in all forms can be well informed by the thoughtful coordination of diverse minds and abilities. Analysis and synthesis have their places, and yet some kind of integration is required. A way of thinking is needed that can simultaneously account for the part as well as the whole. This way of thinking would move freely between synthesis and analysis, and possibly go beyond synthesis and analysis.

Challenges to Psychology as a Science

This section will address how poor differentiation between popular psychological research paradigms leads to tension between them. Particular attention will be paid to the disparity between the call for evidence-based practices in mainstream professional psychology with the popularity of constructivist clinical theory, which reflects the long-standing gap between the human sciences and the natural sciences. The section concludes suggesting that if psychology is to move toward an accepted science of human behavior then theory is needed which can account for and predict problems of complexity in the human condition.

Research paradigms in psychology.

The philosophy of the Enlightenment was *positivistic,* which assumes an objective reality which can be accurately known through controlled experiment. A positivist experimenter looks for empirical evidence which confirms a hypothesis and assumes that the experiment is an accurate representation of reality (Kazdin, 2016). *Postpositivism* augmented positivism acknowledging and attempting to limit the bias and/or influence of the researcher or experiment, something which is particularly important in the social sciences. Karl Popper's criterion of *falsification*, that a theory is only scientific if it is possible to disprove it, originated as a critique of Freud, Adler, and Marx's theories. Popper proposed these theories fail the test of falsification and so are no closer to science than myth (Popper, 1963/2002).

A postpositivist experimenter would conduct a positivist experiment but clearly state known biases and limitations and endorse a result as agreed by multiple raters or a double-blind to minimize experimenter bias. The goal of experimentation in postpositivism is, as Richard Feynman (1985) put it, "bending over backwards to show how you are maybe wrong" (p. 313). Positivism and postpositivism are most concisely differentiated by verification and falsification, respectively (Ponterotto, 2005). "Whereas a million white swans can never establish, with complete confidence,

the proposition that all swans are white, one black swan can completely falsify it" (Guba & Lincoln, 1994, p. 107). If the strength of the positivistic paradigm is the incremental accumulation of knowledge through verification of analytical questions, a weakness can be in increasing understanding when specific questions are not yet available particularly for individual differences within a sample.

Many clinicians formulate treatment around *constructivist* theories. Constructivist, and, later, *critical* theories assume that there is not one objective truth but many truths as defined by (i.e. constructed through) the subjective experience of each individual (Ponterotto, 2005). Constructivist approaches increase understanding of a problem by opening the door to new and unexpected information, i.e. "there is no wrong answer." For example, this attitude of curiosity is useful for exploring the feelings, phantasies, and associations of a patient, or to expose the lived experience of an underprivileged group (Ponterotto, 2005). If a strength of this approach is in increasing understanding of a subject where no specific question has yet been posed, a weakness may be in the erosion of reliable knowledge in extreme cases due to the rejection of the anchor of objectivity which prevents falsification. Constructivism alone cannot produce testable theories which by definition are postpositivist, and problems arise when claims of objective validity are made within this paradigm. Popper, once enamored with Freudian theory, was careful to highlight the usefulness and plausibility of Freud's ideas in his critique: "This [failure of the falsifiability criterion] does not mean that Freud and Adler were not seeing certain things correctly: I personally do not doubt that much of what they say is of considerable importance, and may well play its part one day in a psychological science which is testable" (Popper, 1963/2002, p. 49). Freud himself was clear about the importance of refuting or replacing his provisional concepts as appropriate to future evidence. Freud (1915) writes,

> It is only after more thorough investigation of the field of observation that we are able to formulate its basic scientific concepts with increased precision, and progressively so to modify them that they become serviceable and consistent over a wide area. Then, indeed, the time may have come to confine them in definitions. The advance of knowledge, however, does not tolerate any rigidity even in definitions. Physics furnishes an excellent illustration of the way in which even 'basic concepts' that have been established in the form of definitions are constantly being altered in their content." (p. 116).

According to Popper, the only thing that Freud (and Adler's) theory confirmed was "that a case could be interpreted in the light of the theory" (Popper, 1963/2002). Every subsequent instance of confirmation simply added to the impression that the theory was correct. There now exists a plethora of theoretical schools derived from Freud's "science" which, while intuitively logical and supported by confirming evidence in therapy, use concepts and language specific to their own theoretical formulation and lack an objective basis to organize critique between them. Zepf (2010) laments in the *Journal of The American Academy of Psychoanalysis and Dynamic Psychiatry*, "The theoretical and technical-therapeutic conceptualizations of, for instance, self-psychologists, object-relationists, attachment theorists, intersubjectivists, Lacanians, social-constructivists, Kohutians, neo-, post- and contemporary Kleinians, ego-psychologists, orthodox and so-called post-Freudians contradict one another to a considerable extent" (p. 463). The problem surfaces again in the question of requirements for psychoanalytic training instructors, where "every training analyst teaches either his or her interpretation of a concept he or she values for whatever reasons, or, as is mostly the case, his or her personal, eclectic selection of concepts taken from different theories" (p. 465). This sort of critique apathy, possibly facilitated by constructivist views in psychological theory, has created a situation where each theory is seen as "equally valid despite the contradictions between them" (p. 466) and the meaning of theoretical concepts become more a matter of opinion of the analyst than postpositivist science based on evidence.

Differentiation of research paradigms.

While each paradigm likely has its own part to play in the grand scheme of science, problems arise when research conducted in one or a mix of these paradigms lay claim to the same title of "science." reinforce their allegiance through the publication of scientific journals which define the paradigm, yet make use of definitions of basic research terms which are incompatible with other paradigms which also claim to be scientific.

One recent and humorous incident illustrates the problem of claiming scientific validity in the constructivist paradigm. Lindsay & Boyle (Lindsay & Boyle, 2017) produced an article using language and terms common to postmodern and femenist jounrals, but developed the theoretical concepts from their own imagination. The article, which was authored specifically without researching the theories it referenced and included many openly contradictory sentances, managed to be published in the journal *Cogent Social Sciences*, a "fully peer-reviewed, open access journal" (Cogent Social Sciences, 2017). The authors claimed to have been inspired by an even earlier hoax where Alan Sokal submitted an article to the journal *Social Text* in 1996 (Sokal, 2018).

Nevertheless, systematic research of subjective experience within the constructivist paradigm may contribute to postpositivist hypothesis generation or may simply add to a relativist canon of historical record bereft of inductive inference. Other constructivist psychological philosophies such as critical psychology may not claim to contribute to knowledge where the goal of research is to affect the individual or group more than it is to observe it (Ponterotto, 2005).

Poor differentiation between research paradigms in psychology may contribute to polarization between professional and research psychologists, as clinical theory exists in the constructivist paradigm while policy and funding is governed by bodies within the postpositive paradigm. As of this writing, the American Psychological Association (APA) defines *psychology* in the *Glossary of Psychological Terms* as "the scientific study of the behavior of individuals and their mental

processes", and then defines *science* as "the set of procedures used for gathering and interpreting objective information in a way that minimizes error and yields dependable generalizations" (APA, 2017). The terms *objective information* and *minimizes error* bound the APA's philosophy of science squarely within the postpositivist paradigm, which accepts the importance of qualitative research but implicitly limits constructivist philosophies to service in the hypothesis-generating phase of the postpositivist pipeline. The APA requires *evidence based practices* (EBP) to be the mainstay of clinical training and treatment, defining *evidence* as,

> . . .derived from clinically relevant research on psychological practices . . . based on systematic reviews, reasonable effect sizes, statistical and clinical significance, and a body of supporting evidence. The validity of conclusions from research on interventions is based on a general progression from clinical observation through systematic reviews of randomized clinical trials, while also recognizing gaps and limitations in the existing literature and its applicability to the specific case at hand. (APA, 2017)

The APA limits subjective opinion to the role of "clinical expertise" in the context of scientific evidence and leaves the door open to working around the limits of positivistic science. In 2006, the *APA Presidential Task Force on Evidence-Based Practice* issued a report stating that "Researchers and practitioners should join together to ensure that the research available on psychological practice is both clinically relevant and internally valid. It is important not to assume that interventions that have not yet been studied in controlled trials are ineffective" (APA, 2006, p. 275). This flexibility requires continual pressure from the research *and* clinical communities to refine what is considered evidence based to be both valid and relevant to clinical practice and the human condition. Based on the current stance of the APA on evidence as objective data, this pressure should include questioning of the philosophical assumptions that underline clinical theory and the consequences of untestability stemming from them.

One source of the conflation of research paradigms in psychology is the *Diagnostic and Statistical Manual of Mental Disorders*, (American Psychiatric Association, 2013) (DSM-V), now in its 5th

edition. The DSM-V provides a descriptive nosology for mental disorders after the fashion of the medical field but provides no etiological theory to explain their relationships or guide research. The introductory chapter of the DSM-V describes the emphasis on statistical reliability of the criteria in place since the 3rd edition and how this emphasis continues today in the 5th edition. However, since the publishing of its predecessor in 1844, the diagnoses contained in the DSM have been derived from the analysis, however rigorous, of *consensus* among clinicians and comparison of those agreements to patient self-report (APA, 2017). This process (promoted as an exhaustively rigorous example of positivistic science) can only speak to the development of reliable opinions and cannot claim to represent objective empirical data found in nature. Further, the DSM is far from generating reliable differential diagnoses with the precision common to biological medicine, probably due to significant symptomatic overlap between diagnostic criteria. From the introductory chapter in the DSM-V,

> The results of numerous studies of comorbidity and disease transmission in families, including twin studies and molecular genetic studies, make strong arguments for what many astute clinicians have long observed: the boundaries between many disorder "categories" are more fluid over the life course than DSM-IV recognized, and many symptoms assigned to a single disorder may occur, at varying levels of severity, in many other disorders. . . In short, we have come to recognize that the boundaries between disorders are more porous than originally perceived. (pp. 5-6)

It is possible that diagnoses appear so "porous" because of a lack of etiology, however provisional, to the purely descriptive criteria provided in the manual. This lack of etiology led National Institute of Mental Health (NIMH), currently world's largest funding agency for research into mental health, to issue a strong blow to the DSM by withdrawing funding for research based purely on DSM diagnoses. The NIMH (2013) described its reasons for the decision a few days before the DSM-V was published,

> The weakness is its lack of validity. Unlike our definitions of ischemic heart disease, lymphoma, or AIDS, the DSM diagnoses are based on a consensus about clusters of clinical symptoms, not any objective laboratory measure. In the rest of medicine, this

> would be equivalent to creating diagnostic systems based on the nature of chest pain or the quality of fever.

Perhaps more alarming is the rather extensive technical introduction in the DSM-V written to promote the scientific validity of the manual with no mention of its obvious scientific shortcomings. If the American Psychological Association is to endorse the DSM as "the standard classification of mental disorders" (APA, 2017), then there is much progress to be made toward psychology as a science.

In the same statement announcing the withdrawal of funding for DSM research, NIMH announced their exclusive support for their own Research Domain Criteria (RDoC), an alternative research framework intended to produce diagnostic criteria based on biology. Though commentary on the still-new RDoC is scarce, critics (Kaplan, 2016; Weinberger, Glick, & Donald, 2015) suggest that "overinvestment" of resources into RDoC model precedes the development of well-defined categories backed by scientific evidence showing that they improve the wellbeing of patients. Weinberger et al. write that though RDoC may improve on the problem of validity in the DSM-V and provide a much-needed framework for research, it: 1) contains physiological dimensions developed by researchers without clinical experience and with no empirical evidence to support them, 2) "does not recognize the implications for categorization incurred by the unexpected discoveries of psychopharmacologic treatment" (pp. 1162-3), 3) uses a dimensional model which does not allow the distinguishing of wellness VS illness, and 4) cannot provide an explanation of how a patient gets sick and then gets better in order to guide and assess treatment. RDoC is also a strictly atheoretical reductionist model which ignores the possibility of symptoms arising as emergent properties, which may have been a strength of the black-box holistic approach of the DSM. Others argue that NIMH should not exclusively limit funding to research designed around the RDoC.

If psychology as the study of human behavior is to become an accepted science in the postpositivist realm, then there is a need for theories which generate testable clinical hypothesis which put predictive theory to the test. There is also a need for theoretical concepts which are communicable with other scientific disciplines (Wilson, 1998). For example, a clinical psychologist who uses object relations theory will have difficulty drawing from or contributing to evolutionary biology research to refine that theory, as an "object" (Winnicott, 1969) is a subjective concept that does not translate easily and intact to the objective realm.

A major challenge to psychology as a science is to move beyond reductionism into a paradigm which can account for problems of complexity. There must also be theory which distinguishes wellness from illness beyond the presence of isolated reductionistic physiological markers as defined in RDoC. Attachment theory is one example of a step in the direction of explaining behavioral problems based on reciprocal interaction between the child and caregiver. This represents a step beyond linear thinking akin to cybernetic theory, but maintains a cause-and-effect relationship between the caregiver and child's attachment styles which represents a move back to linear thinking (Dallos, Lakus, Cahart, & McKenzie, 2016; Ross, Hinshaw, & Murdock, 2016). Attachment theory does not yet account for varying attachment styles among siblings with the same primary caregiver attachment. While the descriptive concept of *self-state* may account for some complexity and dynamism in individual's behavior, this concept is not currently defined well enough to generate testable hypotheses. As was the case with meteorological variables in the weather prediction described the earlier section on complexity in science, descriptive concepts like self-states may account for past data but do not provide a pathway to theory which can predict future data. One solution would be to research the effects of the primary caregiver's relationships with other members in the family as a complex system.

Challenges to the Study of Vipassanā Meditation

We turn now to a review of the relationship between vipassanā meditation and postpositive psychology. The preceding sections represent a rather broad philosophical discussion to show that the major challenges facing psychology as a science of human behavior are not only technical but pertain to the paradigmatic assumptions of reductionistic science in general. Some of these challenges may, in turn, limit the potential for vipassanā meditation to contribute to the study of human behavior and might be overcome through a shift from a reductionistic paradigm to a natural systems paradigm. This hypothesis assumes that vipassanā has something to do with knowledge or a framework for obtaining of knowledge that may be organizable within the paradigm of systems philosophy. If supported, the most direct outcome of this effort would be differentiating what is science from what is religion in vipassanā, if any such distinction were found. An indirect outcome of this goal would be examining the potential for the historical Buddha to have produced a theory of human behavior, the understanding of which necessitates knowledge of universal laws and patterns of organization that govern the rest of our environment much like the goals of systems philosophy in general.

Confusion of traditions and conflation of technical terms.

In *The New Buddhism*, Coleman (2001) reviews the dramatic transformation occurring within ethnic Buddhist traditions as they transmigrate into the Western scientific worldview. Progressive Western perspectives on science and spirituality challenge stagnating conservative traditions, while the rapid and often superficial assimilation of ancient structures threatens the richness of millennia of evolution. It has now been 2500 years since the life of the Buddha, and the staggering number and variation of the traditions that have evolved from the singular achievement of this figure poses a challenge for historical scholarship. The Buddha himself made statements in line with Max Weber's (as cited in Coleman, 2001) assertion: "Once any charismatic religious teacher dies, the message must be 'routined' if it is to continue," and that there is a degree of erosion inherent in this

routinization. Religious figures who inspire a new way of thinking possess a unique mix of qualities which enable them to see through the homogeneity of the time but also create the likelihood that their followers may not possess the ability to maintain the message or principles at the same level. Further, the varying opinions, perspectives, and accumulative contributions of the founder's followers and their cultural contexts influence the teaching over time.

What sets the Buddha's discovery apart from religious traditions is the comprehensive step-by-step instructions for replicating his discovery (Goenka, 2015; Vipassana Research Institute, 2014), followed by an appeal for each meditator to strive to prove him wrong (Hart, 1987). This particular topic will be covered in detail in the subsequent chapter on vipassanā meditation. This crucial aspect of the teaching suggests that the vipassanā rests squarely within the postpositive scientific paradigm. At the same time, all traditions hold that a Buddha's ability to teach his discovery is so rare that the knowledge generated by it will slowly erode as a function of his students' lesser capacity to comprehend and transmit it. This is because a Buddha is defined as a normal living being who has developed a profoundly rare mixture of talent and commitment to the care of all beings. Buddhas are so rare that only one is said to exist in the world at a time and the time between them is immeasurable (Bodhi, 2013). The rare mixture of qualities enables this living being to rediscover the *dhamma* (Sanskrit: dharma), or universal "law of nature" (Hart, 1987), through profoundly rigorous experiment and without the aid of a teacher. It is precisely this unaided rediscovery of the dhamma that makes an otherwise ordinary living being a *samāsambuddha*, or perfect Buddha (Bodhi, 2013). In contrast to religious traditions, this designation is not meant to elevate the Buddha to a divine status outside the realm of science and everyday life. There have been and will be many Buddhas who emerge as a function of a set of fluctuating natural conditions just as the global water supply is in a constant flux between states of evaporation into clouds and condensation into rain.

All Buddhas teach the same message: the nature of suffering and the way out of suffering. However, because of a Buddha's rare perfection, that message is the most "pure" when given by the original teacher and slowly loses its purity as the Buddha's followers do their best to preserve the teaching. In the earliest known traditions, this erosion is said to occur in part through the creation of sects which provide status to members of each sect, the introduction of rights, rituals, and blind belief, etc. Any of these conditions may contribute to the concept of Buddhism or the dhamma as an "organized religion" (Goenka, 1987/2012, p. 57).

Now, within the preceding statement, we already face a bifurcation in traditional conceptions of what these teachings are and one of the most important challenges for relating these teachings to Western scientific tradition. Shortly following the Buddha's death, a large gathering of his most devoted students, known as *the sangha*, gathered to record the entirety of his sermons before they were lost from memory. This gathering is known as the *First Buddhist Council*. About seventy years later, the sangha gathered again to discuss the rules of monastic conduct and the first major philosophical schism formed among the Buddha's followers. Conservatives (the remnants of which are today called the *Theravada,* or Teaching of the Elders, who base their teachings on Pāli suttas) represented a simple step-by-step teaching with concrete concepts and emphasis on individual rigor for the good of all beings. Reformists (the remnants of which are today called the *Mahāyāna,* or Great Vehicle, which base their teachings on the Sanskrit sutras) promoted an explicitly cosmological perspective on the teachings with an emphasis on a special relationship between student and teacher (Bodhi, 2013). Both factions agreed that the Buddha taught the same method (known as *satipaṭṭhāna,* which comprises the theoretical basis for vipassanā meditation) that he used to attain enlightenment, but that he obtained a more "perfect" enlightenment due to his following a much longer and profoundly rigorous path than any one of his followers. This longer path is known as the path of the *bodhisatta* (Sanskrit: bodhisattva), and the schism remains rooted in the Mahāyāna's

express denunciation of the classical, individual path of vipassanā as a "lesser" path. Today there are many dispensations of the Buddha's teachings in the Mahāyāna tradition, the more notable being the Japanese tradition of *Zen*, and the Tibetan tradition of *Vajrayāna*, or *Diamond Vehicle*.

At the surface level most or all traditions share the same concepts. However, deeper inquiry reveales numerous traditions carrying the Buddhist label who promote concepts and pedagogies that may be antithetical to another tradition also claiming to be Buddhist. The consequences of both popular and academic literature ignoring subtle traditional differences are a weak conception of what the Buddha taught (Rahula, 1974), what the practical implications for these differences are, and how to handle contradictory definitions for technical terms in related research. Thus, the challenge for any substantive philosophical study in this domain is to define which tradition is examined and for what purpose. This is a most challenging task due to the difficulty in differentiating between the major traditions based on knowledge gained from popular and scientific literature.

One barrier to this effort is in differentiating what is science from what is religion in Buddhist writings. One tradition, such as Mahāyāna Shin Buddhism, may use the term "Buddhist religion" (Andreasen, 1998) while another such as the vipassanā tradition of S. N. Goenka may stand quite specifically against using the terms "Buddhist" and "religion" when referring to their own practical frameworks (Hart, 1987). Both these traditions attribute to the same historical figure. Modern historians tend to attribute the terms Buddhism and Buddhist to a cultural projection onto the group of philosophical traditions by Western scholars who are used to discussing spirituality and metaphysics in terms of organized religion (Coleman, 2001). Some authors will go to great lengths to point out a Buddhist religion does not exist in any form in any tradition. Germer (2013) writes,

> It cannot be overemphasized that Buddhist psychology is not a religion in the familiar, theistic sense, although Buddhists in some Eastern cultures worship the Buddha's teachings and image. The historical Buddha (563-483 B.C.E.) is understood to have been a human being, not a god, and his life's work was dedicated to alleviating psychological suffering. (p. 14)

Indeed, the deeper one's experience becomes in any one tradition, the more complex and subtle the concepts become, and the harder one has to work to differentiate a scientific concept from a religious concept. On deeper investigation, a lay meditator may find that these begin to relate to each other as incommensurate paradigms. However, while technical incompatibilities exist, all traditions do share a common thread: a practical, pragmatic framework with a clear, logical formulations; the priority of personal experience over doctrine or another's opinion, including that of the Buddha himself; the sole aim of practice and learning is the relief of suffering in all beings.

There are stories from the Buddha's life which locate his teachings within the objective realm and apart from the realm of religious belief system. The following story of two earthen pots is one such example. A young man who was suffering from the death of his father came to the Buddha asking him to perform a ritual so that his father could gain access to heaven. The Buddha could see that the young man was too agitated to accept a logical explanation of his teaching and so he asked him to gather two earthen pots, one filled with butter and the other with pebbles. After the young man had done so, the Buddha asked him to place the pots in the river and break them with a long stick. The Buddha then asked him to call his priests and have them pray for the stones to rise to the surface of the water as the butter did. When the boy protested at the illogical task, the Buddha explained to the boy that while he understood the reliability of the law of nature, he did not apply the same knowledge to one and all. The Buddha said that there was nothing he could do for his father; If his father performed actions like pebbles, he will go down like pebbles. If he performed actions like butter he would go up like butter (Goenka, 2008).

This logical, pragmatic formulation of the teachings along with the rather postpositivist appeal for each meditator to validate the discovery for oneself is a message apart from the systems of dogmatic religious faith. Confusing this empirical message with the function of belief in religion (Deegalle, 2017; Hackley & Hackley, 2015; Moore, 2017; Trammel, 2015) poses an obvious

opinion/fact conundrum for experimentation. If a framework does not include a system for objective verification, then the framework exists within a dogmatic or belief-based domain and cannot be compared with similar frameworks on general terms. This conundrum is similar to that facing clinical theories derived from Freud's psychology (Zepf, 2010), which Popper (1963/2002) would place on the same level as myth or religious belief.

The following example can illustrate one way to demarcate these scientific and religious realms. All major religions include an ethical system which revolves around a common set of concepts such as abstaining from killing, stealing, lying, inappropriate sexual conduct, etc. However, the foundation for moral conduct (*sila*) taught by the Buddha is not taught as a divine mandate but as an integral and pragmatic component to developing the profound level of *samadhi* (concentration; unbroken attention on a needle-sized area of focus as it systematically moves through the entire body, part by part) required to support the development of *paññ*a (wisdom; the rigorous examination of the entire physical and mental structure). *Paññ*a is the essential component for understanding the nature of suffering as it applies to that physical and mental structure (Goenka, 2015). Though developing even the most preliminary level of progress in the field of samadhi requires multiple days of sustained practice in a controlled environment, all effort goes to waste without first obstaining from the various amoral activities that steal one's attention and cause more agitation in the mind. In a nutshell, one simply can't concentrate when the conscience is screaming for attention.

Sila, samadhi, and paññ*a* form the inseparable tripartite core of the practical teaching of the Buddha (Polanski, 2015). Religions often enforce ethical frameworks with similar rules but outside of the context of a precisely defined cause-and-effect relationship with other parts of their belief system. The exclusion of a precise causal relationship between ethical conduct and other facets of the belief system opens the possibility for individuals to exclude ethical conduct from the overall framework, or to create their own explanations and/or assumptions about the role of that ethical

conduct. If the Buddha's teachings are conceived as a religion in this way, it is easier to disseminate the practices for developing samadhi and pañña without sila as is the case with modern mindfulness-informed therapies such as Mindfulness-based Stress Reduction (MBSR), Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), etc. The same argument can be made for teaching sila and samadhi without pañña as was the case prior to the Buddha's crucial discovery (Goenka, 1987/2012), or with sila and pañña without samadhi, as is often the case in popularized forms of vipassanā taught in shorter length meditation courses today.

In academic research, differentiating between various dispensations of the Buddha's teachings is as crucial as differentiating between the Buddha's teachings and organized religious teachings. The Tibetan traditions, known as *Vajrayāna,* or the Diamond Vehicle, mix Mahāyāna Buddhism with the later Indian spiritual framework known as *tantra* (Patrul Rinpoche, 1998). Tibetans practice mental visualization and the vibratory power of spoken mantra where Theravadin eschew practices which deviate from bear observation of involuntary experience (e.g., bodily sensation generated without the intention of the observer). This practical conflict poses a challenge related to the paradigmatic conceptions of observer bias for a researcher attempting to relate the practice to a particular objective metric. Further, the Pāli Canon, the scriptural product of the First Buddhist Council and essential record of the Buddha's own words (Nānamoli, 1992), contains statements declaring never to mix any practice with vipassanā. This statement would stand in conflict with the use of tantra in Tibetan Buddhism, and mantra in Tibetan and other Mahāyāna Buddhist traditions, and even the use of psychotherapy or acupuncture for vipassanā meditators at certain levels.

All Mahāyāna traditions teach an exclusive collection of sutras (sermons in the oral tradition later recorded in Sanskrit) given by the Buddha but not necessarily attributed to his lifetime (Williams, 2009). These sutras are said to have been "revealed" at a later time as an effect of his

attainment similar to an echo on a stone wall. Rigorous theoretical examination reveals this suggestion to be entirely plausible within the theoretical boundaries of all traditions but stands at odds with the widely-accepted declaration in the Pāli Canon that the entirety of the teaching is simple and that there are no secret teachings.

Zen traditions contain practices based on passive observation of involuntary phenomena which resemble the conservative Theravadin empirical philosophy, but which also incorporate other practices aimed at the use of logic and the intellect apart from bear observation which conflict with Theravadin bear observation. The Tibetans, Zen, and countless other Mahāyāna traditions typically perform rites and rituals: bowing in reverence to the Buddha to counting mantra repetitions using mantra beads; reserving secret teachings for advanced meditators; or the use of icons of the Buddha or other ethnic deities which are explicitly forbidden as corruptive to the supposed "purity" of the empirical framework taught by the conservative traditions. His Holiness the 14th Dalai Lama of Tibet is a uniquely gifted figure who often promotes a wonderfully evolved relationship between science and religion (Dalai Lama, 2005). However, it is not uncommon for him to use the umbrella term "Buddhist" to refer to exclusive Tibetan practices that are not only antithetical to Theravadin practices but taught by the Theravada to be counterproductive to the relief of suffering.

All traditions agree that the bodhisatta (Mahāyāna) path is the higher path aimed at delaying the attainment of enlightenment. However, the Theravada reserve that path for the profoundly rare and exceptional meditator to find on their own while the stated goal of the Mahāyāna is to teach the higher path directly to all students (Bodhi, 2013). The Theravada teach that a meditator must work for their own salvation to assist in the salvation of others ("you can't help others until you first help yourself") and that those with a propensity for the bodhisatta path will gravitate naturally toward it. In contrast, Mahāyāna traditions claim that this classical view is by definition short-sighted and selfish and that the higher path should be taught directly and from the cosmological perspective of

enlightenment using terminology that is more difficult to grasp for the lay student. The Theravada, in turn, emphasize personal experience through empirical investigation and tend to avoid "giving away" deeper discoveries to students who have yet to experience them for themselves. Further, the Tibetan Mahāyāna teach that a student who completes the path of vipassanā (this person would be known as an *arhat* (pāli: *arahant*), or liberated person) for their own salvation will become frozen in a particular *loka* (world, or "plane") for eons until a perfect Buddha taps them on the head and wakes them to return to the higher path. It is not hard to see the stark contrast in the perspectives of different Buddhist traditions and the likeness of the language in some traditions to the language of a religious belief system.

Similar to differing research methods among scientific paradigms, philosophical incompatibilities among these traditions generate vast practical and paradigmatic differences (Bodhi, 2013). These differences revolve around teaching style and the choice (and interpretation) of one of the four objects of contemplation in the core teaching of satipatthana: body; sensations in the body; mind; thoughts in the mind (Anālayo, 2003). Just as in science, these philosophical positions provide different aspects from which to view what appears to be a common domain of knowledge, at least on the surface. These differences provide an array of choices more or less appropriate to a student's preferred learning style. Thus, the purpose of this brief critique is not to make a case for one tradition over another but to point out the potential consequences of conflating their technical and philosophical aspects in the pursuit of differentiating science from religion in the teachings. All the major traditions have produced exceptional individuals: Webu Sayadaw in the Theravada tradition (U Ba Khin, 2012), Thich Nhat Hanh in the Zen Mahāyāna tradition, and His Holiness the Dalai Lama in the Tibetan Mahāyāna tradition, to name a few. Each of these figures has contributed immeasurability to the quality of life around the world by making the discovery of this historical figure more accessible to lay people. However, conflating the unique strengths and weaknesses of

different traditional modalities of practice in the literature confuses and misrepresents traditional technical terms which in turn limits the potential for the Western scientific community to reap the benefits of the unique strengths of any one tradition. This study aims to address this problem by producing a theoretical formulation that sufficiently reviews any dependence on a specific traditional context (the classical, pre-sectarian view) as well as incompatibilities within another traditional context (the reformist, Mahāyāna view and possibly also the sectarian Theravadin view).

Differentiation of traditions in clinical literature.

The weak distinction between traditions is as present in the contemporary scientific literature as it is in popular literature. One experiment may use a randomized trial to measure the effect of a "Buddhist walking meditation" on a quantitative biological metric (Gainey, Himathongkam, Tanaka, & Suksom, 2016) which directly contradicts the teaching that gross body movements conflict with the necessity of remaining still in seated position to reach the higher stages of insight during the most common and essential practice of satipaṭṭhāna as taught by some traditions (Goenka, 2015). Another experiment measuring the effect of John Kabat-Zinn's Mindfulness-Based Stress Reduction (MBSR) training on relationship variables (Gillespe, Davey, & Flemke, 2015) may describe MBSR as a "Buddhist" meditation when in fact the MBSR framework goes against warnings in most Buddhist traditions against engaging their practices for the relief of a symptom or syndrome as opposed to a deeper understanding of the nature of all symptoms (Hart, 1987). These traditions teach that practicing vipassanā will probably affect a change in the symptom for the short term but will ignore the broader systemic context of the symptom and other symptoms.

At a superficial level, there is a conflation of a very large set of traditional practices in most RCT experiments (Melloni, et al., 2013) which control for "meditation" as an independent variable while actually controlling for only one technique among the countless techniques or modern clinical interventions originating either within or apart from any Buddhist tradition. Different meditation

techniques can have widely different purposes, side effects, and actual outcomes, and distinguishing a traditional (or modern) technical context can avoid drawing incorrect conclusions about experimental results.

Limitations to vipassanā as a psychological intervention.

Some researchers are aware of these problems and work to make them known. A common thread between this cohort seems to be the maintenance of a devoted personal practice contributing to the clarification of unique features within their tradition or the dangers of conflating technical terms between traditions. Also, a few articles (Chiesa, 2012; David, 2014; Dimidjian & Linehan, 2003; Gardner, Moore, & Marks, 2014; Lee, 2017) will address the need for better-operationalized constructs in research and might also propose a new experimental model, typically with regards to mindfulness interventions. John Kabot-Zinn (1998) has probably made the largest contribution to this effort by producing Mindfulness-Based Stress Reduction Framework (MBSR) which includes standardized techniques and an eight-week certification program for coaches. Early conventional (Kabat-Zinn, Lipworth, & Burney, 1985) and longitudinal (Miller, Fletcher, & Kabat-Zinn, 1995) statistical support behind this simple and cost-effective treatment modality have made the term *mindfulness* both a clinical and household term. Kabat-Zinn has considerable training in traditional Buddhist practices having trained with well-known Zen-Buddhist teachers such as Thich Nhat Hanh and Seungsahn (Wilson, 2014). His work to develop the MBSR program represents a unique formulation of ancient mindfulness practices while maintaining some degree of compatibility with his own traditional context, which is no simple task. The MBSR has made the most superficial benefits of the Buddha's teaching of the cessation of suffering accessible to the average person and put the concept of mindfulness into popular awareness.

Nevertheless, researchers (Lee, 2017; Nilsson, 2013; Polanski, 2015; Zeng, Oei, & Lui, 2014) including Kabat-Zinn himself (Kabat-Zinn, 2003) remain cautious about problems associated with

removing such techniques from their traditional context and altering them to fit the scientific paradigm. Kabat-Zinn askes, "Is there potential for something priceless to be lost through secular applications of aspects of a larger culture which has a long and venerable, dare we say, sacred tradition of its own?" (Williams & Kabat-Zinn, 2011, p. 4). We answer with an affirmative "yes."

Zeng (2015) is concerned with the potential for conflation of technical terms such as *awareness*, *attention*, and *equanimity* which have subtle but precise meanings in relation to the goals of the traditional practice of vipassanā as taught by S. N. Goenka: "Equanimity without awareness only solves superficial problems while ignoring deeper ones, and high awareness without equanimity causes even more suffering because it makes people more sensitive to pain" (pp. 1699-1700). While both ACT and DBT support the novel third-wave philosophy of developing the capacity to observe and "let go" (Kabat-Zinn, 2003, p. 148) of troubling thoughts and symptoms as symptoms instead of reality, neither makes the crucial link between these adverse experiences and bodily sensations. MBSR and Mindfulness-Based Cognitive Therapy (MCBT) incorporate observation of the body particularly when treating chronic pain, but do not go so far as to include the development of the faculty to feel "subtle bodily sensations" (Zeng, Oei, & Lui, 2014, p. 1694) vital to developing an understanding of the broader systemic relationships between a symptom and dynamic processes in the rest of the body. In traditional vipassanā, "stronger emotions such as anger are associated with changes in breathing, and subtler emotive activities such as satisfaction may be associated with subtle bodily sensations such as slight vibrations throughout the body" (Zeng, Oei, & Lui, 2014, p. 1694). Both desirable and undesirable experiences are taught to manifest similarly in the body, for example, increased heart rate or breathing rate for both anger and elation. Moment-to-moment reactions of attraction or aversion to these sensations amplify the emotional rollercoaster that is suffering. A traditional practice would develop neutral observation of all experiences regardless of valence, and not just undesirable experiences (Bodhi, 2013; Goenka, 2015; Young, 1994).

Traditionally, the non-reactive observation of both positive and negative experiences is what allows a person to transcend the old pattern of "rolling" (Goenka, 1987/2012, p. 80) in the emotional rollercoaster of suffering. This nonjudgmental stance toward all phenomena regardless of perceived valence implies a key aspect of traditional forms of vipassanā, which is the priority of the search for the "truth," whatever that may be, over fixing a single problem (Hart, 1987). This is the reasoning for the practice of vipassanā to be the path to the "unconditioned realm" (Polanski, 2015, p. 26), in that happiness is seen as a state that is unconditional, it is not dependent on the sensorial environment in any way. As in science, the yet-to-be-discovered truth is not always what we want it to be. This is why teachers in many traditions first will assess an individual's capacity to take on more difficult levels of practice. Progress in vipassanā does not always appear to be linear and a student may not be ready to work through the deeper complexes that await them.

Unfortunately, the current philosophy of curing isolated problems with isolated fixes in positive medicine (Fulton, 2014) is not always compatible with the suggestion that progress in vipassanā may not always appear to be linear or immediate. "By categorizing mental suffering as analogous to other forms of physical illness, medicine abandoned explanations that were metaphysical, theological, or moral in nature. . .Medicalization may give a false impression that any suffering is evidence that 'something is wrong with me,' and is therefore potentially treatable" (Fulton, 2014, pp. 209-210). Sometimes a meditator may appear to be regressing when they begin to exhibit symptoms that may be unrelated to the original presenting symptom.

For example, a back ache, cold, or "dark night" (Fleischman, 2015, p. 18) of depression may emerge when the individual originally became interested in meditation simply to feel satisfied in their job. In the traditional context, The Second Noble Truth, known in the West as the truth of the origin of suffering (Goenka, 1987/2012), describes the nature of all symptoms as the result of a complex web of conditions present in the body and mind. Unforeseen issues may arise naturally as

the mind and body work through more fixed complexes in deeper levels of practice (Young, 1994). The deeper a practice becomes, the more complex and unforeseen the connections between the presenting problem and the conditions which contribute to it, and the more important that these seemingly irrelevant issues are addressed in the seemingly random order that they emerge. It is for this reason that why Shinzen Young (1994) warns,

> We are chock full of sources of unhappiness which are completely foreign to our being. It is not in the nature of consciousness to suffer. However, we have acquired certain limiting forces: cravings and aversions, painful memories, inappropriate yet habitual behavior patterns, and so forth. . .When we sit down and do this practice that's all going to come up. So you don't always feel good while doing Vipassana meditation. In fact you might feel lousy. I know, having heard that, some of you may want to leave right now. You say, "I thought meditation is supposed to make a person feel great." Yes, in the long run, but an important aspect of meditation is to sit down and start working through the sources of not feeling great, whatever they may be. You literally eat your way through them, one after another, after another, after another. How? By just being mindful and having equanimity, that's all. Whatever comes up, you'll observe it and you'll do nothing. You'll be very aware and that's all. (p. 2)

Prominent teacher of vipassanā meditation Acharya S. N. Goenka (1987/2012) uses the technical explanation of this process in terms of saṅkhāras, or reactionary artifacts of past conditioning which arise as mental or physical symptoms during this process of purification. In a summarized publication of the discourses for his standardized 10-day silent vipassanā courses, Goenka (1987/2012) writes,

> Any moment in which one does not generate a new saṅkhāra, one of the old ones will arise on the surface of the mind, and along with it a sensation will start within the body. If one remains equanimous, it passes away and another old reaction arises in its place. One continues to remain equanimous to physical sensations and the old saṅkhāra continue to arise and pass away, one after another. If out of ignorance one reacts to sensations, then one multiplies the saṅkhāra, multiplies one's misery. But if one develops wisdom and does not react to sensations, then one after another the saṅkhāra are eradicated, misery is eradicated. (p. 43)

Paul Fleischman (2015), possibly the only student authorized to give discourses to experienced students on his behalf, writes within the context of Goenka's particular style of observing bodily sensations, "Meditation practiced in this way is a wide containing systems practice. It is dynamic and

changing, not one thing, but a collection of many things held together in a more elastic and resilient psychological capacity" (p. 5). Fleischman continues,

> And we all need to keep in mind that all of us, all of the time, to some greater or lesser degree, are subject to our common human frailties of anxiety, depression, panic, and other forms of mental suffering. That's why we seek out meditation in the first place. Meditation does not cause all of the anxiety, confusion, or "dark night" that occurs in the lives of people who have meditated, because those people have had many other influences upon them before and after they meditated, such as their genes, family, religion, school, etc. (pp. 17-18)

This concept of nonlinear progression in vipassanā meditation points to an important gap in the literature regarding the limitations and adverse experiences in mindfulness therapies (Lindahl, Fisher, Cooper, Rosen, & Britton, 2017). This gap could be an effect of reductionistic thinking within the medical model (Fulton, 2014; Lee, et al., 2017; Polanski, 2015), which limits the scope of a problem to the successful application of its singular solution. "By placing all our misery at the feet of psychotherapy or psychopharmacology, thereby implying it is a disorder, a precious opportunity to encounter the truth of life's difficulty may be lost" (Fulton, 2014, p. 210). Engler (Wilbur, Engler, & Brown, 1986) quotes an Asian meditation teacher who puts it simply: "Many Western students do not meditate. They do therapy. They do not go deep with mindfulness" (p. 29).

In short, a reductionistic understanding of vipassanā meditation enforces a symptom-oriented view which is both inaccurate and insufficient for describing the practice. A vipassanā researcher might change a conventional research question from "How can I stop back pain in this cohort?" to something like, "What are the conditions that cause this back pain to come and go?" or "How is it that I do not feel this back pain when I am riding my bike or arguing with my spouse?" This shift from a single question about removing the symptom to multiple questions about the nature of the symptom implies a shift from first-order change to second-order change necessitating a "qualitative difference" in the underlying interdependent causal system (Watzlawick, Weakland, & Fisch, 1974). While posing a formal research question or even an intention is not a part of traditional

vipassanā practice, the shift from first-order-change to second order change in the example necessitates the type shift in thinking implied by the Second Noble Truth pertaining the systemic quality of suffering.

There are, of course, difficulties in pulling one's attention off of a pressing problem to take a deeper look at the nature of the problem itself. When the back screams in pain or one's child has behavior problems in school, the idea of looking anywhere other than the immediate problem for a solution can seem quite disconnected from reality. And as discussed in the section on linear thinking, those who exhibit this tendency probably possess an evolutionary advantage over those who do not. However, this shift necessitates an entirely new way of looking at the role of vipassanā meditation with regards to human health. In *Vipassana Meditation: A Practical and Spiritual Path*, Fleischman (2015) describes a higher-order perspective on vipassanā meditation as a practical "way of life,"

> Vipassana should also be practiced in an atmosphere that is free of exaggerated claims for medical cure or radical personality transplant. One of the foundation blocks of meditation as a way of life is that it does not become misdirected towards limited goals. Vipassana is not a substitute for treatment of any kind. It is not a cure, nor a preventative for mental or physical disorders. No one can be cured of all disease, and any activity that is focused on cure loses the broad perspective that animates Vipassana, which is a lifelong, spiritual path, and not merely to eliminate disease. (p. 18)

There is a need for greater rigor in understanding the historical and cultural context from which these technical terms have emerged if the deeper aspects of these practical traditions are to contribute to the literature (Puhakka, 2015). Gambrel & Keeling (2010) write of Joanna Macy's work in the general systems paradigm for doing so,

> Theory that provides the foundation of mindfulness-based systemic therapies needs to be developed. While many clinicians are beginning to implement mindfulness in their work with couples and families, few discuss their theoretical premises for doing so. Macy's (1991) philosophical discussion of general systems theory and Buddhism is a useful starting point for theory development. (p. 420)

To date, there have been no efforts to develop a theory suitable for the study of mindfulness practices as they pertain to clinical work, let alone a theory suitable for the study of traditional vipassanā meditation.

Though there are significant limitations in the literature, valuable contributions have nevertheless emerged from the recent explosion of interest in these traditions, particularly in the last ten years. After all, the Buddha is widely accepted to have said that he only ever taught the relief of suffering, and the evidence is clear that the systematic implementation of symptom-oriented third-wave interventions such as MBSR, MBCT, ACT, and DBT has been effective in the relief of certain kinds of suffering. Further, the confusion of traditions and their technical terms is understandable given the vast complexity of both the traditional practices and the problem of understanding human health and behavior. It is possible to find research (Pruitt & McCollum, 2010) which sufficiently reviews the traditional scope related to the intervention studied, and others (Dimidjian & Linehan, 2003; Garton-Gundling, 2017; Lee, 2017; Nilsson, 2013; Polanski, 2015; Wilson, 2014; Puhakka, 2015) who go so far as to cover the challenges or consequences of removing vipassanā technical terms from their full traditional context. But the majority of experimental research does not sufficiently specify the traditional context that informs the work, and the majority of researchers who do this sufficiently do not adequately locate the work in relation to technical terms within one tradition which may be antithetical to, or commonly confused with, technical terms in another tradition.

Vipassanā and natural systems.

Most important to this study, there appears to be no research which acknowledges the connection between technical terms in vipassanā meditation and natural sciences within the postpositive paradigm. This is a notable finding considering that it is fairly well accepted within most or all Buddhist traditions that developing an understanding of the fundamental laws that govern

human experience as well as the rest of the natural world is essential to progress on the path of the cessation of suffering. Instead, the vast majority of both popular and scientific literature examines the relationship of traditional techniques and concepts with psychological concepts and within the context of clinical psychology. A comprehensive search in the EBSCO and APA PsychInfo journal article databases on August 15th, 2017, revealed no results outside the area of specific clinical outcomes. Further, a significant majority of this literature rests in analogical comparisons with psychological concepts which fail Popper's test of falsification. This understandable marriage of vipassanā with clinical theory is almost surely due to practices in all Buddhist traditions involving observation of oneself, a practice paralleled by the subjective paradigm in psychodynamic psychotherapy. Psychological theory designed to assist those seeking relief from suffering is aligned in many ways with the stated goals of every tradition claiming allegiance to the Buddha.

Unfortunately, this focus on the subjective realm of clinical theory reveals weakness in academic understanding of the traditional context and practice of vipassanā which is to reduce suffering by understanding the nature of suffering itself. Shinzen Young (1994) describes this paradigmatic hurdle,

> The insights that come as a result of Vipassana are deeper and more general than those that are ordinarily encountered in psychotherapy. They deal with very broad issues that are multiply rather than singularly applicable. In science, a deep theory augers many specific applications. Out of a single fundamental breakthrough in science you may have dozens—or even thousands—of specific applications. So in the same way, the insights that come from Vipassana practice let us understand the very nature of personality itself, not just things about our own personality. (p. 1)

The *Four Noble Truths ,* given by the Buddha to describe the most essential part of the teaching in every tradition, suggests that the practice of vipassanā is rooted in the search for objective truth: 1) that suffering is inherent in life; 2) how suffering comes to be; 3) how suffering comes to cease; 4) and the instructions for the cessation of suffering. These four truths are taught to exist within the same fabric of reality of all other natural phenomena such as gravity, the changing of the tides, the

building and eroding of mountains, and the passing of the weather. They are there to be verified by any living being possessing the capacity to give the experiment an honest trial (Goenka, 1987/2012).

Though this ontological meta-inquiry into the nature of suffering originates within the framework of the body and mind, it is inseparable from an investigation into the most fundamental natural laws (Fleischman, 2016). This perspective exists within each tradition but is rarely, if ever, taught or included in contemporary scientific and psychological literature. Therefore, if the dhamma is "the information state that guides but is not the same as the material universe" (Fleischman, 2016, p. iv), then it is vital for both popular and scientific literature on vipassanā meditation to move beyond the basic, reductionistic paradigm of linear cause-and-effect and into a deeper ontological and paradigmatic critique about the nature of suffering within the full traditional scope of the teachings. That is, there is a need for researchers to attempt to replicate the Buddha's findings within the full context of his experiment.

Experimental support for mindfulness-based therapies and paradigmatic crtique of a systems perspective on Buddhist traditions have produced a compelling area of study that will likely keep experimental and theoretical researchers busy for decades. Macy (1991) as provided the ground-work for a theoretical basis for this by outlining the resemblance between the Buddha's system of "mutual" causality and the paradigm of causality implied in systems philosophy. The fact that the complete comprehension of this paradigm of causality also represents the core of the Buddha's discovery about the nature of suffering points to the intriguing potential for the systems paradigm. What remains is the need for research into the theory and effects of vipassanā meditation within the natural systems paradigm. This type of research would be demarcated as striving to understand the homo sapiens phenomenon as it is in nature as opposed to simply experimenting with ways to change it. RCT research on psychological interventions narrows the findings to the scope of the a priori assumptions of the intervention and often ignores the complexity of the natural phenomenon

itself (Puhakka, 2015). As we shall see in the subsequent chapter on vipassana meditation, the Buddha himself did not teach a psychological intervention *per se* but the scientific investigation of the human phenomenon "as it is" (Goenka, 1987/2012, p. 25). If there is any vipassanā "intervention," than it is this basic shift in intent. Research that adopts the same attitude may produce scientific theory that more accurately accounts for and predicts the effects of vipassanā meditation.

Chapter 3: Overview of Bowen Theory and Systems Philosophy

The purpose of this chapter is to position Bowen theory in relation to mainstream research and applied psychology. An important aspect of describing this position is to distinguish the unique paradigmatic position of the theory, which to the greatest extent is called here *natural systems philosophy*. Without such a distinction, it is easy to confuse the subtle meanings of biological terms used in Bowen theory such as *basic-self*, *emotion*, *differentiation, fusion,* etc. with general systems or non-systems concepts, and lose sight of the broad reach of Bowen's contribution to the natural sciences.

Like the prominent systems philosophers described earlier, Bowen valued developing an integrative framework which organizes information from many levels and believed this would only be possible with a move to systems thinking. He worked in the context of a grand integrative natural system theory which would "bind the millions of disparate facts of the physical universe into one, overarching system" (Wylie, 1991). However, it is probably not accurate to say that Bowen conducted his research within the systems paradigm as it is understood by prominent systems philosophers. We will position Bowen's work in relation to popular systems philosophers by first examining popular notions of systems philosophy, followed by a look at what set Bowen apart in his natural systems view.

First, we will review the philosophical foundation of the systems paradigm in general and what sets it apart from mainstream science. Then we work our way from the most general application of systems philosophy in Bertalanffy's General System Theory (GST), Lorenz's discovery of chaos and the study of complexity, and end with the concept of natural systems and Bowen's natural system theory of the human family. The purpose is not to give a comprehensive overview of the range of system approaches, but to distinguish Bowen's system theory from other system approaches and pave the way for a paradigmatic comparison of the Buddha's work with the concept of a natural system.

Systems Philosophy

Modern systems philosophy first arose as a critique of the limits of reductionism for problems of complexity and a call for organizational unity in the sciences. These problems are described in the preceding chapter on complexity and compartmentalization in science. A common aim of the early systems thinkers, including Bowen, was the development of an overarching multidisciplinary framework that could organize and coordinate knowledge from the vast array of the analytical disciplines. This required a radical augmentation of the existing philosophy of science. As with Wilson (1998), many of these philosopher-researchers were interested in answering the most difficult human problems like overpopulation, ecological crisis, and war, by integrating research from many domains (Bertalanffy, 1968/2015).

While the modern paradigm of systems philosophy can be credited to integral theorist Ervin Laszlo (1973), the origin of systems thinking in the West might be traced back to Thales and Democritus of Ionia and eventually Aristotle, who wrote his *Metaphysics* to reconcile the rationality of Plato's Theory of Forms with common observations in nature (Aristotle, 2004). Late 19th and early 20th century Russian physician and philosopher Alexander Bodganov (1912-1917/2003) wrote of unifying the sciences through *Tektology* as a discipline of relationships and processes instead of an elementistic view of static things. Bodganov saw the natural world as one of organization, where forces either composed or decomposed material aggregates according to their nature. Bodganov (1912-1917/2003) writes of pervasive organization, even in apparent "deorganization,"

> And yet we are left with destructive activity. On direct and isolated consideration this function is *de-organizing*. However, a deeper analysis shows that even this form is an outcome of competition between different *organizing* processes. When a man kills and eats an animal, he deorganizes some living system to organize its elements according to his physical constitution. (p. 2)

This view contributed to systems thinking through a focus on the processes of nature as opposed to merely studying the elements and constituents of nature.

Though the unification of knowledge was the philosophical goal, there are many different approaches to systems thinking today. That is, systems thinking as a discipline is still in development. Of these, the work of Ludwig von Bertalanffy (1968/2015) was a seminal philosophical starting point for the special theorists to follow. A biologist, Bertalanffy laid the framework for what science might look like united under the banner of systems philosophy. He provided key concepts such as *open* and *closed system* which define much of the vernacular adopted by systems theorists, including Bowen (Papero, 1990). Bertalanffy's open-system theory eventually became the basis of what is known today as GST, which is a philosophical loom through which to weave the fabric of an integrative theory of all of nature. Bertalanffy adopted the organismic perspective in his theory of open systems such as living beings, which are less predictable and more adaptive than closed systems such as machines or classic physics experiments.

Together with Bertalanffy, Hungarian philosopher and integral theorist Ervin Laszlo defined the systems paradigm in *Introduction to Systems Philosophy: Toward a New Paradigm of Contemporary Thought* (1973) as a philosophy of science, calling it "Systems Philosophy." This work is probably the most general of the systems literature, outlining the most fundamental purpose of the specialized theories which are to follow. In a previous article *Systems Philosophy,* Laszlo (1971/2003) critiques an over-focus on reductionistic thinking in science and called for scientific generalists to synthesize the analytic data of reductionistic science. He argues that reductionism has provided for the feats of engineering of the industrial revolution but has left the cognate disciplines a scattered and uncoordinated array of increasing specialization, that "the fields of knowledge are worked in patches, each man concerned with no more than his own territory, 'cultivating his own garden'" (1971/2003, p. 111). The lack of generalists in science has restricted increasing knowledge from increasing meaning in human life, creating an "existential vacuum" in the West which has contributed to the rising interest in Eastern synthetic thought. Laszlo (1971/2003) writes,

> Bookstores are crammed with Eastern sacred texts, studies of astrology, reincarnation, states of consciousness, and the like. Students from across the country are demanding courses in Buddhism, Hinduism, and Mysticism. . . . Psychiatrists, psychologists, and clergymen of all faiths are joining the younger generation in this pursuit. . . . The demand to see things whole. (pp. 12-13)

Laszlo suggests though specialization is as important as generalization, that between "atomism" and "holism" it is holism that marks a "healthy, self-actualizing person," and that "Insistence on the atomistic mode is in itself a form of psychoneurosis" (p. 112).

Laszlo's systems philosophy primarily presumes that the world exists, and "is, at least in some respects, intelligibly ordered" (1971/2003, p. 113). He distinguishes two secondary presuppositions which define the specialist and the generalist; that "the world is intelligibly ordered in special domains; the world is intelligibly ordered as a whole" (p. 114). However, the second presupposition, that of the generalist, is more often assumed to require demonstration while the first, that of the specialist, is taken as fact. He argues that specialists tend to ignore the second presupposition and assume that special observations alone reflect facts of nature, that results in special domains are easily validated but results in general domains can also be validated through corroborating evidence across multiple special domains. The second presupposition points to Wilson's (1998) argument that *consilience*, findings from disparate domains supporting one another, is one of the most important criteria of science.

One prospect of systems thinking is that it can organize solutions to problems of great complexity where reductionism cannot. Systems philosophy is in large part an effort to move beyond the psychological splits indicated by linear thinking and into a paradigm which assumes that polarities are a product of the observer and not of nature. However, a common misconception of systems philosophy is that it is equivalent to *holism*, which itself is only one side of the split between holism and *atomism* (Bunge, 1977). An atomistic, or reductionistic view of the human would break us down to cells, atoms, electrons, protons & neutrons, quarks, etc. A pure holistic, or gestalt, view

might focus on overall experience using aggregate, irreducible terms like person, human being, or feeling terms like anger, happiness, and will. Bunge (1977) addresses this problem by defining the relationship between analysis and synthesis in the systems paradigm. He divides systems thinkers into two camps,

> Those who wish to extend the range of application of the scientific approach to all cognitive problems dealing with systems, whether natural, social, or artificial, and those who hope General systems will give them instant wisdom and spare them the trouble of learning some mathematics and some science. Where as the former see in [general systems theory] an extension of ordinary science and an exciting new venture of the analytic mind, the latter see in [general systems theory] a retreat from reason and a return to semi mystical speculation. (p. 103)

Bunge argues that synthetic holism ignores the analytic rigor of atomism, defining the goals of analysis as "the same as those of science, namely the explanation, prediction, and control of whatever can be explained, forecast, and controlled" (p. 104). The method of atomism is reason and the method of holism is intuition. Emergent properties "cannot be explained by analysis and must be accepted with reverence" (p. 104). Bunge goes on to assure us that systems thinking "does not hold that such novelties are unexplainable, and so must be accepted by an act of faith. If it did, [general systems theory] would be incapable of suggesting theories aiming at explaining precisely such emergent properties and patterns" (p. 104). Therefore, Bunge suggests that the systems approach goes beyond atomism and holism through the explanation of emergent properties of the whole in terms of the interactions of the parts. Perhaps most importantly, Bunge writes that "the [general systems] approach lies midway between the scientific and the philosophical approaches" (p. 104).

This highly integrated blending of general and specific domains can be seen in the simultaneous interest of systems researcher-philosophers such as Bertalanffy, Bowen, and Wilson in areas of special research, as well as where that special research fits into the global integrative scheme. The challenge inherent of this kind of philosophical and practical integration, including the

integration of rational and intuitive methods, may in some part explain the relatively small proportion of systems researchers today in comparison with the vast majority of special researchers and associated funding for specialized research. This imbalance could both explain and support Laszlo's call for scientific generalists.

Thus, the ultimate aim of the best-known systems philosophers is to study isomorphic properties of organizational units and processes in nature. Systems thinking looks beyond simple "cause and effect" relationships and into a broader, mutual-causal context of complex problems (Macy, 1991). This type of ecological thinking naturally looks beyond solving specific issues and into understanding how many issues may relate to each other in order to effect change on a broader level. Laszlo (1971/2003) writes of the emergence of special theories under the banner of systems philosophy,

> Their common denominator is the systems concept *par excellence* of general theory; their advantage over other concepts is that they are capable of remaining invariant where others encounter limits of applicability. That is, the range of their transformations (more exactly, the number of operations in regard to which they are invariant) is greater. Hence, they can exhibit general order where the classical concepts show only delimited special orders. (pp. 115-116)

E. O. Wilson echoes Laszlo's call for generalists in *Consilience* (1998), where he suggests consilience, or "explanations of different phenomena. . . that can be connected and proved consistent with one another" (Wilson, 1998, p. 53), as a particularly strong and important criterion for scientific validity. Writing with spiritual inspiration of his passionate shift from organized religion to the natural sciences, Wilson suggests that the early Enlightenment thinkers like Condorcet & Bacon "got it mostly right the first time" (p. 8), and that the early scientific ideal as worthy of revival now more than ever. Perhaps reflecting his own desire to replace his search for wholeness in the Bible with a search for unity in science, Wilson holds tight to science as an inductive process with a

necessary step for synthesis in the spirit of Laszlo. He cites William Whewell (1840) as the first to mention consilience in *The Philosophy of the Inductive Sciences* as,

> literally a 'jumping together' of knowledge by the linking of facts and fact-based theory across disciplines to create a common groundwork of explanation. He said, "The Consilience of Inductions takes place when an Induction, obtained from one class of facts, coincides with an Induction, obtained from another different class. This Consilience is a test of the truth of the Theory in which it occurs." (p. xxxix)

For Wilson, the criterion of consilience, supportive relationships among independent findings from disparate natural domains, is the wholeness-variable of the scientific world view.

Consilient findings support Laszlo's secondary presupposition that "the world is intelligently ordered as a whole" (1971/2003, p. 144), that science has the potential to provide some level of meaning beyond that of reducible material elements. Wilson (1998) also urges that this synthesis does not provide something extra on top of what science already is, but that it is an integral part of science that is often left out. "The ongoing fragmentation of knowledge and resulting chaos in philosophy are not reflections of the real world but artifacts of scholarship" (p. 8). He urges that consilience will face its "surest test" "in the social sciences and humanities" (p. 9) as the meaning-maker of the sciences. He gives an example of the problem of global deforestation, which is affected by knowledge and assumptions in the domains of environmental policy, ethics, biology, and the social sciences,

> We already intuitively think of these four domains as closely connected, so that rational inquiry in one informs reasoning in the other three. Yet undeniably each stands apart in the contemporary academic mind. Each has its own practitioners, language, modes of analysis, and standards of validation. The result is confusion, and confusion was correctly identified by Francis Bacon four centuries ago as the most fatal of errors, which "occurs wherever argument or inference passes from one world of experience to another." (p. 9)

Wilson may echo Bertalanffy's (1968/2015) observation of a growing recognition of the interconnectedness of problems in the 1960's,

> Politicians frequently ask for application of the "systems approach" to pressing problems such as air and water pollution, traffic congestion, urban blight, juvenile delinquency and organized crime, city planning (Wolfe, 1967), etc., designating this a "revolutionary new concept" (Carter, 1966; Boffey, 1967). A Canadian Premier (Manning, 1967) writes,
> the systems approach into his political platform saying that an interrelationship exists between all elements and constituents of society. The essential factors in public problems, issues, policies, and programs must always be considered and evaluated as interdependent components of a total system. (p. 4)

In short, Wilson urges a change in the priority of synthetic knowledge. One way to enforce this priority would be a basic change in education. He writes, "Every college student should be able to answer the following question: What is the relation between science and the humanities, and how is it important for human welfare?" (p. 13). He goes on to promote this synthetic view at all levels of society,

> Every public intellectual and political leader should be able to answer that question as well. Already half the legislation coming before the United States Congress contains important scientific and technological components. Most of the issues that vex humanity daily—ethnic conflict, arms escalation, overpopulation, abortion, environment, endemic poverty, to cite several most persistently before us—cannot be solved without integrating knowledge from the natural sciences with that of the social sciences and humanities. Only fluency across the boundaries will provide a clear view of the world as it really is, not as seen through the lens of ideologies and religious dogmas or commanded by myopic response to immediate need. Yet the vast majority of our political leaders are trained exclusively in the social sciences and humanities, and have little or no knowledge of the natural sciences. The same is true of the public intellectuals, the columnists, the media interrogators, and thinktank gurus. The best of their analyses are careful and responsible, and sometimes correct, but the substantive base of their wisdom is fragmented and lopsided (p. 13).

Laszlo's critique was seminal for the paradigm, and most clearly defines the philosophical trend that was already underway immediately following World War II without depending on definitions from special domains. Beginning with Alan Turing's statistical analysis of German tactics during the War, scientists and engineers of the time were beginning to approach problems of complexity (mentioned in the Chapter 2 section *The Problem of Complexity in Science* in this document) from an increasingly multidisciplinary perspective (Good, 1979; Mardia & Cooper, 2012). Many

fields began using systems concepts to solve particularly illusive problems, from weather prediction, to missile guidance systems, to the role of the family in the behavior of the individual. These domains began creating specialized *system theories* reflected most purely in the philosophical groundwork laid by Laszlo and Bertalanffy.

However, researchers who retained an interest in an integrative theory did so in different ways. The majority, including Bertalanffy (1968/2015), Wiener (1961), and Midgley (2007), preferred beginning with existing conceptual models from various intellectual domains, such as mathematics or mechanical control systems, gathered under the banner of Bertalanffy's general systems theory. Others, such as Bowen (1988), chose to study specific systems as they occur in nature with the hopes of gradually combining them into an integrative *natural systems theory* by combining research from many domains, such as neuroscience (Bassett & Gazzaniga, 2011) and collective behavior (Berdhal, Torney, Ioannau, Faria, & Couzin, 2013). Thus, the many approaches to systems thinking led to different meanings for the term *system* which contribute to equally different approaches to solving problems.

General Systems Theory

Of the special theorists, Bertalanffy probably remained the most evenly divided between systems philosophy in general and a system theory. In *General Systems Theory: Foundations, Developments, Applications* (1968/2015), Bertalanffy's writing straddles the philosophical while touching on specific domains such as the biological organism, social systems, and the human mind. He was interested perhaps most of all in unification. He traces his general systems concept to the "natural philosophy" of Leibniz, the "coincidence of opposites" of Nicholas of Cusa, Köhler's "physical *gestalten,*" and Lotka's formulations of "population problems" (p. 11).

But Bertalanffy as biologist was looking for a single theory of everything defined by mathematical laws. He was interested in what living organisms shared with non-living aggregates and

began with his concept of an open system. An open system seemingly contradicts the second law of thermodynamics which states that all energy tends to entropy, to disorder, to decay. But living systems seem to organize energy to their service, they repair themselves, they order their environment. A closed system such as a combustion engine, will tend toward decay as in the second law of thermodynamics, where an open system will tend toward homeostasis and even greater complexity over time by way of reorganizing free energy from outside the system. Reproducing, self-repairing systems are open systems. Open systems have the property of *equifinality*, meaning they can reach a similar result in many ways. Equifinality is demonstrated in the move toward homeostasis from many organismic states. If a person is stimulated or depressed, they possess a tendency back to baseline. Closed systems are mechanistic and can (generally) only reach a result in one way (pp. 131-134).

Bertalanffy was interested in creating a unified theory of the sciences, which he called the general systems theory (GST). GST assumed isomorphic relationships between different levels of organization, for example in the boundaries, transfer of information, homeostatic and self-organizing tendency of a human cell or social group. This framework would provide a common language for multiple scientific disciplines to share and compare results and to learn from what their individual units of study might have in common. It would account for problems of complexity and provide a way of combining data from many levels of analysis into a coherent whole (Bertalanffy, 1968/2015).

Bertalanffy argued that the need for such a theory arose from researchers encountering similar problems in differing domains. "The structural similarity of such models and their isomorphism in different fields became apparent; and just those problems of order, organization, wholeness, teleology, etc., appeared central which were programmatically excluded in mechanistic science. This, then, was the idea of 'general system theory'" (Bertalanffy, 1968/2015, p. 13).

Bertalanffy writes of the original function for the Society of for General Systems Research, namely to:

> (1) investigate the isomorphy of concepts, laws, and models in various fields, and to help in useful transfers from one field to another; (2) encourage the development of adequate theoretical models in the fields which lack them; (3) minimize the duplication of theoretical effort in different fields; (4) promote the unity of science through improving communication among specialists. (p. 42)

Bertalanffy (1968/2015) quotes L. Frank's introduction from a cybernetics conference:

> The concepts of purposive behavior and teleology have long been associated with a mysterious, self-perfecting or goal-seeking capacity or final cause, usually of superhuman or super-natural origin. To move forward to the study of events, scientific thinking had to reject these beliefs in purpose and these concepts of teleological operations for a strictly mechanistic and deterministic view of nature. This mechanistic conception became firmly established with the demonstration that the universe was based on the operation of anonymous particles moving at random, in a disorderly fashion, giving rise, by their multiplicity, to order and regularity of a statistical nature, as in classical physics and gas laws. The unchallenged success of these concepts and methods in physics and astronomy, and later in chemistry, gave biology and physiology their major orientation. This approach to problems of organisms was reinforced by the analytical preoccupation of the Western European culture and languages. The basic assumptions of our traditions and the persistent implications of the language we use almost compel us to approach everything we study as composed of separate, discrete parts or factors which we must try to isolate and identify as potent causes. Hence, we derive our preoccupation with the study of the relation of two variables. We are witnessing today a search for new approaches, for new and more comprehensive concepts and for methods capable of dealing with the large wholes of organisms and personalities. The concept of teleological mechanisms, however it may be expressed in different terms, may be viewed as an attempt to escape from these older mechanistic formulations that now appear inadequate, and to provide new and more fruitful conceptions and more effective methodologies for studying self-regulating processes, self-orientating systems and organisms, and selfdirecting personalities. Thus, the terms feedback, servomechanisms, circular systems, and circular processes may be viewed as different but equivalent expressions of much the same basic conception. (Frank et al., 1948, condensed). (pp. 16-17)

General systems look at an objective view of living systems but was not interested in equating them to mechanistic systems. He suggested that as open systems, living organisms possessed the property of equifinality which means that there was no one way for an organism to solve a problem (Nichols, 2016). Open systems exchange information and energy with their

environment and change their internal structure, or programming over time (Bertalanffy, 1968/2015). Though pointing out the isomorphic properties of living systems, he was also pointing out their inherent unpredictability.

Today Bertalanffy's general systems vision remains incomplete, no more than compelling philosophical fuel for the direction of science. However, Bertalanffy's general systems view shares much conceptual overlap with natural systems research, an alternative systems perspective. It can provide a provisional intellectual jig to formulate hypotheses and many of the concepts may be found to be valid. The deductive process beginning with mathematical presuppositions for natural phenomena may yet prove useful at some level, as it certainly promotes the potential unity of the natural sciences. In the next section, we will review the natural systems concept and some examples of natural systems research.

Popular Systems Thinking

One definition of system is a theoretical mechanism employed to assist the human mind to make sense of complexity. A researcher will most conventionally assign generalized labels to various aspects of a problem using system terms, such as open or closed system, subsystem, object, attribute, differentiation, relationship, boundary, and environment (Baecker, 2017; Hall & Fagen, 1956). Cybernetics researcher Baecker (2017) writes, "[Systems] are distinguished by observers, scientific or intellectual, and discussed with other observers. They describe a complexity, established and maintained by a boundary, which selectively separates a unit from and connects it to an environment as seen by an observer" (p. 10). They may apply terms from cybernetics to describe the regulatory processes of a system, such as negative and positive feedback, *homeostasis*, and first or second order change (Wiener, 1961; Becvar & Becvar, 2018). A system that can reproduce itself with negligible error might be termed *autopoietic*, a property normally associated with living things,

including social systems, which have developed this capacity over inconceivably long periods of time (Luhmann, 1986).

For example, a researcher may define a social system as the constituents (objects) of a regional political group, who possess various demographic attributes. The group may be bounded by those who vote in a particular election, are distinguished from other political groups (environment), and defined by the public media and forums (relationships) through which they communicate. The group or an individual in the group may be considered more or less defined (differentiated) as a function of how diverse their reasons for voting a particular way, and how easily swayed they are new opinion, and may maintain its base through the generations (autopoiesis) (Luhmann, 1986). The boundary of the system is problem-oriented and so possesses a subjective quality (Baecker, 2017). The system serves as an *a priori* model designed to organize techniques for change.

Natural Systems

A natural system is quite simply a system which occurs in nature. Hall and Fagen (1956) write that "The description of these is the task of the astronomer, physicist, chemist, biologist, physiologist, etc., and again the amount one can say about a given natural system depends on the number of essential variables involved" (p. 72). Natural system researchers are typically more interested in direct observation with fewer *a priori* assumptions than Bertalanffy's pure mathematical ideal for GST or Weiner's machine-control philosophy for cybernetics. Though they may use mathematical models to describe the behavior of the system, the models are the result of the inductive process; they are derived from the observations as opposed to explaining the observation from the model. One may think about a naturally occurring system using some of the terms from general systems, but it is the intention of discovering the nature of the system that is not pre-supposed in the human mind that distinguishes natural systems research.

Systems science as the study of complexity is taking root in the study of biological systems (Kitano, 2002). While specialized natural systems research does not bear that name, the multidisciplinary aspect of this class of research falls in line with Von Bertalanffy's (1968/2015) *general systems* vision of uniting the sciences through a common language, most commonly through the use of complex systems methodologies. Concepts such as *hierarchy*, *modularity,* and *connectivity*, *reciprocation*, *autopoiesis*, which focus on relationships instead of essential elements transfer well across natural systems from cellular mitosis to migration of germ cells and wildebeests (Guttal & Couzin, 2011; Meunier, Lambiotte, & Bullmore, 2010). For example, what is it that patterns of change in immunological therapies, addiction withdrawal, and taming a wild stallion, have in common? Could there be an agitated introductory period, followed by a phase of extreme chaotic protest, ending with spindled peaks among a gradual titration of habitual behavior before finally resting in a new equilibrium, as with one of Lorenz's *strange attractors* (Gleick, 2011)? What do these patterns have in common with transitive brain wave frequencies in and out of sleep stages? How might knowledge of these commonalities across these systems allow heterogeneous processes in one area to be transferred to another? These are the types of questions that require the synthesis of data from multiple levels of analysis (i.e. special, temporal, hierarchical, etc.) which is common in complex systems methods (Bassett & Gazzaniga, 2011).

While the study of non-linear patterns in dynamical systems has been part of physics for some time (Gleick, 2011), it has only recently made its way into the fields of neuroscience (Mattei, 2014; Siegel, 2012). Mattei (2014) writes of the increasingly multidisciplinary nature of neuroscience: "the concept of self-organization has been able to offer a proper account of the phenomenon of evolutionary emergence of new complex cognitive structures from non-deterministic random patterns, similarly to what has been previously observed in nonlinear studies of fluid dynamics" (p. 1). Models based on complex systems concepts suffer less from this limitation, but may require

unlearning old ways of thinking about the brain and the mind in order to grasp the subtle relationship between analysis and synthesis while still remaining within the postpositivist realm (Bowen, 1980). Complex systems possess emergent properties which occur as a function of the relationships among the elements in the system ("the whole is greater than the sum of its parts"), and it is the emergence of higher-level patterned activity in neuronal networks that organizes systems-oriented theories of the brain (Bassett & Gazzaniga, 2011; Sieglemann, 2010; Telesford, Simpson, Burdette, Hayasaka, & Laurienti, 2011).

For example, one way of answering the question of how the concept of *mind* relates to the physical brain is by looking at mind as an emergent property of the complex interactions of the physical components of the brain, body, and environment (Bassett & Gazzaniga, 2011; Duncan, Chylinski, Mitchell, & Bhandari, 2017; Doursat, 2013; Sieglemann, 2010). Seen in this light, the process we call "mind" could possess similar properties as other strange attractors (Gleick, 2011). Those strange attractors could be called "self" from the perspective of human subjectivity. This "self" may possess something akin to the feeling of "personality" in a finicky autopilot on a sailboat or laptop computer which seems to have "a mind of its own", or unforeseen organic-feeling "noise" in an electronic modular synthesizer or guitar distortion pedal which speaks to a "deeper part of us" than a flat, mechanical sounding sine or triangle wave. A relatively reductionistic way to visualize the mechanics of these sorts of strange attractors is using the *double-rod pendulum*[2], a simple deterministic device which never repeats the same pattern of oscillation twice due to the non-linear effect of two

[2] For the simplest examples of strange attractors see the Wikipedia page for the double rod pendulum (https://en.wikipedia.org/wiki/Double_pendulum), and the classical example of the Lorenz Attractor (https://en.wikipedia.org/wiki/Lorenz_system).

dynamic coefficients (in this case the positions of the two joints) interacting with each other through one simple binomial equation[3].

All of these examples follow deterministic rules yet exhibit an ordered-disorder in their behavior that makes them appear *alive* due to their reciprocal feedback relationships (Fleischman, 2012). If a property such as strange attraction is *emergent* then there is no evidence of the property derived from properties of individual components alone. Telesford (2011) writes,

> the dynamic nature of a complex system cannot be understood by thinking of the system as comprised of independent elements. This concept also highlights the limits of reductionism; one cannot fully understand a complex system by only understanding its constituent parts (e.g., understanding the brain via knowledge about individual neurons). (p. 295)

Lessons from research in one type of complex system can inform research in other complex systems by virtue of their portability across many classes of natural systems. Bassett (2011) writes,

> The concept that emergence of complex behaviors might occur through the interaction of multiple temporal scales is one that, perhaps unsurprisingly, is not confined to neuroscience. Recent work characterizing power structures in animal societies suggests that emergence or the development of aggregates is a direct consequence of temporally dependent system uncertainty which, in social systems can be based on misaligned interests. (p. 9)

Swarming behavior in fish (Tunstrøm, et al., 2013) and locusts (Guttal, Romanczuk, Stephen, Sword, & Couzin, 2012) is predictable at the group level using a few simple variables. However, there is no evidence for this emergent group-level predictability found in the individuals alone. While consistent individual differences (i.e. "animal personalities"; (Jolles, Boogert, Sridhar, Couzin, & Manica, 2017) are found to determine group performance such as the time to find safe areas or areas with food,

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[3] As we shall see later in the collective behavior of shoaling fish and modular networked models of the brain, a minimum of two dynamic coefficients is all that is needed to produce a strange attractor which appears to be "alive" in its unpredictability.

and factors such as individual tendency toward leadership positions (Couzin, Krause, Franks, & Levin, 2005), the overall emergent patterns of group states such as swarming, milling, and group polarization (Tunstrøm, et al., 2013) remains the same regardless of individual differences (Couzin, et al., 2011; Jolles, Boogert, Sridhar, Couzin, & Manica, 2017; Killen, Marras, Nadler, & Domenici, 2017; Strandburg-Peshkin, Farine, Couzin, & Crofoot, 2015). That is, the program of change in the species appears predictable while the particular pathways chosen within that program are difficult or impossible to predict given the complexity of the related variables. The process is predictable but the content is not.

Research in fish shoaling behaviors has produced theories which show how a few simple variables such as proximity to a neighbor, proximity to a safety gradient, and proximity to a predator, generate a pattern of aversive behavior in a school of fish to a predator which appears to be highly coordinated at the group level, as if each fish had knowledge of the grand plan of changing trajectory and more or less executed the change in direction to suit it (Katz, Tunstrøm, Ioannou, Huepe, & Couzin, 2011; Schaerf, Dillingham, & Ward, 2017; Tunstrøm, et al., 2013)[45]. However, individuals are found to have relatively little knowledge of emergent group properties and in fact behave primarily in their own self-interest (Hein, et al., 2015). Each fish will simply move to maintain a comfortable balance of distance and closeness to other fish. Similarly, each fish follows a program to distance from a predator. The approach of the predator initiates the aversive movements in a few fish at the front of the school, which triggers changes in enough other fish to initiate a

[4] For an example of the stable "milling" pattern, see the following video of tuna: https://www.youtube.com/watch?v=D6HdoIsLMFg

[5] For examples of shoaling fish avoiding predators and the theory that explains their coordinated behavior, see the following video: https://youtu.be/X7taxbJ6wwc

phase transition where the entire school is moving in the newly emergent trajectory pattern. The speed of the predator may modulate the rate that this programmed aversion response propagates throughout the school of fish.

The area where most of the complex systems research is taking place in humans is in mapping structural and functional modularity and emergent properties of the brain using models based on network graph theory. "Brain networks are increasingly understood as one of a large class of information processing systems that share important organizational principles in common, including the property of a modular community structure" (Meunier, Lambiotte, & Bullmore, 2010, p. 1). The principles of collective behavior overlap in that they involve the abstract relationships between uninformed parts into wholes which exhibit emergent properties. The brain *as a unit*, in this sense, can be studied somewhat similarly to a school of fish *as a unit*, where what we call "mind" may emerge from the interactions of individual neurons and feedback mechanisms in the rest of the body which are otherwise uninformed of the beautifully coordinated behavior that they are taking part.

Systematic methods of studying natural systems are now emerging as a combination of mathematics and lessons learned through the study of complexity in physics. One method rapidly growing in popularity is *network graph theory*, which "draws from advances in statistical physics, mathematics, computer science and the social sciences to provide a principled framework in which to examine complex systems that are composed of unique components and display nontrivial component-to-component relations" (Bassett & Gazzaniga, 2011, p. 1). Graph theory itself has been around since the time of Euclid (18th century) and organizes processes around a complex unit of nodes (e.g. neurons, organs, or conspecific social individuals) whose relationships are described by edges connecting the nodes (Power, et al., 2011). The focus is not so much what each node is *per se*, but how often one node communicates with each other node, usually limited by some sort of arbitrary salience threshold. "Centrality metrics such as degree, betweenness, closeness, and

eigenvector centrality determine critical areas within the network" (Telesford, Simpson, Burdette, Hayasaka, & Laurienti, 2011, p. 295). Mapping at this level of normalization allows for the synthesis (observing overall relationships) of analytical data (reducing the whole into individual parts) at multiple levels (by constructing relationships among hierarchies of *modules*, for example between sub-modules and sub-sub-modules, etc.).

Network graphs are employed to assist in determining the relationship between *structure* and *function* of the brain. The brain may be divided into three dimensional units of brain tissue called *voxels*, where each voxel is a node on the graph. fMRI data would then be analyzed to determine the degree to which each node fires with each other node on the graph, quantifying the strength of their relationships (Bassett & Gazzaniga, 2011). A rectangular matrix called a *dendrogram* could then be used to visualize how each node is connected to each other node (Zemanova, Zhou, & Kurths, 2006). The structure of connections described in the dendrogram is often referred to as a *connectome* (Krakauer, Ghanzanfar, Gomez-Marin, MacIver, & Poeppel, 2017). Connectome matrices show strong relationships down the line from top-left to top-right when the nodes are listed in order of proximity, indicating the *small-world* nature of brain networks, or nodes are typically connected to close-by neighbor nodes for speed of transmission. Groups of nodes may fire so often together that they are designated as *communities*, or groups of nodes, or groups of groups of nodes (Zemanova, Zhou, & Kurths, 2006). Activity in neural communities correlate with specific functions, supporting the notions of functional modules in a network. Modules are organized into hierarchies where modules in similar taxa have stronger relationships, and sub-modules in differing taxa have weaker relationships (Bassett & Gazzaniga, 2011). Network models are usually controlled using a t-statistic by comparing models against synthetic *null models* which express randomized connections between nodes. Randomized relationships in null models are assumed to illustrate little or no organization (Nelson, Bassett, Chamchong, Bullmore, & Lim, 2017). The use of randomized networks as null

models as a sort of white-noise comparator is not ideal but is the best control available as of this writing.

Brian networks can contribute to an understanding of complex pathology in terms of change in the interrelatedness of modules. While studies in schizophrenia in the last 40 years have mostly focused on isolated brain areas or singular genetic causes or predispositions with pharmacological remedies, large-scale network graph research of the brain reveals that schizophrenics may show a breakdown in holistic integration of brain modules at both the structural and functional levels (Nelson, Bassett, Chamchong, Bullmore, & Lim, 2017). Because network approaches normalize data across domains, more holistic connectivity research can integrate analysis from many levels, for example both structural and functional data (Meunier, Lambiotte, & Bullmore, 2010). Unifying neurological data from different levels under a common mathematical framework such as network graphing is a relatively new concept to the field, and shows promise for more integrative methods to come in the future.

Examples of natural systems.

The similarity of distributed decision-making procedures in social species shares striking similarities across social species and intra-individual organizations such as neural networks in the brain. Contrary to common sense, a single component in a highly integrated system may possess little to no knowledge of the overall patterns emerging at the level of the collective unit. Each component merely acts on the combination of its own internal information state and the information state or states provided by its locality.

For example, a single neuron does not possess knowledge of the process of cognition which only emerges at the level of the whole brain as a property of the coordination of many neurons. Each neuron simply functions upon the combination of its own internal state and the information received from its immediate neighbors. From this view, each neuron is a black box in relation to the

totality, and no evidence of the emergence of cognition can be found from merely studying a single neuron in isolation. Indeed, a single neuron cannot function without the relationship context in which it differentiated its own structure (Bassett & Gazzaniga, 2011).

An ant colony will use concurrent methods of communication similar to the parallel coordination of neurons in the brain (Boi, Couzin, Buono, Franks, & Britton, 1999). Each ant functions like an individual neuron embedded in the larger network by function of mutual excitation. As one ant spontaneously activates, the ants around it may also activate. Many waves of coordinated excitation simultaneously pass through the colony at any given moment. The particular frequency and periodicity may differ from that of neuronal activity in the brain, there may be some overall patterns in the processes at the level of the colony which mimic the level of the brain quite closely. This can also apply to the level of the single ant or neuron. For example, a single ant will activate and then enter a period of rest where the chance of reactivating is less, mirroring the gradated action potential in a neuron (Couzin, 2009).

Various species employ organizational schemas differently than the highly integrated communication of an ant colony. The bee species *Apis mellifera* relies on the collaboration of parallel efforts of many scouts as it searches for a new nest site. Each scout will begin the search for a single site alone and return to the nest upon finding a suitable candidate. Each scout will then vote on their own site by attempting to recruit another member to follow them to view the site for themselves. This vote is submitted using a *waggle dance* which increases in intensity according to the perceived quality of the site. The scale of intensity appears to adhere to some objective measure which appears to be agreed upon by the group, to some degree. The process repeats as new recruits assess the site and recruit more and more bees using the waggle dance. The hive then migrates to the new site once a quorum is reached at it (Gruner, Fietz, & Jantsch, 2015).

A non-systems perspective would focus on the events described thus far which lead to the selection of the new site. In contrast, a systems perspective would look at the interactions of the various threads of the search carried out by many scouts and how this massively parallel decision-making process increases the overall intelligence of the hive. As such, the non-systems perspective would tend to focus on the parts of the process that pertain to this species while the systems perspective would open the door to examination of the elements of the process which pertain to multiple species and even lower and higher levels of organization such as the single brain or cell, or the interactions of many groups of many species.

Interestingly, the level of ignorance of a single *Apis mellifera* to concurrent search processes is a key element in the selection of a suitable nest. Each scout is only informed of the quality of their own site and the site information transmitted by the individuals around them. This allows each individual to focus on their specified task, a feature which is known to increase the level of intelligence of the collective (Lorenz, Rauhut, Schweitzher, & Helbing, 2011). This counter-intuitive feature of collective intelligence is explained by the tendency for individuals to conform to the opinions of others, but only if they are exposed to them. Conversely, the cognitive power of the collective is dependent on the diversity of opinions (i.e., information) among the individuals. When the overall sample provided by individuals is more diverse, there is increased error but also increased accuracy as the variance in the individuals tend to converge around the mean as a function of the *central limit theorem* (Couzin, 2009).

Mann & Helbing (2017) have found that this *herding effect* can be partially mediated by providing incentives to accurate minority predictions. This incentive program would run counter to "market-based" incentives at the collective level which promote herding and conformity (p. 5077). This finding presumably supports individual differences which lead to more accurate information for the overall average. So, if an individual is particularly intuitive, or possesses a superior method of

information gathering which is undisclosed to the collective, the incentives would help keep their minority decision in the minority position.

Research in animal decisions shows that accurate minorities increase in value as the group size increases. That is, the larger a group, the greater the chance that an individual minority will persuade ambivalent or naïve individuals (Couzin, Krause, Franks, & Levin, 2005). There are many other factors that influence the speed at which information travels through the group network. More intense responses in an individual can trigger a non-linear increase in the intensity of responses in near neighbors. This gradated response behavior is adaptive in that it optimizes the metabolic effort to the minimum level required to accomplish the required task and expedites certain responses which are time-sensitive.

For example, a school of fish may instantaneously maneuver to evade an attacking predator and will later reconfigure into a slow and stable milling configuration. The basic collective programming for each behavior remains largely the same, but individual differences among the fish make dramatic changes in the character of behavior by virtue of the structure of highly integrated emotional decision networks. Like neurons in the brain, each individual is only aware of the behavior of their neighbor which places the fish on the perimeter in a look-out position and the others in a conservative following position (Strandburg-Peshkin, et al., 2013). A minority of look-outs along the perimeter of the group may notice a predator which triggers a systemic reaction throughout the school fish-by-fish, like multiplexed stack of dominoes. In the slower unperturbed milling configuration, each individual is responding to the cues of its neighbors but perturbations of normal intensity take longer to propagate throughout the group. Similarly, the swarming of crickets and locusts is only motivated and guided by the very real fear of cannibalism, as any cricket that does not fly in line with the swam will literally be eaten by their neighbor (Simpson, Sword, Lorch, & Couzin, 2006). Perhaps humans are lucky that their unique capacity for reflection and self-regulation

allows them to stand against the group in longer lasting relationships and without the fear of more primitive regulatory mechanisms like cannibalism.

This highly integrated and reactionary behavior can serve as a weakness when the group is exposed to repeated perturbations which exceed the group's capacity to recover and adapt. The group will continue to increase its integrated reactivity which increases conformity in the group. This is a problem because group conformity can undermine the decision-making power of the group as CI is dependent on high variance in the distribution of individual judgements (Lorenz, Rauhut, Schweitzher, & Helbing, 2011; Mann & Helbing, 2017). The more that individuals can first serve their own function as individuals before contributing to the collective decision, the higher the collective error and the more accurate the collective decision.

Humans and natural systems.

The above findings using systems models support the importance of the integrative study of natural phenomena as opposed to assuming causal relationships between essential individual differences. But applications of complex systems concepts to research in human behavior have a long way to go before reaching the level of sophistication already found in research on other species. For example, as of this writing there is very little research on human groups which produce this sort of predictive models. A search on the literature using Google Scholar on July 23rd, 2017 using the keywords "'collective behavior' humans" revealed a striking scarcity of literature on human collective behavior when compared to research on other social swarming species. The results show numerous speculative books on the philosophy of collective behavior in the past 15 years which is sometimes applied to humans, and a single study (Silverberg, Bierbaum, Sethna, & Cohen, 2013), of human swarming behavior. Using video footage of heavy metal concerts, this study observed two stable "gaslike" and "circular vortex" states similar to Tunstrøm's (2013) "swarm" and "milling" states that are similar to swarming behavior in other species.

There is some research on the concept of collective intelligence in humans, a construct based on models of individual general intelligence used to determine differences in group's abilities to solve problems. Collective intelligence, as defined by Wolley et al. (Wolley, Chabris, Pentland, Hashmi, & Malone, 2010) is found to be only moderately correlated with individual intelligence, and more strongly correlated with individual's abilities to determine the emotions of other individuals through visual facial cues. Interestingly, Wolley found that the proportion of women in a particular group was a strong determinant of collective intelligence, probably due to the fact that women score higher on scales which measure ability to determine emotions in others. Where the women score lower on these scales the difference is unnoticeable. Some research reveals the predictability of democratic consensus in animal groups (fish and baboons) based on proportions of informed and uninformed individuals (Couzin, et al., 2011), yet only makes inferences about the outcomes of human decision making. This suggests that we know much less about collective behavior in humans than we do other species.

A rudimentary search through the literature will reveal an increase in non-essentialist models of organization in neuroscience (Bassett & Gazzaniga, 2011). However, branches of neuroscience research tend to apply complex systems methods to social concepts more derived from human subjectivity as opposed to the human individual or social group as a natural system. Though the fields of affective neuroscience and social neuroscience (Barrett, 2013; Jaegher, Paolo, & Adolphs, 2016; Siegel, 2012) generate vital knowledge on the physiological basis for emotion and affect regulation in humans, related hypotheses may suffer the same limitations as the *a priori* psychological assumptions that generate them; namely the assumption that intuited psychological concepts like *anger*, *ego*, *object*, *abandonment, attachment*, *object*, *relational matrix, empathy,* etc. are the primary mode of understanding human behavior (Barrett & Satpute, 2013; Baumeister & Bushman, 2017; Decety & Jackson, 2006; Ibanez, et al., 2016). The fact that these concepts are difficult to define, difficult or

impossible to refute, and pertain only to humans may support the possibility these concepts originate more from the subjectivity of the human observer as opposed to direct observations of humans as a natural phenomenon. Thus, the inductive potential of these social domains are limited and are more difficult to transfer without translation to research in other biological realms such as ecology, microbiology, entomology, collective behavior, etc., and non-biological realms such as physics, meteorology, paleontology, astronomy, etc. While social neuroscientists benefit from the application of complex systems research methods derived in other domains, the level of compartmentalization from the natural sciences will remain dependent on the how much the constructs are derived from human subjectivity as opposed to direct observations of human beings and groups as a natural system.

The described research in non-human species as well as early pioneering natural systems-based research on human behavior (Bowen, 1978; Bowen, 2015) suggest that many properties of individual behavior are not evidenced at the level of the individual but at the level of some emergent property in the collective. Yet, the dominant paradigm for the study of the human behavior remains focused exclusively on the individual. Perhaps this points to a particular feature of the value system of social psychologists and medical researchers which focuses on the relationship of pathology to psychological or physiological variables found only in the individual. Research on reciprocal influence of individual and group behavior is already well underway in other species (Guttal & Couzin, 2011) but is almost non-existent for humans. Future research on human behavior may look into the impact that group variables have on individual behavior and the relationship of these group variables to the enormous canon accumulated on individual differences. Further, this type of research could explore relationships of group variables not just to normal behavior but also to pathological behavior, and possibly even medical symptoms.

Bowen Theory

In his seminal 1988 publication, *Family Evaluation*, Michael Kerr described the shortsighted nature of our approach to the most important human problems, "We demonstrate against war as if we understand the causes of war. We could just as easily demonstrate against schizophrenia" (p. 27). This critical view of what is known and what is not known, and how our inability to distinguish between the two impacts our decisions, will be an important emphasis of this section on Bowen's way of thinking and the theory that is a product of that way of thinking.

The Bowen theory is a complex, highly integrated system of interrelated concepts which define various predictable patterns of human behavior. It is not possible to accurately portray the theory and the type of thinking that it represents with the space provided here, nor is it necessary. Bowen defined a system theory of the human family as an emotional unit, and the Buddha did not define a theory of the human family *per se*. Therefore, this section will only outline important aspects of Bowen's work and style of thinking which pertain to the research question, "To what extend did the Buddha define a natural system?" Other concepts will only be briefly explained.

Bowen and systems thinking.

Murray Bowen was unique in his study of human behavior from a natural system perspective. There are many systems theorists who use models derived from general systems or cybernetics ideas, but few who prioritized the study of human behavior as a natural phenomenon via systems thinking. There are many systems thinkers applying the concepts of complexity, isomorphism, and circular relationships as applied to human health and behavior, and all perspectives pass neglect the cellular, organic, mind/body and jump directly to the social to create a one-level theory. There are no other natural systems theorists who study the human family as an emotional unit which governs the behavior of the individual. This was Bowen's primary contribution.

Perhaps more important than the idea of the family as an emotional unit was Bowen's radical approach to medical research. At age fifteen when he was working as an "ambulance helper" he witnessed "bewildered, unsure, and fumbling" emergency medical personnel fail to care for a dying girl, and from that point he thought he could help medicine find better answers (Bowen, 1978, p. 483). As with many of the doctors returning from the Second World War, he was interested in improving the treatment of psychological problems. He was trained as a psychiatrist and eventually became chief resident at the Menninger Clinic in Topeka, Kansas, which was the foremost psychoanalytic clinic in North America at the time. During his time at Menninger, he began developing new ideas about the influence of family members on the symptoms of his patients. He understood that Freud had intended to create a natural science of human behavior but began to think that the assumptions of psychoanalysis were too deeply rooted in human subjectivity. He had great respect and admiration for Freud as a "genius" theoretician with a unique ability to remain objective while in contact with his patients' great emotional distress (Kerr & Bowen, 1988, p. 352). He believed that Freud had contributed one of the most important advances in the understanding of human behavior since Darwin.

But Bowen believed that Freud's fatal mistake was straying from bare observation of nature by using concepts which could not be directly connected back to nature. He writes that Freud had made an "unwitting error[s] in judgement" creating a theory that was "tinged with feelings when it was based on the history of human civilization rather than science itself" (Kerr & Bowen, 1988, p. 357) . In his book *Family Therapy in Clinical Practice,* Bowen (1978) describes his opinion on the limitations of psychoanalysis,

> Few events in history have influenced man's thinking more than psychoanalysis. This new knowledge about human behavior was gradually incorporated into psychiatry, psychology, sociology, anthropology, and the other professional disciplines that deal with human behavior, and into poetry, novels, plays, and other artistic works. Psychoanalytic concepts came to be regarded as basic truths. Along with the

> acceptance there were some long-term complications in the integration of psychoanalysis with other knowledge. Freud had been trained as a neurologist. He was clear that he was operating with theoretical assumptions, and that his concepts had no logical connection with medicine or the accepted sciences. His concept of "psycho" pathology, patterned after medicine, left us with a conceptual dilemma not yet resolved. He searched for a conceptual connection with medicine, but never found it. Meanwhile, he used inconsistent models to conceptualize his other findings. His broad knowledge of literature and the arts served as other models. A striking example was the oedipal conflict, which came from literature. His models accurately portrayed his clinical observations and represented a microcosm of human nature; nonetheless, his theoretical concepts came from discrepant sources. This made it difficult for his successors to think in concepts synonymous with medicine or the accepted sciences. In essence, he conceptualized a revolutionary new body of knowledge about human functioning that came to exist in its own compartment, without logical connection with medicine or any of the accepted sciences. The knowledge was popularized by the social sciences and the artistic world, but few of the concepts found their way into the more basic sciences. This further separated psychoanalysis from the sciences. (pp. 338-339)

Bowen believed that "The use of concepts from literature separated [Freud's] theory from facts that could be proven and validated by science" (Kerr & Bowen, 1988, p. 357). He believed that the psychoanalysts and psychiatrists who came after Freud had convinced themselves that the field represented a science,

> The twentieth century has been involved in a debate about whether psychoanalysis is a science. It is a science in the sense that it defines a body of facts about human functioning never previously described. It is not a science in the sense that it has never been able to make contact with, nor be accepted by the known sciences. The use of the scientific method has lulled psychoanalysis and psychiatry into believing it can someday become a science. The scientific method is a way of ordering random and discrepant data in a scientific way in the search for common denominators and scientific fact. Researchers have spent decades studying and restudying facts within psychoanalysis, discovering some new bits of information within the closed compartment, but they have not been able to make contact with the accepted sciences. Use of the scientific method does not make a body of knowledge into a science. (p. 391)

Bowen had a particular interest in solving difficult problems. He began reading extensively in biology, evolution, and the natural sciences to understand how the "known sciences" had tackled new and difficult problems. He decided that any science of human behavior would have to be consistent with evolutionary theory, and began looking for an institution which would support

research based on his developing hypothesis on the interpersonal nature of schizophrenia (Kerr & Bowen, 1988). He eventually moved to the newly created NIMH in 1954 and began the original study on the family where he would develop his family system theory (Bowen, 1978; Bowen, 2015).

The systems sciences were spontaneously emerging in different locations in the West and in various forms during the 1940's and early 1950's. Laszlo (1971/2003) and Bertalanffy (1968/2015) were developing systems philosophy and general systems concepts pertaining to a mathematical basis of nature. Wiener was developing his cybernetic theory based on the central idea of feedback loops as natural phenomena. The exact extent of the influence on Bowen by the emerging systems philosophy is unknown. But perhaps his most important contribution was his effort to leave aside *a priori* assumptions to produce a mode of original thinking. Bowen (1978) writes,

> There is another common misconception that should be mentioned. Many believe that family systems theory, as I have developed it, came from general systems theory. That is totally inaccurate. I knew nothing about general systems theory when I started my research. It is a way of "thinking about thinking" which occupies the same position to divergent theories that the scientific method occupies in relation to divergent and discrepant facts. In the 1940s I attended one lecture by von Bertalanffy of which I remembered nothing, and one lecture by Norbert Wiener of which I remembered very little. Whether anything from those lectures found its way into my thinking is a matter for conjecture. I did extensive reading in biology, evolution, and the national sciences, which I believe led to my formulation of emotional systems theory on the model of "systems" in nature. (p. 398)

This suggests that Bowen's natural systems view was unique in origin. While it can be argued that Bowen took the term "system" from some element of academic culture at the time, he developed a simpler and more concrete meaning of the term which guided his research, and eventually his clinical practice. His theory emerged from observations based on his notion of systems thinking, and if the concepts in theory have any basis in the facts of nature, then it might be assumed that anyone thinking about and observing nature in this way would eventually discover them. Thinking in this way about homo sapiens as a natural system is perhaps his most important contribution. Further, this attitude toward science is perhaps the most important aspect of Bowen theory in this study.

Michael Kerr (1988), a close associate of Bowen, defines "systems thinking" as a broad category of science which focuses on relationships and processes instead of categories and properties of things. He defines it as a movement toward nature, and away from assumption and dogma. Kerr writes, if one equates "systems thinking with the ability to be aware of the process of nature instead of the *content* of nature, then there is evidence that systems thinking [in the West] dates back at least 2,000 years" (p. 14). The Greeks living in Ionia believed that the world was made of atoms and that everything that occurred now was the result of conditions propagated from the past, including their own existence.

Kerr then associates Ptolemy's geocentric theory with a sort of "pre-Ionian" regression for almost two millennia, "This conceptualization prevailed over the ideas of the Ionians and influenced thinking for more than 1,700 years! In addition, man continued to believe that he was created in his present form and that, yes, diseases were caused by demons" (p. 15). One marker for this type of thinking would be a reliance on overly-simplistic, linear cause-and-effect thinking about a problem and the loss of the broader notion that causes are also effects. This linear "cause-and-effect" thinking is equivalent to what will be called in the present study "linear thinking."

Kerr views Copernicus' heliocentric model of the solar system, followed by Kepler's theory of planetary orbits, and Newton's predictive theory of universal gravitation as examples of developments rooted in systems thinking because they model processes instead of things. He argues that it is the fixation on the content and lack of attention to the processes of nature that sets science back. He makes the case that Bowen's theory of the human family as an *emotional system* draws its therapeutic efficacy precisely from developing the ability to "think systems" in this way (Kerr & Bowen, 1988, p. 158). Kerr distinguishes the natural system in the context of Bowen theory,

> Rather than applying general systems concepts to the family, Bowen assumed that the family was a naturally occurring system. The word "natural" refers to something that pertains to nature, to something formed by nature without human intervention. The

> concept of a natural system, in other words, assumes that systems exist in nature independently of man's creating them. The existence of natural systems does not even depend on the human's being aware of them. The principles that govern a natural system are written in nature and not created by the human brain. The solar system, the ant colony, the tides, the cell, the family of homo erectus, are all natural systems. The human family system sprung from the evolutionary process and not from the human brain. We did not create it. We did not design human relationships anymore than the elephant or gibbon designed their family relationships. Family systems theory assumes that the principles that govern such things are there in nature for us to discover. (p. 24)

Caskie (1994) describes Darwin's theory as an exemplary natural system theory, "Darwin's theory of evolution was a natural systems theory that saw nature as a system, organized according to reciprocal relationships, mutually interdependent and mutually influencing. His theory described and proposed a mechanism which connected components of living systems" (Caskie, 1994).

Like classical psychological theorists, both Weiner and Bertalanffy developed systems views that assumed human behavior is more a function of what is unique to humans than what humans have in common with the rest of nature. Wiener's "first goal in building a theory was to smooth out the differences between the mechanistic and vitalistic positions in science through the use of common concepts derived from the field of communications engineering" (Caskie, 1994, p. 9). He believed that man's social structure was merely analogous to social structures in other species but that the faculty for language was the decisive organizer for human society. Similarly, Bertalanffy was interested in extending general systems concepts to human behavior and the rest of the sciences in an effort to unite the scientific disciplines. He was more interested in man's uniqueness and believed that "man's capacity for creating symbols, and thus, culture" was the primary organizer for the uniqueness (Caskie, 1994, p. 11).

Bowen stands apart from system theorists as one who prioritized the study the homo sapiens species as it is in nature. The resulting theory rests on the discipline through which he tested and refined his hypotheses to predict behavior at the group level. Kerr (1988) writes that just as

Johannes Kepler's work on discovering that the orbits of the planets were elliptical instead of circular, a hypothesis had to be refined if it did not explain any single observation,

> It has always been the task of science to modify theories and models to fit observations as opposed to modifying or ignoring observations to preserve existing theories. Kepler, although often frustrated by the existence of observations that did not quite fit his models, persisted until he was finally rewarded with a mathematically precise model that accurately described all the motions of all the planets (p. 16).

This ideal became the rule in the psychiatric ward during Bowen's original NIMH family study. The entire staff was involved in contributing to theory as a part of therapeutic work in the clinical ward (Bowen, 2015). This "research attitude" created an air of curiosity and objectivity which also played a key part in the application of theory to clinical problems, and most importantly served as a model for patients to adopt themselves (Rakow, 2016). Bowen (1978) detailed his approach to science and uniquely disciplined approach to clinical research during the NIMH study,

> Psychotherapeutic principles and techniques were developed for each clinical situation. The hypothesis also predicted the changes that would occur with the psychotherapy. When research observations were not consistent with the hypothesis, the hypothesis was modified to fit the new facts, the psychotherapy was modified to fit the hypothesis, and new predictions were made about the results of the psychotherapy. When an unexpected clinical crisis arose, it was handled on an interim "clinical judgment" basis, but the hypothesis was considered at fault for not "knowing" about the situation ahead of time, and not having a predetermined therapeutic principle. The therapy was never changed to fit the situation except in emergencies. The goal was to change the hypothesis to account for the unexpected crisis, to change the therapy to fit the hypothesis, and to make new predictions about the therapy. Any failure to change in psychotherapy was as much a reason to reexamine and change the hypothesis as any other unpredicted change. Strict adherence to this principle resulted in a theoretical-therapeutic system that was developed as an integrated unit, with psychotherapy determined by the theory. (p. 520)

Bowen's findings in this original study suggested that individual behavior is relatively unpredictable when conceptually separated from the group context, and in particular the context of the family emotional system. Studying the family "as an emotional unit" (Bowen, 1978, p. 192) suggests that the family lives and breathes as a single, multigenerational organism, and that variables which pertain to emotional process in the group may account for variance on a higher order than

variables which pertain to an individual. The family unit is called a "system" in that "a change in one part of the system is followed by compensatory change in other parts of the system" (Bowen, 1978, p. 179). If there is a change in a symptom in one person, theory says chances are good that it would be related to a shift in one or more parts of the patient's emotional system.

These differences are also apparent in the various modes of family therapy which emerged during the time of Bowen's NIMH study. Kerr (1988) writes,

> The way a therapist thinks about what energizes or drives the process he observes in a family will govern what he addresses in therapy. Many family therapists, for example, talk about the family being a "system" but they have many different ideas about what makes the family a system. (1988, p. 11)

Bateson, one of the most prominent family researchers of the time, used pre-existing machine-control ideas from cybernetics to think of the family system (Bateson, 1987). Bateson might conceptualize relationship as a set of reciprocal transactions between two people which serve to regulate the whole. His *double-bind* hypothesis is based on observations on a taxonomy of semantic abstractions used between mother and child which hold the child in a kind of emotional servitude with the mother. Nichols, a modern author of family therapy texts, might think of the family system as "an encounter between distinct interpersonal cultures" (Nichols, 2016, p. xxi). For Nichols, family therapy provides a mirror for one person to reflect their emotional experience onto another, similar to the classical encounter group concept. In that case, the goal of therapy might be to fill the room with an appropriate number of people to serve that purpose.

An important distinction between Bowen and his fellow family therapy pioneers was that his peers were interested in therapy while he was interested in developing a scientific theory of human behavior in the family. Bowen thought that prioritizing therapy over theory imposed preexisting assumptions onto the human as a natural phenomenon which might not be grounded in scientific

theory. Kerr (1988) describes how the use of the term "system" to describe the human family as a product of nature differed from other family therapists in subtle ways,

> Many biological and social theorists, for example, are convinced that the parts (cells, people, other organisms, or whatever they happen to be studying) so mutually influence one another that there exist "wholes" (body, family, or whatever) that must be understood as entities in their own right. The concept of "whole" implies that there exists an entity with principles of operation that regulate the functioning of the entity's parts. A problem with the ideas of many of these theorists, however, is that they do not include a description of how the parts affect one another to create this "whole." Without at least some idea about the "how", it is quite easy to drift away from the realm of science and into the realm of holistic philosophy. . . .Systems is a descriptive term. It does not account for what is occurring, for what "drives" the process. . . . Saying that people function in reciprocal relationship to one another is a description of a phenomenon, not an explanation. . . . Saying that the human relationship process is rooted in instincts, has much in common with what occurs in other forms of life, and has a function in evolutionary terms is a step toward accounting for what occurs. This way of thinking about what "energizes" the phenomenon being described is contained in the concept of the family emotional system. (pp. 10-11)

Kerr's meta-perspective on the term "system" echoes Bowen's critique of Freud's and other family therapists' use of "discrepant models" to develop theory which describes a single phenomenon. For example, Salvador Minuchin used the terms *power*, *hierarchy, subsystem, boundary, alignment, coalition*, *triangulation*, and others to describe specific organizational *structures* which the therapist would adjust in a family (Minuchin, 1974). But the emphasis is on describing discrepant configurations within the family structure and not strong and well-defined process-oriented relationships between them. Each configuration stands on its own as a static entity. Because the relationships between the structures are loose, the terms themselves do not define a system where a change in one structure directly predicts a change in another structure. Thus, the application of each term to a particular case is left up the therapist's intuition, which would likely have supported Minuchin as a remarkably intuitive master clinician. Therefore, the structural family "theory" serves more as a mental framework for organizing clinical interventions than the study of the family as a system which arises from nature.

Kerr responds to this "erosion" of the term theory as a research device, "The trend of the decades had been one in which therapists interpreted theory according to their own feeling states" (1988, p. 365). Bowen believed that human behavior would only be accepted as a science if it were "anchored in biology, evolutionary theory, and other knowledge about natural processes" (Kerr & Bowen, 1988, p. 5). Bowen thought that "systems thinking would provide the conceptual bridge from psychiatry to the accepted sciences" (Kerr & Bowen, 1988, p. 6) . He believed that the "physical structure of the human brain was scientific, that the human brain *functions* to create feelings and subjective states, and that the brain is capable of separating structure from function" (Kerr & Bowen, 1988, pp. 354-355). Even the use of mathematics was in question, as a conceptual framework that relied on ideas created outside the observation of a specific natural context, and then often imposed upon nature to form theory. "To get beyond mathematics and technology, I fashioned a natural systems theory, designed to fit precisely with the principles of evolution and the human as an evolutionary being." (p. 360).

Bowen broke from the mainstream in two ways: through the understanding that emotional functioning extends beyond psychological constructs and to all life; and the understanding of human behavior beyond the individual in the relationship system (Kerr & Bowen, 1988). Bowen Theory contains eight concepts; *nuclear family emotional system, differentiation of self, triangulation, cutoff, family projection process, multigenerational transmission process, sibling position,* and *emotional process in society*. Kerr (1988) writes, "None of these eight concepts in Bowen Theory were borrowed from psychological theory," explaining that theory development occurred in a vacuum to allow for an entirely new way of looking at the individual. The orientation was instead a natural system theory and the focus was the shift from the individual to the family as an emotional unit. According to Kerr, this shift encourages one to "focus simultaneously on thinking/feeling behavior affecting atmosphere, and equal emphasis on atmosphere affecting each's thinking/feeling behavior" (p. 9). In therapy, holding

this perspective requires a "quantum leap in the conceptual capacity of the observer" to shift the unit of focus from individual to system and back again as often as the session demands (Kerr, 1981).

The emotional system.

Bowen's primary assumptions were organized in the context of existing biological theory, including Darwin's theory of evolution. Definitions of research terms were assumed to come from or relate to biology. What resulted was not only a concept to organize research on human behavior, but a concept to organize research on the individual, relationship system, and similar systems in other species. Titelman (2014) describes the emotional system as "behavior governed by the part of the human we share with the rest of life" (p. 304). The emotional system "describes the automatic processes by which an organism directs its response to the challenges and opportunities it faces" (Papero, 2016, p. 17). Kott (2014) writes that "What differentiates Bowen theory from other family systems approaches is its emphasis on the sensitivity human beings have to each other at a biological level" (p. 76). According to Bowen (1978), the emotional system handles the "myriads of sensory stimuli from the digestive, circulatory, respiratory, and all the other organ systems within the body as well as stimuli from the sensing organs that perceive the environment and relationships with others" (p. 372). In a detailed description on mammalian evolution, Bowen (1988) later writes, "The neocortex is designed for solutions of situations that arise in the external world. It receives signals primarily from the eyes, ears, and body wall" (p. 36). Titelman (2014) continues that "the emotional system includes 'all the automatic functions that govern the autonomic nervous system' and can be thought of as 'synonymous with instinct that governs the life processes in all living things' (Bowen, 1978, p. 356)." (p. 26). Kerr (1988) defines the emotional system in this way,

> Given the limits of our present knowledge about living systems, it is possible to define the emotional system in only a general way. Defined broadly, the concept postulates the existence of a naturally occurring system in all forms of life that enables an organism to receive information (from within itself and from the environment), to integrate that information, and to respond on the basis of it. The emotional system

> includes mechanisms such as those involved in finding and obtaining food, reproducing, fleeing enemies, rearing young, and other aspects of social relationships. It includes responses that range from the most automatic instinctual ones to those that contain a mix of automatic and learned elements. Guided by the emotional system, organisms appear to respond sometimes based on self-interest and sometimes based on the interests of the group. (pp. 27-28)

Kerr writes that one function of the emotional system concept is to say that all of life is defined by universal life forces. Saying that a human is defined by their emotional system is to say that human behavior is fundamentally governed by forces which are common to all of life. This is a different way of looking at human behavior than beginning with the assumption that human behavior is defined more by what is unique among humans, namely the reflective and self-regulatory capacities made possible by the relatively recently developed neocortex. Kerr reflects on the pervasiveness of this sort of automatic response in all of life,

> An example of emotionally determined behavior in a lower animal is the activity of a highly stimulated horde of soldier caste ants vigorously responding to intruders into their colony. The ants neither contemplate the meaning of their actions nor harbor strong nationalistic feelings; they simply act. Another example of emotional reactiveness in a lower animal is the teeth baring of a male baboon in response to a stranger. The automatic movement of a plant, a barnacle, or a moth toward a light source is another emotional response. (p. 30)

Bowen (1978) defines it in this way,

> Man is conceived as the most complex form of life that evolved from the lower forms and is intimately connected with all living things. . .. Emotional functioning includes the automatic forces that govern protoplasmic life. It includes the force that biology defines as instinct, reproduction, the automatic activity controlled by the autonomic nervous system, subjective emotional and feeling states, and the forces that govern relationship systems. . . . The theory postulates that far more human activity is governed by man's emotional system than he has been willing to admit, and there is far more similarity than dissimilarity between the 'dance of life" in lower forms and the 'dance of life' in human forms. (pp. 304-305)

The emotional system concept provides a channel of communication that can bridge the compartmentalization caused by polarities in biology, such as "psychic versus somatic causes of disease" (Kerr & Bowen, 1988, p. 28). "While immunologists, endocrinologists, virologists, geneticists, and other specialists can all describe the activity of pathological processes in the systems

they study, they cannot account for that activity adequately" (Kerr & Bowen, 1988, p. 29). Kerr writes,

> For example, thinking of the body as an emotional system may enhance our understanding of a clinical problem such as cancer. If the body can be conceptualized accurately as an emotional system, then cancer may reflect some sort of disturbance in the balance of that system. This way of thinking about cancer is quite different from the way of thinking upon which most cancer research has been based. Research on finding the cause of cancer has tended to focus on what is occurring inside the cancer cell. The research question has generally been, "What has gone wrong with this cell to cause it to behave abnormally?" Research based on the assumption that cancer is caused by a defect or disturbance within the cell may eventually provide an adequate explanation. On the other hand, an adequate explanation may possibly depend on being able to conceptualize the body as a biological unit, for example, as a colony of cells. Cancer would reflect a disturbance in the unit as a whole. The disturbance observed within the cell would be a reflection of a disturbance in the larger system of which the cancer-containing organ is a part (p. 29).

Another feature of the emotional system concept is portability from the individual to the relationship system. Papero (2016) describes the emotional system as simultaneously serving two purposes in the individual: the internal regulation of the individual, and the regulation of the individual in the context of the relationship system,

> Often active below the threshold of a person's awareness, emotion involves multiple complex interactions of physiology and psychology that deeply influence the individual's functioning (how the individual responds to the conditions he or she faces). That functioning in turn unfolds in sets of reciprocal interactions with important others, each influencing the other to form repetitive sets or patterns. These patterns can be observed and predicted in conjunction with variables in context. (p. 15)

This two-pronged function of the emotional system in an individual organism is one example of how an individual both defines and is defined by its context. Papero (2016) points out the reciprocal nature of emotion as "the force or energy that both produces and results from interaction between discrete living entities and between a living thing and environment" (p. 18). While Darwin defined emotion as the instinctual energy which compelled a single organism to action, Bowen extended this definition to include the interaction of instincts from multiple entities within a single system. Various

systems may then interact at different levels, for example individuals in a family, or the various organic systems within an individual or within a single cell. This type of system is "driven" by emotion, is the product of millennia of evolution, and may even adhere to laws of organization more fundamental to life.

Kerr suggests that humans have a tendency to assume that human motives are psychological, that there is a reason for behavior. He believed that we assume that an emotional response in an animal, such as rejecting and recoiling away from food, is automatic, while the same response in an adolescent female "is generally ascribed to a psychological conflict" (p. 30). We can ask the human "why" they respond the way they did but we cannot ask the animal the same question, and so we assume that the animal has a "how" but not a "why." Kerr (1988) writes,

> Focused as we are on psychological reasons, it is easy to forget that humans, like soldier caste ants and barnacles, are motivated to do many things on the basis of processes that have roots deeper (older in an evolutionary sense) than thinking and feeling (p. 31).

The emotional system concept underpins Bowen's definition of the human family as a system. It defines the human family by the highly integrated nature of the automatic processes within each individual in relation to the group. Thus, just as the emotional character of the inputs and outputs of each organ in the body occur in conjunction with adjacent organs, homo sapiens has evolved to function in conjunction with adjacent homo sapiens as a highly integrated, emotional unit. The emotional inputs and outputs of each component in the system were designed to interact.

As Freud or other family therapists applied discrepant concepts to different aspects of human behavior, Bowen sought to develop a theory which could one day integrate all aspects of human behavior. The emotional system as an integrative concept was Bowen's answer to overcoming the problem of using disparate models to describe a single phenomenon. Though the theory itself is not a complete picture of human behavior, he was careful not to add new concepts

that did not have a relationship to established concepts. Thus, the emotional system concept provides a starting point for organizing research into the relationships between systems within the individual, relationship context, as well as how these relate to systems in other species. Bowen (1978) writes,

> Man's family is a system which I believe follows the laws of natural systems. I believe knowledge about the family system may provide the pathway for getting beyond static concepts and into the functional concepts of systems. I believe that family can provide answers to the medical model dilemma of psychiatry, that family concepts may eventually become the basis for a new and different theory about emotional illness, and that this in turn will make its contribution to medical science and practice (Bowen, 1978, p. 151).

Differentiation of self.

In biology, the term differentiation has a very specific meaning, which is, "The normal process by which a less specialized cell develops or matures to become more distinct in form and function" (2017). This definition contains a few important implicit points. First, that differentiation is a process. Second, that it pertains to an individual. Third, that it defines something which occurs in that individual in relation to a greater system. Fourth, it indicates that the individual plays a part in an integrated system because "specialized" is relative term which describes one individual's function in relation to another individual's function. Fifth, though it is not directly implied in the definition, it might be inferred that the purpose of the process of differentiation is at least partially guided by the system, and that purpose is to produce a more adaptable system. The path of specialization is influenced or dependent on the individual's position relative to other specialized individuals. If a town of 50 has one baker, it is not likely that the next person will become another baker. One might further infer that the type of specialization which occurs is selected naturally for adaptability, an idea consistent with evolutionary theory. Increased specialization requires increased coordination, just as a society with different professional fields requires a common currency to communicate the value of

their effort in work. Therefore, differentiation implies adaptability by virtue of increased specialization with increased coordination.

In his early research on schizophrenia, Bowen observed that families grappling with a psychosis were expressing a more intense form of the same emotional process as higher-functioning families (ref). He defined the *differentiation of self scale* to illustrate the continuum of a family or individual's dependency on the environment. Papero (2016) writes of the development of the construct,

> . . . unlike the psychotic level *folie à deux*, Bowen observed that this 'psychological oneness' can be found not only in severely symptomatic families, but in all families to some degree. And some family members are more caught up in it than others. This observed variation became a part of the foundation for the development of the concept of the scale of differentiation of self, the core of the Bowen theory (p. 17).

A less differentiated family would require more energy and more resources to survive in the face of pressure from the environment. A more differentiated family would be more efficient in their response to environmental pressures and would have more energy to offer members of the family and also the environment. Kerr (1988) describes some of the qualities of more or less differentiated families,

> Family systems theory also addresses the human's capacity for cohesiveness, altruism, and cooperativeness. Specifically, the theory attempts to account for the variability in these properties between families. The higher the level of differentiation of people in a family or other social group, the more they can cooperate, look out for one another's welfare, and stay in adequate contact during stressful as well as calm periods. The lower the level of differentiation, the more likely the family, when stressed, will regress to selfish, aggressive, and avoidance behaviors; cohesiveness, altruism, and cooperativeness will break down. . .The more differentiated a self, the more a person can be an individual *while in emotional contact with the group.* (p. 93).

This scale was intended in part to show that human families had much in common with other species, from the social structure of ants, to the stress and stampede effect in bovine herds, to mating patterns in primates (Kerr & Bowen, 1988; Gilbert, 2006). While the term differentiation

pertains to life at all levels, differentiation of self is the process by which an individual human differentiates from their family of origin. It is the core construct of Bowen theory.

The scale illustrates the observation that every family operated along the same fundamental rules, he defined a scale which had no notion of normal and abnormal, as psychiatry had not properly defined the terms (Bowen, 1978; Nichols, 2016). Poor differentiation is not a pathological pattern developed later in life but is a lack of developmental maturation out of the symbiotic attachment between an individual and the emotional system. Though the effort of differentiation is more intense with caregiver bonds, the process also occurs to progressively lesser extent between an individual and their siblings, extended family, work, and social systems.

The goal of "coaching" in Bowen Theory is to assist an individual in expanding awareness beyond their personal frame to develop a level of equanimity with stressors from the rest of the environment (Titelman, 2013). That is, the "work is to differentiate self from one's emotional systems – the work that makes the difference in lives" (Gilbert, 2006, p. kpp 29). Bowen defined two more systems which function along with the emotional system: the *feeling system*, and the *thinking system.* "The feeling system is postulated as a link between the emotional and intellectual systems through which certain emotional states are represented in conscious awareness" (Bowen, 1978, p. 356). "The intellectual system is a function of the cerebral cortex which appeared last in man's evolutionary development and is the main difference between man and the lower forms of life. The cerebral cortex involves the ability to think, reason, and reflect, and enables man to govern his life, in certain areas, according to logic, intellect, and reason" (Bowen, 1978, p. 356).

Bowen wrote that "The terms 'fusion' and 'cutoff' describe the ways cells agglutinate and the way they separate to start new colonies of cells" (Kerr & Bowen, 1988, p. 362). The thinking and feeling systems in a less differentiated person are more fused in their functioning. That is, a fused system functions with a higher level of interference from the other. A person who is more fused is

less able to access feelings without predominance of thinking, and less able to access thinking without a predominance of feelings. Differentiation of self is the process through which a person increases their capacity to choose between thinking and feeling as anxiety increases in the environment. Bowen observed that the people who applied this concept in their own families automatically benefitted from that effort in other areas of life. Therefore, the benchmark of differentiation is seen as how well someone has differentiated from the emotional system in their family of origin (Bowen, 1978).

The benefit of higher differentiation of self is less reactivity, longer foresight, and more energy to devote toward other more productive aspects of life. Markers of higher differentiation include the ability to remain firm in and state one's deepest convictions without requiring others to change theirs, and to retain more access to the thinking system as anxiety increases in the group. These qualities make more differentiated people powerful leaders, even if they are not the one who are explicitly making decisions for the group. Alan Gurman (as cited by Wylie, 1991), professor of psychiatry at the University of Wisconsin Medical School describes differentiation of self, "Maturation, moral development, the ability to cope with stress, modulate anxiety, and assert yourself without stepping on other people's toes; in short, being your own person – psychodynamic therapists have been talking about all that for years." Kerr (as cited by Wylie, 1991) says it is very simply, "Differentiation is the ability to think, feel, and act for oneself."

"For oneself," in this sense, points to an individual having more choice over their behavior and less automatic, reflexive, non-thoughtful behavior determined by reaction to the group. This individual-centric behavior not to be confused with *individualist* and *collectivist* tendencies in a group, which are factors of human culture. How mature, thoughtful, and intentional an individual responds to cultural demands are factors of the emotional system, which defines a more basic level of behavior than culture.

Bowen held that the thinking system is ideally informed through, but not ruled by, the feeling system. But differentiation is "not to be confused with avoidance" (Kerr & Bowen, 1988, p. 68). An avoidant person is just as reactive to their family emotional system as a person who is fused within it. Therefore, a more differentiated person is able to remain in contact with relationship while retaining the ability to choose between thinking and feeling as anxiety rises in the group. Less differentiated individuals waste energy coping with stressors from the environment that could otherwise be used for the more productive and enjoyable parts of life (Nichols, 2013; Papero, 2016). Just as less differentiated thinking and feeling systems are less able to function autonomously, less differentiated individuals are more dependent on their environment. They are more vulnerable to medical and psychological symptoms but are not necessarily symptomatic so long as the environment is sufficiently supportive (Bowen, 1978).

The original NIMH study, which ended in 1959, provided the valuable observations from a quasi-naturalistic environment of the in-patient ward. Bowen then moved his research to the Georgetown Medical Center where he continued developing the theoretical system. He published the theory in 1966. By that time, he had accumulated years of experimentation differentiating himself from his own family of origin, and when a death occurred in the extended family he was prepared to seize the opportunity to make an orchestrated move toward differentiation. In a report on this effort he described his theoretical view of the process and markers of differentiation of self as it applied to the counterbalancing life forces of *individuality* and *togetherness*,

> Each small step toward the "differentiation" of a self is opposed by emotional forces for "togetherness," which keeps the emotional system in check. The togetherness forces define the family members as alike in terms of important beliefs, philosophies, life principles, and feelings. The forces constantly emphasize the togetherness by using "we" to define what "we think or feel," or the forces define the self of another such as, "My wife thinks that . . . ," or the forces use the indefinite "it" to define common values, as in, "It is wrong" or "It is the thing to do." The togetherness amalgam is bound together by assigning positive value on thinking about the other before self, living for the other, sacrifice for others, love and devotion and compassion for others,

> and feeling responsible for the comfort and well being of others. If the other is unhappy or uncomfortable, the togetherness force feels guilty and asks, "What have I done to cause this?" and it blames the other for lack of happiness or failure in self.
> The differentiating force places emphasis on "I" in defining the foregoing characteristics. The "I position" defines principle and action in terms of, "This is what I think, or believe" and, "This is what I will do or will not do," without impinging one's own values or beliefs on others. It is the "responsible I" which assumes responsibility for one's own happiness and comfort, and it avoids thinking that tends to blame and hold others responsible for one's own unhappiness or failures. The "responsible I" avoids the "irresponsible I" which makes demands on others with, "I want, or I deserve, or this is my right, or my privilege." A reasonably differentiated person is capable of genuine concern for others without expecting something in return, but the togetherness forces treat differentiation as selfish and hostile. (1978, pp. 494-495)

Bowen gives a clinical example of a husband who stopped giving in to his wife's demands for togetherness which impinged on his ability to care for himself. Though the wife protested, the husband was able to hold his ground, and once the wife adjusted to his new position she thanked him for it. Bowen considered "this sequence a basic increase in bilateral differentiation which can never return to the former level" (1978, p. 496).

Poorly differentiated people "share more of self" with others (Bowen, 1988), and so rely on others more to provide them a sense of wholeness. A commonly cited example from the NIMH study is where a psychotic patient would belch and the mother would say "excuse me" (Bowen, 1978, p. 6). While this patient and mother represent an emotional fusion, the father was just distant. Conversely, Siegel (2012) describes how infants of depressed mothers participate in the "sharing of such states" and can be as equally unresponsive as their caregivers. In terms of reactivity to stress, Bowen (1988) described differentiation as "the coefficient of personality" (p. 69), that some personality traits may have a genetic basis but differentiation partly determines how those traits are expressed. The telltale signs of low differentiation may disappear in situations where one is able to comfortably share self with another. The force of togetherness is dominant for both individuals in these situations but the comfort is temporary. Eventually one of the two experiences a deficit of

individuality, and at that point the closeness becomes too intense to contain with in the pair. One of the two will eventually seek a togetherness with a third individual, which in turn causes the rejected individual to try to get back inside the togetherness. In adults, poorly differentiated people are unable to survive either alone or apart and may cycle between immature relationships in order to feel whole. Bowen termed this cycling between individuality and togetherness *triangling* (Bowen, 1978; Kerr & Bowen, 1988).

Triangles.

The triangle, not to be confused with the psychological concept of a triad, is the fundamental building block in the emotional system. Triangles serve an adaptive function in the group as pathways to balance anxiety. Triangles are what makes "strength in numbers" possible. In a well differentiated context an anxious individual can temporarily share their anxiety with others by increasing the level of closeness with one or more members. This behavior is basically similar to herding organisms such as cows or arctic muskox huddling together to protect against an approaching predator (Gilbert, 2006). Patterns of triangulation become more fixed in place as the level of anxiety increases beyond a group's ability to adapt. Chronically anxious groups become more rigid in their functioning and patterns of triangulation eventually become set in stone (Bowen, 1978, 1988; Papero, 2015; Titelman, 2013). If members are fixed on the close side of a triangle they are considered to be *fused,* and wherever there is a fused dyad there is a third who is isolated.

The members on the more comfortable close side of a triangle or set of interlocking triangles cling to a chosen subjective reality which serves to lessen their own anxiety at the expense of the members on the far side of the triangle or set of interlocking triangles. Nichols (2013) adds, "Triangulation lets off steam but freezes conflict in place" (p. 78). These people are in effect ignoring more objective realities of their situation in favor of a subjective representation which supports their need for togetherness as a quick-fix in the moment. An example would be where one-

person gossips about another using facts which support their own point of view but ignoring other facts which refute it.

There are two ways for an individual to relieve tension with an emotional system, to fuse with it at the expense of self, or to cut off from it completely. The polar opposite of fusion, *emotional cutoff* also relieves tension in the short term but does nothing to change the underlying pattern of emotional reactivity that will affect all relationships in the person's life. Bowen (1988) writes that success in relationship requires harmony between individuality and togetherness, and "harmony [in relationship] requires giving up a bit of 'self'" (p. 81). He goes on to write that giving up too much self leads to increased anxiety and behaviors such as "overeating, undereating, overachieving, underachieving, excessive alcohol or drug use, and relationships such as affairs [which] are, in part, symptoms of anxiety and attempts to manage it" (p. 87). Ignoring the sensory feedback from these behaviors in favor of maintaining a more subjectively-informed sense of self provided by a fusion can lead to medical and psychological symptoms.

Conversely, the dilemma for cutoff individuals is that they will reencounter this pattern in other relationships because they still have very little "self" to give up in order to maintain harmony in the relationship. Bowen scholars (Bowen, 1978; Gilbert, 2006; Papero, 2014; Titelman, 2003) emphasize the benefit of maintaining a connection with as much of the extended family as possible. Bowen promoted maintaining an "'open relationship to every living relative', a goal he believed would do more for enhancing a solid self than anything else he could do in his whole life" (Titelman, 1998, p. 17). The more connections one has in their lives, the larger their support network is (Papero, 2014). In times of stress they can spread their need across more members without relying on a few rigid triangles.

Family projection and multigenerational transmission.

Attachment theory is one example of an effort to define a theory of human behavior which moves toward process as opposed to simply the content of nature. There are many conceptual overlaps with Bowen's research and attachment theory (Skowron & Dendy, 2004). Three main differences stand out. First, that insecure attachment accounts for low adaptiveness to stress as a deficit in the caregiver's support of a child while Bowen theory accounts for problems as the result of overfocus as regulated by the family system. Second, attachment theory does not account for varying health outcomes in siblings which come from the same parents. Third, concepts in attachment theory pertain to the mother-child dyad while concepts in Bowen theory pertain to each member in the family.

Bowen observed four mechanisms that a family will use to bind anxiety in order of severity: conflict, over-functioning-underfunctioning reciprocity, triangling, and projection onto a child which is a particular form of triangling. Conflict requires little explanation. "Overfunctioning-underfunctioning reciprocity" (Kerr & Bowen, 1988, p. 57), sometimes referred to as one-up/one-down or symptom in spouse, occurs when one spouse begins to invest more resources into the relationship than the other which can lead to a symptom or some other kind of underfunctioning. Triangling occurs when anxiety cannot be contained within the parental relationships and the couple looks for a scapegoat or one parent allies with a third against the other parent. The fourth mechanism, projection onto a child, is the most difficult to resolve. Bowen observed that a single child could become the object of focus in the parent triangle. This occurs when a problem in a child offers a diversion from anxiety in the parental relationship. The overfocus increases anxiety in the child which makes the symptom worse. As the symptom in the child increases, anxiety in the parent or parents decreases. The child, unable to resist the parental overfocus, eventually accepts the family

projection as part of themselves and the symptoms increase. The cycle is intensified as medication and individual psychotherapy are administered to the "sick" patient (Bowen, 1978).

In the original NIMH study, it was found that when a psychotic child patient would start to improve, the parent would develop a condition. The moment the parent began calling the child "sick," the patient's symptoms would reappear. This reciprocity was so predictable that the ward staff would use a change on patient's symptoms as a warning for the parent's symptoms, and visa versa (Rakow, 2016). These observations formed the basis for the concept of the triangle, as it was observed that a change in a symptom was preceded by mother or child ally with the ward staff against the other (Rakow, 2016).

Important observations came from the nurses on the ward, who Bowen trained not to "fix" the family's problems but to serve as a resource for the family taking responsibility for working out their own emotional challenges. This was a departure from the typical role of a nurse and was easier for some to adjust to and more difficult for others. But this "neutral" role allowed the nurses to conduct a more naturalistic observation of the staff. In a review of the nurses' notes from the NIMH study, Rakow (2016) cites an undated entry logged by Bowen,

> Change in the functioning of one family member would be followed immediately by a reciprocal change in the functioning of the family member who was closest attached emotionally, and that this in turn would be followed by reciprocal change in other family members. There was one mother and patient who had no significant emotional ties other than to each other." [The A family] "Each time there was a significant improvement in the patient, the mother would, within a few hours develop a severe physical illness, that could be prolonged and require hospitalization. In another family, the following pattern repeated three times in two months. It involved the mother and patient in the hospital and an adolescent son at home. The patient would get worse, more symptoms of psychosis, the mother immediately become more adequate, decisive, and resourceful, and within the next 24 hours the adolescent son would be picked up by the police for delinquent behavior, like stealing a bicycle, street fighting, and carrying an illegal knife." [The C family] (Bowen, undated) (p. 148)

The selection of a particular child can occur for various reasons, such as overinvestment in the child's future prior to birth or the development of a symptom in the child. Bowen hypothesized

that the child who is caught in a projection process acquires a level of differentiation slightly lower than the parents. The other siblings who are relatively free of the emotional oneness of the projection process acquire a level of differentiation slightly higher than their parents. Levels of differentiation increase through some lines of inheritance and decrease through others in what Bowen termed the *multigenerational transmission process* (Kerr & Bowen 1988; Gilbert, 2006).

Accounting for variation among siblings is an area often missing from developmental theories such as attachment theory. Bowen wrote that each nuclear family participates in a basic multigenerational transmission process, where some siblings doing worse, some doing better and some doing about the same as their parents. That is, some lines are decreasing differentiation, some are increasing in differentiation, and some are maintaining the level of differentiation that they inherited. Because a less differentiated person is associated with poorer health outcomes, the multigenerational transmission process provides a doorway into longitudinal medical research.

The suggestion that mental illnesses such as schizophrenia or severe intellectual disability could be the inheritance of several generations of accumulated regression stands at odds with the predominant view that they are caused by physiological factors pertaining solely the individual. It does not just say that schizophrenia is a behavioral disease, but a roadmap to track the various medical and behavioral dimensions of functioning that "cause" such a disease when combined together. A concrete, physiological basis for these diseases may one day be found (Nelson, Bassett, Chamchong, Bullmore, & Lim, 2017) and appropriate therapies may then be developed, but the question of etiology ultimately remains. As concept that interlocks with the concepts differentiation of self, triangles, cutoff, and family projection process, the multigenerational transmission process concept provides a way to link broader longitudinal variables to present day health outcomes, while pointing to concrete solutions to increase family functioning in the future.

Bowen said that through a *family diagram* of at least three generations, one can very quickly see the transmission of more or less differentiation from parent to child (Papero, 2016). The less differentiated child will find a partner with roughly equivalent level of differentiation, which is then passed on to their children in similar fashion. In this way triangles can persist through the generations and beyond recent memory. Bowen went so far as to hypothesize that a schizophrenic could be produced in as little as three generations (Bowen, 1978). Kerr (1988) gives an approximate timescale for the transmission process to occur,

> Although functioning that is stable in most aspects and functioning that is unstable in most aspects are both linked to trends in functioning in a multigenerational family, the rapidity with which changes in levels of functioning (and, consequently, discrepancies in the functioning of family members) occur is variable. Marked discrepancies in functioning can occur in as few as three generations. For example, the functioning of the grandparents of a family member whose functioning is unstable in most aspects may have been fairly stable. Such quantum jumps in functioning are uncommon, however. It is much more common for only mild to moderate discrepancies in functioning to exist after four or five generations. So a fairly stable nuclear family unit can have a descendant who has a chronic schizophrenic level of functioning in just three generations (a quantum jump), but it is more common for such a marked decrease in level of functioning to require five to ten generations to develop. Similarly, a fairly unstable nuclear family unit can, in three or four generations, have a descendant whose functioning is stable in most aspects, but it is much more common for such a pronounced increase to develop over five to ten generations. (p. 223)

Expanded beyond the evolutionary timeline of homo sapiens, this key concept connects the theory to its roots in evolutionary biology by implying that every individual is the product of both the physiological, behavioral, and genetic inheritance. The family diagram, or visible representation of the family tree and the emotional processes through the generations, "reflects the ebb and flow of emotional process through the generations. It defines the vicissitudes of a living organism, the multigenerational family" (p. 306). Thus, consistent with evolutionary theory, the family unit and the species evolve over time to greater or lesser levels of differentiation and adaptation to the environment.

The evolutionary view thus described can appear deterministic, and the position of the child might appear hopeless as a sort of victim in the process. However, the reciprocal nature of the triangle also implies that each member has the opportunity to move toward differentiation. What's more, emotional reciprocity also implies that one person pulling up in functioning automatically impacts the functioning of others for the better. In an often-cited passage, Bowen (1978) sums up the broad, bidirectional impact of a shift in the emotional system:

> When any key member of an emotional system can control his own emotional reactiveness and accurately observe the functioning of the system and his part in it, and he can avoid counterattacking when he is provoked, and when he can maintain an active relationship with the other key members without withdrawing or becoming silent, the entire system will change in a series of predictable steps. (p. 436)

This passage points to the predictability of the emotional system at the group level. What's more, a longitudinal view of the family emotional process suggests that any one person's efforts can have a significant impact on the lives of many others to come. Similar to prominent systems philosophers, Bowen's approach discourages passivity in favor of engagement with one's social environment on the premise that the experience of others directly impacts one's own experience (Macy, 1991).

Measuring differentiation of self.

Bowen theory contains eight interlocking concepts which can be used to predict the ways in which a family will respond to environmental pressure. As one of these eight concepts, differentiation of self pertains to an individual and is the main construct of the theory. As of this writing, it is not possible to measure the other seven concepts but many attempts have been made at measuring differentiation of self. Aside from the clinical evidence from Bowen's NIMH research project and subsequent anecdotal evidence, these instruments represent the state of the art of Bowen theory as a verifiable science.

While Bowen outlined a theoretical scale for differentiation of self ranging from 0 and 100, he based an individual's score on clinical observations and interviews with an individual over many

months along with external variables such as the functioning of the person around him. Bowen (1978) describes the difficulty in quantifying the scale,

> The scale is most important as a theoretical concept for understanding the total human phenomenon and as a reliable instrument for making an overall evaluation of the course of a life, and accurate predictions about the possible future life directions of a person. It is not possible to do day to day or week to week evaluations of scale levels because of the wide shifts in the functional level of pseudo-self in low-scale people. A compliment can raise the functioning level of self and criticism can lower it. It is possible to do reasonably accurate general estimations from information that covers months or years. (p. 475)

As stated, the definition of differentiation of self as a concept for "understanding the total human phenomenon" is quite broad. As with the other concepts in the theory, it was intended more to generate hypotheses for the development of theory than to point to a precisely measurable construct. Despite the broad multivariate and longitudinal nature of the theoretical construct, the attempts at measuring differentiation of self which achieved significant validity in both American and international populations.

Psychometric instruments for differentiation of self.

The most widely used instrument today is the Differentiation of Self Scale (DSI) (Skowron & Friedlander, 1998), which was later revised as the DSI-R (Skowron & Schmitt, 2003). The DSI-R includes four dimensions: emotional reactivity, I-position, fusion and emotional cut-off. The DSI was examined by Bowen experts for theoretical validity, validated for construct validity with other scales of differentiation, and had internal validity of .88 using Cronbach's alpha (Miller, Anderson, & Keala, 2004). It has been found to be reliable in samples within the United States (Jankowski & Hooper, 2012) and as we shall discuss later, it has been translated into several languages to test its concept of differentiation across cultures. As of this writing, the DSI-R is the most widely used, and most psychometrically validated instrument which measures differentiation of self (Sloan & Dierendonck, 2016).

In a study on the moderating effect of self-construal (i.e. self-image) on the relationship between differentiation of self using the short-form DSI-SF (Drake, Murdock, Marszalek, & Carolyn, 2015), and well-being in US college students (Ross & Murdock, 2014), it was found that there is a "relationship between differentiation of self and well-being such that high levels of independent self-construal serve as a buffer to psychological symptoms for those with low levels of differentiation of self" (p. 487). In a study on American college women, Gushue & Constantine (2003) used the DSI to find that "individualism," or the ability to define self, and "collectivism," or the ability to draw on others for support while maintaining self, are positively related to less emotional reactivity and less fusion. Based on this finding, the authors suggest that "for some African American women, a cultural belief in the fundamental equality and similarity of human beings is positively related to efforts to define a self" (2003).

In many studies, differentiation of self has been found to be a partial predictor of psychological distress in American populations (Charles, 2001; Bartle-Haring & Probst, 2004; Murdock & Gore, 2004; Skowron, Stanley, & Shapiro, 2009; Krycak, Murdock, & Marszalek, 2012). Some studies on Bowen theory look at marital satisfaction as measurable an outcome (Miller, Anderson, & Keala, 2004; Hardy, Soloski, Ratcliffe, Anderson, & Willoughby, 2015). Marital satisfaction is often described in terms similar to differentiation of self, such as resilience in the face of stress, or general level of reactivity to emotional problems in the marriage. Hardy et al (2015) found that the quality of relationship with the family of origin is positively correlated with marital outcomes in American samples. Similarly, Priest (2015) found that the concept of differentiation could explain the positive correlation between early abuse/violence in the family of origin and distress in committed romantic relationships among samples of American individuals with Generalized Anxiety Disorder.

Bowen and scholars of his theory affirm that in systems-oriented therapy, a therapist will only be as effective as they have managed to become within their own family of origin (Bowen, 1978; Kerr & Bowen, 1988; Titelman, 1998/2013). One study on differentiation of self in the therapist and therapy outcomes measured two factors; client's perception of therapeutic alliance; and psychological well-being (Bartle-Haring, Shannon, Bowers, & Holowacz, 2016). It was found that the effect on differentiation found there to be a significant relationship between differentiation in the therapist and positive outcomes, but in the opposite direction expected. Interestingly, while the therapists level of differentiation decreased (as measured by suggestion of triangulation and cutoff through the DSI), the quality of the therapeutic bond as reported by the client increased. However, the authors of the study interpreted the client's favorable perception of the subjective *alliance* to be a positive outcome and counter to Bowen's notions of differentiation making a therapist "more effective," which may or may not be correct. Bowen's position on the therapeutic relationship differed from individual modalities in that the "coach" is mean to stay outside the couple's transference by guiding them to work out their problems for themselves (Titelman, 1998/2013, p. 31). Therefore, it is possible that the lesser differentiated a therapist is, the more likely they are to form a comfortable-feeling yet unhealthy bond with the client which is in line with Bowen's notion of increased triangulation in poorly differentiated individuals (Titelman, 1998/2013, p. 33).

The Level of Differentiation of Self Scale (LDSS) (Haber, 1993) is a self-report inventory which is found to correlate with psychological wellbeing. The Personal Authority in the Family System Questionnaire, or PAFS-Q, (Bray, Williamson, & Malone, 1984) doesn't necessarily measure Bowen's concept of differentiation but measures Williamson's closely related concept of personal authority (Miller, Anderson, & Keala, 2004). The Chabot Emotional Differentiation Scale (CED) (Licht & Chabot, 2006) takes a different approach by measuring an individual's ability to think while under emotional stress. Chabot claims that "although Bowen (1978) described both interpersonal

and intrapsychic aspects of differentiation, a strict reading of his (1978) work indicates that the essence of his theory lies in its intrapsychic rather than the interpersonal component of his work" (p. 177). While other measures attempt to measure differentiation in terms of definition as a unique psychological self from family, the CED focuses on the physiological ability to engage the thinking system over the emotional system in what Chabot calls intrapsychic differentiation. That is, how much an individual can think clearly in an emotionally charged situation, a concept that may be more portable across ethic boundaries. Subsequent validity studies have found the CED to be portable across ethnic boundaries (Karasik, p. 2004; Reynolds & Chabot, 2006). Chabot writes that "Although interpersonal measures of differentiation are unable to appropriately characterize development in non-Western cultures, identity development is considered a universal process that should be validly measured using measures of intrapsychic differentiation" (p. 175).

A relatively unique concept of Bowen Theory is the consideration of genetic inheritance through the multigenerational transmission process (Bowen, 1978; Kerr & Bowen, 1988). Klever (2005) conducted a longitudinal study that uses the Nuclear Family Functioning Scale (NFFS) to measure nuclear family functioning, and the Multigenerational Family Functioning Questionnaire (MFFQ) to assess "preponderance and severity of symptoms" (p. 258) across each generation by questioning each member of the family about all symptoms in all other members of the family. It has been found in the Kansas City, Missouri sample that "in a correlation analysis of the first five years of this twenty-year study, multigenerational functioning, especially nuclear family of origin functioning, was associated with nuclear family functioning" (p. 253). In other words, symptomology of the multigenerational unit was passed on to the current generational unit.

Cultural portability of differentiation of self.

Because Bowen aimed to define behavioral systems universal to all life, it is important for research to challenge the validity of differentiation of self across ethnic and cultural boundaries.

Unfortunately, research in this area is limited or confusing. Skowron & Friedlander (1998) have called for cross-cultural validation of the DSI, and there have been several variants which show some validity and temporal reliability but tend to require further verification with more representative samples.

The DSI-R was translated into the DSI-T for use in Turkey and found reliable but with some differences to Western populations (Isik & Bulduk, 2015). While Turkish culture is traditionally considered collectivistic, the country is in economic transition and shows aspects of individualism and collectivism in family structures. Families tend toward individualism as socioeconomic status increases, but overall tend to value emotional interdependence but economic independence. Despite this difference, one qualitative study on MFT training in Turkey revealed that students found the family systems-oriented training to be highly applicable to their collectivistic upbringing (Guvensel, Dixon, Parker, McDonald, & O'Hara, 2015).

Some items from the DSI-R were excluded from the DSI-T for lack of a proper translation, for example one which used the term “emotional roller-coaster” (p. 109), where there is no equivalent term for "roller-coaster” in the Turkish culture. Differentiation levels in Turkish sample were about the same as US samples, while internal validity was the same as non-English-speaking countries but lower than US samples. Gender differences were the same as in US samples, which showed women being more emotionally involved in relationships than men and found it more difficult to take an “I” position. The convenience sample used was of middle and higher socioeconomic statuses which tend to be more similar to US samples in individualism (Isik & Bulduk, 2015).

The DSI was translated directly into Hebrew for use in Israeli populations (Peleg-Popko, 2002). The Hebrew vision was found to be sensitive to somatization and psychological distress among a population of 20-year-old college students, with internal validity matching US samples. This

2002 study did not focus on cultural or ethnic differences in the population but focused on the portability of the translated instrument more or less as-is from the English version. The Hebrew version was then updated with the additions to the fusion scale in the DSI-R and tested to predict marital satisfaction in a randomized population sample (Peleg, 2008). A negative correlation was found between differentiation and somatic symptoms and social anxiety had a positive correlation with somatic symptoms, indicating that differentiation should be considered when examining the cause of somatic symptoms there. As with US samples, significant gender differences were found. Men were found to be more emotionally cutoff and women were found to have higher marital satisfaction, emotional reactivity, and fusion with others. Men's marital satisfaction increased over time while women's marital satisfaction decreased over time, and marital satisfaction overall was moderated by differentiation of self with a Pearson coefficient of .39. Little attention was paid to gender and cultural influences on the study, for example varying views on marital satisfaction or the social concept of marriage in general.

A Korean version of the DSI-R was used to compare differentiation of self and family functioning across three cultural groups (Kim, et al., 2015). Korean families have particular cultural tendencies in family relationships which indicate poor differentiation from the perspective of Bowen theory but that are viewed as favorable in Korean culture. For example, sons usually have very close relationships with their mother. A daughter-in-law feeling pressured and controlled by the mother with then have conflict with her husband, the son. One previous study using the DSI-R had shown a positive correlation between differentiation and family functioning in South Koreans (Chung & Gale, 2009). The new Korean instrument (Kim, et al., 2015) was first confirmed using multigroup confirmatory analysis to ensure that the instrument itself was stable across language and ethnic barriers. It was then administered to three groups: South Koreans living in South Korea, South Koreans living in the United States, and White Americans living in the United States. Higher

differentiation of self was found as a significant predictor of family functioning, family communication, and family satisfaction in all groups. Further, these correlations were stable however long the South Koreans had lived in the United States. One interesting finding of this study was that South Koreans who had moved to the United States had higher family satisfaction than both of the other two groups. Kim et al. (2015) write, "although more corroborating research is necessary, these results suggest that BFST's concept of differentiation of self, family communication, and family satisfaction can all be used reliably by family researchers and family therapists as culturally respectful indicators of healthy family functioning" (p. 81).

Overall, the South Korean groups had higher differentiation and higher family satisfaction than the US group. Bowen wrote that less differentiated people were more reactive to family requests for individuality or togetherness (Bowen, 1978). The finding that South Koreans can be more differentiated and happier with their family suggests that higher differentiation cannot simply be equated to higher individualism, which is consistent with Bowen & Kerr's (1988) reminder that differentiation as a general biological concept and differentiation of self as a human concept operate at a level below than culture.

The DSI-R was translated to be culturally-sensitive to Chinese populations (Lam & Chan-So, 2015). The C-DSI is the first instrument for measuring emotional maturity for Chinese people and was tested for external validity using the General Contentment Scale which is a well-established tool in Hong Kong. This translation was carried out in similar fashion to the Turkish and Korean instruments, with a graduate student translating to the native language and an English-speaking person back-translating it to English before revisions. The C-DSI was found to be valid in the small and mostly female student population, but it revealed inconsistencies in some of the items which could be improved through qualitative research to find items more appropriate for indigenous populations. The study also found a potential division in the fusion subscale between "fusion with

others" and "fusion with families" (p. 95), a result echoed in a study in Philippine communities (Tuason & Friedlander, 2000). This same C-DSI study points to a need for further validation studies in China as well as in within the varying communities within China.

Barriers to cross-cultural portability of differentiation.

Though the efforts listed above pertain to porting the DSI-R to non-Western cultures, common theoretical misunderstandings can create barriers for cross-cultural assessment of the construct. Differentiation is often conflated with psychological variables, which disconnects the term from its original biological context. Differentiation of self represents a flexible integration, or "dynamic equilibrium" (Kerr & Bowen, 1988, p. 65) between the poles of the individuality and togetherness life forces. One marker of confusion of the construct is the association with sociocultural tendencies such as divides individualistic and collectivistic cultures, despite the fact that the differentiation of self was created to describe a process that operates at a level below culture.

An example study that confuses the concept measured the portability of "family differentiation" in Italian and British adolescents in transition (Manzi, Vignoles, Regalia, & Scabini, 2006). The authors defined family differentiation as the two distinct constructs of "cohesion" and "enmeshment" (p. 673) which can easily be mistaken for Bowen's differentiation of self but are actually incomparable. "Enmeshment" is a common psychological term which most closely resembles Bowen's concept of emotional fusion, a term which opposes Bowen's definition of differentiation. A subsequent study (Lam & Chan-So, 2015) made the incorrect equation of Manzi et al's (2006) "family differentiation" with Bowen's differentiation, resulting in the questionable assumption that Bowen's construct is not valid in Italy. This assumption contradicts Reynolds & Chabot's (2004) study on intrapsychic differentiation (i.e. unconscious emotional reactivity) in Italian families using the relatively portable CED instrument. Another cross-cultural study by Hung (2006) on Asian American families lumps "individuation" and Bowen's "differentiation" into the same

concept (pp. 226-227). While not actually affecting the outcome of their own study, the authors left the door open to subsequent reviewers making the incorrect assumption that differentiation of self is not valid among Asian American families.

Because current measures of differentiation originate in Western and mostly American society, it will be important to validate them in other, particularly collectivist cultures. However, measuring differentiation of self using interpersonal and socio-cultural variables and ignoring physiological, intrapsychic variables that contribute to the ability to choose between thinking and feeling as anxiety rises in the group (Kerr & Bowen, 1988) can cause confusion on the meaning of the concept. Therefore, in the future it may be more fruitful to adhere strictly to the original biological basis for differentiation when authoring new instruments intended to work across cultural boundaries. There also appears to be a common pattern of confusing differentiation of self with related but dissimilar concepts, which in some cases can skew the understanding of subsequent reviewers.

Psychometric comparisons of Bowen theory and attachment theory.

Bowen theory contains many concepts which overlap with concepts from attachment theory and the question of their relationship is a logical one. For example, Bowen was known to use the term "unresolved symbiotic attachment to the mother" in his writing, which opens questions about whether or not Bowen theory accounts for the phenomenon described by attachment theorists. This section will review a few studies which compare psychometric instruments from both theoretical systems.

Skowron & Dendy (2004) claim to have been the first to compare attachment theory with concepts from a systemic family theory. While their 2004 study did not specifically seek to account for variations in attachment presentations, they did study the convergence of differentiation of self (DoS) measured using the DSI-R and attachment style (AS) measured by the Experiences in Close

Relationships Scale (ECR) (Brennan, Clark, & Shaver, 1998), correlating with a third concept *effortful control* as defined by the Effortful Control Scale (ATQ-S-EC) (Rothbart, Ahadi, & Evans, 2000). Skowron & Dendy (2004) summarized effortful control as the ability to "suppress reactive tendencies, modulate emotion feeling, and engage in purposeful behavior" (p. 338). This definition that is similar to Kerr's (1988) definition of DoS, which reads "Increasing one's ability to distinguish between thinking and feeling within self and others and learning to use that ability to direct one's life and solve problems" (pp. 98).

Testing for theoretical convergence between DoS and AS is perhaps a logical choice for a first study toward understanding the place of attachment theory in a broader social context, as DoS is an individual as well as a systems concept (Skowron & Dendy, 2004). The generic scope of DoS suggests applicability beyond the child-caregiver dyad to all human relationships, and indeed beyond the domain of human functioning into other areas of life through the parent biological concept of differentiation. However, for the purpose of this review one may provisionally equate DoS to the level of security in an individual's attachment style.

Skowron and Dendy (2004) found that there is considerable convergence between DoS and AS, which is in line with the expectations of this review. A significant link was found between measures of DoS and AS, with *emotional reactivity* (ER) correlating with anxious attachment, and *emotional cutoff* (EC) correlating with avoidant attachment, along with a link between DoS and effortful control. However, a link between AS and effortful control was not found, which is counter to claims that attachment security alone determines an individual's ability to regulate affect. This suggests that either there are factors in the instruments used that do not account for all dimensions of the theoretical constructs of DoS and AS, or that there may be extraneous variables outside the caregiver-child dyad which affect one's ability to auto-regulate in the midst of emotional intensity (Skowron & Dendy, 2004).

Subsequent studies found similar convergence with the anxiety and avoidance dimensions of attachment and dimensions of DoS using different measures of DoS (Ng & Smith, 2006; Ross, Hinshaw, & Murdock, 2016). However, Ng & Smith (2006) found no link between AS and non-dyadic measures of *Personal Authority in the Family System* (PAFS) (Bray, Williamson, & Malone, 1984), such as intergenerational intimidation (parents preventing children from psychological maturity) and intergenerational triangulation (parents conscripting children to help sort out their adult relationship problems). Based on Feeney's (2003) finding that attachment style varies according to context, Ng & Smith (2006) suggest that attachment is just one variable among many in the larger context:

> "What these players bring to the relationship is not within the purview of the individual alone. … Hence, the attachment quality of an individual is only one among many variables in the equation. This might explain why intergenerational triangulation (i.e., triangulation involving parents) was not significantly associated with the attachment dimensions." (p. 437)

While early studies looked at convergence of attachment and systemic constructs, work toward a useful integration of attachment and systemic concepts has not occurred until recently. Ross et al (Ross, Hinshaw, & Murdock, 2016) compared *experiential avoidance* (EA) with DoS dimensions of triangulation, claiming triangulation accounted for the relationship between AS and DoS. Their findings suggest that DoS captures a more complete determinant of individual health outcomes. In similar fashion, Dallos, Lakus, Cahart & McKenzie (2016) take a direct look at how tension in the mother and father's relationship impact the attachment response in the child. They aimed to fill a gap in the research of how "a mother's ability to offer a secure attachment is influenced by the anxieties and tensions in her relationships with the child's father" (p. 461). In this study, children's responses to dyadic "attachment dilemmas" were compared to triadic attachment dilemmas to see if contextual variables influenced the type and severity across responses. Their findings suggest that "a child has an attachment, not just with each parent but with the relationship between them" (p. 461), and that triadic dilemmas "generated higher levels of attachment distress

than the dyadic ones" (p. 466). Importantly, they found that children who would normally show secure attachment responses to dyadic dilemmas may show insecure attachment responses in triadic dilemmas. This not only indicates that the familial or social context influences the attachment response, but that the familial context may have a significantly larger impact on attachment responses than previously thought. Further, it was found triadic arousal persists significantly longer than dyadic arousal, indicating that the long-term effects of tension in the family may contribute more to complex trauma.

In an effort toward integration of individual and systemic attachment concepts, Mikulincer, Florian, Cowan, and Cowan (2002) propose a couples-based attachment security model that has each member in a couple as a separate sub-system of attachment characteristics: attachment security; positive models of self and others; relationship satisfaction; interaction of goals of togetherness; and positive models of self and others. Each of these characteristics interacts within a single person as well as with all characteristics in the other person, and the process multiplies exponentially with the addition of each new family member. Mikulincer, et al. (2002) write, "the quality of the relationship between the parents plays a central role in the generational transmission of working models of attachment" (p. 415).

This suggests that the quality of the relationship between two family members may temporarily affect the presenting attachment characteristics of their child. For example, if a mother and her sister argue, then the mother may react to the anxious situation by activating her attachment system with the child. In this example the presence of the sibling may take part in the construction of an avoidant attachment style in the child that matches the now anxious presentation in the mother.

Bowen (1959) observed in his early work with schizophrenia that fathers played an important role in the relationship between the mother and symptomatic child. Either parent was

able to have a relationship with the child so long as the other parent would permit it, though the typical configuration was with the mother in a close relationship with the child. If the parents could manage to contain the anxiety in the marital relationship between them instead of focusing on the child's symptoms, the child's symptoms could abate for some time. Like Bowlby (1988) and Ainsworth (1985), Bowen did not assign caregiver roles according to gender. But unlike Bowlby and Ainsworth, Bowen concluded that the father's role was in part to help support regulate the mother as she cares of the child as well as provide a modulating force between the mother and child. Bowen also mapped how all three in this father-mother-child triad were similarly influenced by relationships with the rest of the members of the emotional system with varying degree of intensity.

Discussion of Bowen theory and attachment theory.

While many aspects of AS and DoS appear closely related, they were developed in parallel by different schools of psychology and as a result classical literature offers little explanation of their relationship. For example, Bowen frequently cites problems in the family stemming from an "unresolved symbiotic attachment" (Kerr & Bowen, 1988, pp. 68, 110, 201, 220) with the mother, but does not differentiate his "attachment" from Bowbly's "attachment." Indeed, the question may have little relevance in a systems context which assumes the level of differentiation and integration of the parts as a complete measure of the *negentropic* capacity of the whole (Becvar & Becvar, 2018). Rothbaum, Rosen, Ujie, and Uchida (2002) eloquently describe similarities between attachment theory and family systems theory such as the forces of togetherness and individuality,

> …attachment theory is focused on dynamics involving protection, care, and felt security, whereas family systems theory is concerned with family dynamics, involving structures, roles, communication patterns, boundaries, and power relations; (b) attachment theory is focused on the dyad, with much of the action occurring within individuals (e.g., "internal working models"), whereas family systems theory is focused on the triad, with much of the action occurring within groups; (c) attachment theory is relatively more concerned with children and development, whereas family systems theory is relatively more concerned with adults and current functioning; and (d) attachment theory has historically relied primarily on empirical research with normal

> populations, whereas family systems theory relies primarily on case studies involving clinic populations" (pp. 329).

It should be noted that though Bowen theory suggests a therapeutic approach that focuses on the highest-functioning members of the family such as the parents, the theoretical focus remains on the family as an emotional unit. The theories' eight concepts apply equally, and also depend on, children as much as adults (Kerr & Bowen, 1988).

Nevertheless, the more recent studies in this review on attachment and systems concepts address this discrepancy as justification for an integration of attachment and systemic concepts. Ng & Smith (2006) compare attachment and PAFS as a) having to do with connection and intimacy, versus separation while maintaining intimacy, b) "hypothesizing continuity of relationship quality across generations," c) "integrating intrapersonal and interpersonal aspects of human functioning," and d) "recognizing the central place of emotion in the family and the life and the well-being of the individual" (p. 433). Both Ng & Smith (2006) and Ross et al (2016) take an optimistic position toward integrating attachment and systems concepts, and claim the considerable theoretical convergence found between DoS and AS as sufficient evidence to do so.

Nearly all studies reviewed here suggest that attachment theory alone may be inadequate in providing a comprehensive picture of human functioning. Ng & Smith (2006) suggest that AS may be contained within DoS as it only captures a subset of adult close relationship functioning and that a "subsystem within a larger family system may be affecting relationship functioning more than attachments" (p. 437). This raises questions about the obsolescence of AS within a systems context. Ng & Smith (2006) write,

> …attachment theory may not live up to researchers' claims to be an all encompassing or complete organizing theory of human functioning. It is most significant in demonstrating relationships among spousal relationships, relationships with children, and, to a lesser degree, relationships between adults and their parents. However, where attachment theory leaves off, intergenerational family systems complements and provides a larger picture. (p. 437)

Bowen (1978) claimed that DoS was more or less passed down through the generations through the multigenerational transmission process. Ross et al's (2016) adds, findings support the idea of intergenerational transmission and offer AS and triangulation as accounting for it, suggesting that "dyadic relationship patterns originate within triadic processes and eventually affect the individual's DoS" (p. 408). They add,

> Although attachment theory accounts for dyadic relationships (between the primary caregiver and the child) and the dysfunction that can result when these relationships are not secure, the theory fails to acknowledge the role of a second primary caregiver or parent, and the potentially crucial aspect of disavowed negative emotional states resulting from them being deemed inappropriate by the caregiver is often considered secondary to the dyadic interaction. (2016, p. 401)

According to Kerr (1988) and Lassiter (2008), the triangle is only the human version of a universal mechanism emergent in every emotional system to ensure the survival of the family or social unit. Lassiter (2008) describes its vital role in social coordination in ideal circumstances as well as its role in the singling out of a scapegoat when the group experiences increased stress. She provides an analog in amoeba colonies which use the secretion of a pheromone in mating that serves to preempt an individual's eventual self-sacrifice. These sacrificial individuals provide the "dead stalk" for the colony's use in future generations (p. 69).

Such a generically applicable concept may therefore contribute to a more flexible and holistic view of human functioning that involves broader sets of variables from more levels of analysis. While failing to step fully into to the broad universal context of natural systems offered by Bowen, the studies in this review did succeed in demonstrating that triangulation may offer a mediating variable that connects the dyadic scope of AS with the greater system (Buehler & Welsh, 2009; Dallos, Lakus, Cahart, & McKenzie, 2016).

Unfortunately, none of the studies in this review address the problem of incompatibility between the scientific paradigms in which each theory is rooted, which suggest that the authors may

not possess sufficient knowledge of the theoretical origins, and so also the *a priori* assumptions, of a system theory. Attachment theory, including other psychoanalytic-derived individual theories rely on *a priori* assumptions contained within a linear-causal paradigm that are more compatible with traditional random control trials. Bowen (1988) considers these individual theories because they were rooted in the psychology of the individual and the paradigmatic assumptions contained therein (Kerr, 1981). Systems frameworks such as Bowen theory rely on *a priori* assumptions contained within a mutual-causal paradigm which is incompatible with the random control trial model (Macy, 1991) unless isolated from their theoretical context. But as part of an interlocking natural system theory, it is not possible to remove these concepts from their parent theory. They were created specifically to overcome the limitations of the linear-causal paradigm (Kerr, 1981).

This paradigmatic incommensurability (Kuhn, 1962/2012; Noone, 2016) may in part explain why attachment theory enjoys extensive empirical research while systemic theories primarily rely on limited clinical case studies from within the same network of theoreticians (Rothbaum, Rosen, Ujiie, & Uchida, 2002; Dallos, Lakus, Cahart, & McKenzie, 2016; Noone, 2016). But it also points to a potential limitation in the foundation of attachment theory altogether, as one rooted in overly-simplistic assumptions about causality and the extent of the family system on influence. It is possible that this paradigm problem does not inhibit the type of theoretical convergence suggested by the studies reviewed here. But it is important to note the possibility of latent problems in attempts to integrate two concepts from different paradigms.

As this review on attachment theory and Bowen theory pokes at the idea of a natural system theory of the human family providing a more complete view of human functioning, it is required that the scope of such research align with a sufficiently broad context. The studies reviewed here limit their scope either to theoretical convergence of DoS and AT, or to qualitative observation of the mother-father-child triad, and so can only account for functioning within an idealized three-

person nuclear family. In contrast, the development of the triangle as a pervasive biological concept suggests that triangulation in the nuclear family has an analog in the extended family, as well as in other higher and lower-ordered taxa pertaining to human life such as society, the organic, and the cellular. While these studies do not address this broad scope for the concept, future research could observe the interaction of triangling on attachment representations among siblings within the same nuclear family, aunts, uncles, and cousins of the children and/or parents, etc. However, the complexity of such an expanded scope raises issues which speak to the most important problem in comparing attachment and systemic theories related to their respective scientific paradigms. It is possible that performing direct comparisons between concepts "rooted in the psychology of the individual" (Kerr & Bowen, 1988, p. 7) such as attachment style, self-states, etc., and natural systems concepts such as differentiation, may be inherently problematic without one nomological taxonomy converting to the other (Kuhn, 2000).

There is no doubt from these and many other studies that DoS and AS attempt to solve similar problems and show some level of theoretical convergence. This does not mean, however, that overlapping dimensions of the constructs are synonymous, a conclusion supported by the evidence that AS may be contained within DoS and does not account for all outcomes such as effortful control, experiential avoidance, internalizing problems, and intergenerational dimensions of PAFS.

Chapter 4: Overview of Vipassanā Meditation

Though the term "meditation" is well-known in the Western world today, it is not well known that various meditation techniques can have many commonalities but also many significant differences. Understanding what differentiates a particular style of meditation as well as the style of teaching it from another technique and style of teaching is vital to understanding any one style of meditation (Drummond, 2006; Drummond, 2006; Fleischman, 2016). This study takes as foundational some of the unique features of vipassanā and S. N. Goenka's style of teaching it, and so this chapter will clarify some of those unique features. An in-depth examination of technical terms and their theoretical relationships will be provided later in the proposed study. Therefore, this section will only provide a brief description of important concepts within the stated tradition of vipassanā. For reference, Appendix A contains a taxonomy of vipassanā terms which may help orient the reader through this section.

A word on the pronunciation of technical terms provided in Pāli, the language spoken by the Buddha. Vowels are pronounced in the long English form. The 'u' symbol is pronounced "*ooo*." A vowel with a macron such as ā, a shorthand combination for two roman 'a' characters together, is pronounced as a long "*ahh*". A vowel standing alone is pronounced in English in short form, such as 'a' as "*aye*". Two consonants together indicate that the preceding vowel is short with a slight pause, as with a short 'i' in anicca. The symbol *ñ* symbol is pronounced with nasalized "ny" as in Spanish. For simplicity, roman consonants with a dot under them, such as *ṇ*, can be pronounced as in English (Goenka, 2015, pp. xiii-xii).

The Buddha's Unique Discovery: Vedanā Paccaya Taṇhā

Vipassanā is a word in Pāli, the language spoken in India at the time of the Buddha. It translates roughly to "seeing things as they are." Simply put, vipassanā represents a "science of mind

and matter" (Goenka, 2000). Vipassanā meditation is the practice which helps a person live in line the "universal law of nature" (Goenka, 1987/2012, p. 19).

Contrary to popular belief, Siddhatta Gotama, the historical figure who lived 2500 years ago and is known as "The Buddha," was not interested in creating a religion, sect, or belief system. Instead, he was interested in investigating the law of nature as it existed before him and would continue to exist after him (Goenka, 1987/2012). He was a human being who performed a rigorous experiment to discover natural laws by investigating them within the framework of his own body and mind (Rahula, 1974). He then operationalized a theory and practical technique so that others could perform the same experiment (Hart, 1987). He taught the *dhamma* (Sanskrit: dharma), which is the law or laws of nature, as a universal fact which did not pertain to a particular belief system and applies to the entire universe. Fleischman (2016) has called the dhamma the "unwavering, orchestrating natural information state of the universe" (p. 23). Gotama's students, though most often referred to in his discourses as *bikkhave* (monks), were called *dhammako,* or students of dhamma (Goenka, 2000). Today, this would be equivalent to saying that a scientist is a student of nature as universal objective truth.

Fleischman writes that "In the Twenty-First Century, it is science, not mysticism, to recognize that we are products of a cosmic information-state that can lead us beyond its own material manifestations" (Fleischman, 2016, p. 26). In every one of his discourses and publications, Goenka repeatedly urges that use of the sectarian term "Buddhist" erodes the universality of an investigation into the law of nature, a law which is observable by anyone who reproduces his experiment regardless of label or affiliation (Goenka, 2000). Goenka states that the Buddha only taught "pure dhamma," and calling a student of the dhamma a "Buddhist" would be equivalent to saying that a modern scientist's discoveries only apply to people who call themselves scientists (Goenka S. N., 1987/2012; 1990a; 1990b; 2006; 2015).

As a "super scientist" Siddhatta Gotama's unique achievement was the discovery of facts about the life process which pertain to all of life, and how to overcome the suffering that is a natural product of this process (Goenka, 1990a). He mastered and became unsatisfied with the styles of meditation of the time (Rahula, 1974), and set out to conduct what is now called an observational N of 1 experiment (Kazdin, 2016) to understand how his physical and mental structure functioned. His experiment was scientific in the sense that his goal was to understand objective facts of nature which exist independently of his observing them, through a process of systematic observation which was distorted by his own subjectivity as little as possible (Goenka, 1990a). It was not scientific in the sense that he did not conduct a randomized control trial that produced generalized probabilistic assumptions about a population based on a representative sample.

His experiment was intended to be verified or refuted using his particular method of investigation which for technical reasons requires direct contact of the observer's sensory apparatus with the observed phenomenon, namely bodily sensations (Goenka, 2006). As with the use of a null-hypothesis, Gotama repeatedly implored his students to doubt his teaching until they have verified its value for themselves. "The words *bhāvito bahulīkato*—know with your own experience and thus gain and multiply knowledge occurs many times in [the Buddha's Pāli discourses]" (Goenka, 2006, p. 5). In the *Kālāma Sutta*, or Discourse to the Kālāma clan of Northern India (as translated by the Pāli Text Society), Gotama says:

> Do not simply believe whatever you are told, or whatever has been handed down from past generations, or what is common opinion, or whatever the scriptures say. Do not accept something as true merely by deduction or inference, or by considering outward appearances, or by partiality for a certain view, or because of its plausibility, or because your teacher tells you it is so. But when you yourselves directly know, "These principles are unwholesome, blameworthy, condemned by the wise; when adopted and carried out they lead to harm and suffering," then you should abandon them. And when you yourselves directly know, "These principles are wholesome, blameless, praised by the wise; when adopted and carried out they lead to welfare and happiness," then you should accept and practice them (Hart, 1987, p. 14).

The result of this experiment was the proposition of natural laws which organize and guide the life process of all living things, known as *paṭiccasamuppāda*, the Second Noble Truth, or "the cause of suffering". It was utilizing knowledge of these laws in practice to increase his own functioning at the deepest physiological and psychological level that lead to what was called his "enlightenment" (Goenka, 1987/2012). Paṭiccasamuppāda is a simple and deep law, but it is impossible to comprehend fully without advanced experience reproducing Gotama's experiment. In fact, it was the total comprehension of paṭiccasamuppāda that marked his own enlightenment (Macy, 1991, p. 26). Nevertheless, the most important parts of paṭiccasamuppāda are easy for an untrained person to understand. The parts which are more difficult to understand become clearer as a person progresses in the practice.

Paṭiccasamuppāda is comprised of twelve distinct physiological and psychological (i.e. organizational /informational) variables or steps which define the life process. It also relies on a particular paradigm of reciprocal, or mutual-causality that defines how each variable relates to the other. Developing the capacity to view reality as this mutual-causal paradigm is a key component of enlightenment (Macy, 1991). The following list shows these variables, or steps in the loop of paṭiccasamuppāda, in the order that informs a new student of satipaṭṭhāna/vipassanā (Goenka, 1987/2012),

1. *avijja* (ignorance)
2. *viññāṇa* (consciousness)
3. *saṅkhāra* (reaction)
4. *nāma/rupā* (mind and matter)
5. *saḷāyatana* (six sense bases/organs)
6. *phassa* (contact with sense object)
7. *vedanā* (bodily sensation)
8. *taṇhā* (craving)
9. *uppādāna* (clinging)
10. *bhava* (becoming)
11. *jāti* (birth)

12. *jarā-maraṇaṃ-soka-parideva-dukkha-domanassupāyasā* (sickness, old-age, death, together with sorrow, lamentation, physical and mental sufferings and tribulations).

Though each variable influences all the others, all twelve together form a feedback loop which repeats many times every second. The entire system exhibits entropic behavior depending on the accumulation of "impurities" (Goenka, 1987/2012, p. 15) known as saṅkhāra (Sanksrit: saṃskāra), and the resulting dissonant noise in the loop. These saṅkhāras are the behavioral reaction that result from the habitual programming of past experiences. A simple example would be an automatic addictive response to the sensations generated from the contact of a substance like alcohol or even chocolate to the taste-sense system or the recalled mental image of the substance (Gürtler, Studer, & Scholtz, 2011).

Most of all, it is important to note the positions of vedanā (sensations), and taṇhā (craving), that loop. "Others proclaimed that *saḷāyatana pacchayā taṇhā* [the sense organs and their respective objects cause/condition craving]; the Buddha discovered and disclosed that *vedanā paccaya taṇhā* [sensations cause/condition craving], which means that defilements arise at the level of *vedanā* and in response to *vedanā*" (Goenka, 2006, p. 4). The discovery of the Buddha, that the real cause of taṇhā lies in vedanā, is the unparalleled gift of the Buddha to humanity" (Goenka, 2006, p. 4). "A meditator who has reached the end (has experienced the entire range) of sensations (and has gone beyond) is freed from craving, is fully liberated" (Goenka, 2006, p. 4).

In the simplest form, Gotama discovered that the process of craving is the result of the aggregate combination of namā/rupā (mind and matter), where mind consists of four integrated systems. First, one of the saḷāyatana, or six sense organs or systems where mind is included as a sense for the purposes of this system, vibrates upon phassa (contact) with a sense object or information from that sense object. He called this vibration viññyana (consciousness). Second, the sensory information is cognized or recognized based on past conditioning, is evaluated and assigned

a valence to indicate the desirability of the associated object. He called this system saññā (perception) Third, the mind generates sensations on the body according to the valence. He called this vedanā (sensation). This important term pertains to all sensory experience including thought, as the mind is included as a sense organ in this system often by way of internal feedback within the body. Finally, the mind reacts to the sensations in accordance with their valence. He called this action saṅkhārā (reaction) (Goenka, 1990a), which in some traditions is called *kamma* (Sanskrit: karma). Saṅkhārā as action or reaction might be equated with a biological notion of emotion as an automatic response to the environment, a concept described in the previous chapter on Bowen theory.

Because the process of paṭiccasamuppāda occurs so fast, even "trillions of times every second" (Hart, 1987, p. 47), it appears to take on a life or character of its own. This is similar to a light appearing to be a discrete entity when it is actually the aggregation of enumerable chemical reactions occurring with "such great rapidity" that it appears to be a single process with a singular character. Goenka (1987/2012) describes this illusion in his 10-day courses,

> Everything is ephemeral, arising and passing away every moment—anicca; but the rapidity and continuity of the process create the illusion of permanence. The flame of a candle and the light of an electric lamp are both changing constantly. If by one's senses one can detect the process of change, as is possible in the case of the candle flame, then one can emerge from the illusion. But when, as in the case of the electric light, the change is so rapid and continuous that one's senses cannot detect it, then the illusion is far more difficult to break. One may be able to detect the constant change in a flowing river, but how is one to understand that the man who bathes in that river is also changing every moment?
> The only way to break the illusion is to learn to explore within oneself, and to experience the reality of one's own physical and mental structure. This is what Siddhattha Gotama did to become a Buddha. (pp. 27-28)

For Gotama, the system of mind and its material basis develops an emotive character by virtue of the step of saṅkhāra (reaction) that behaves as though it is a single entity in its own right. This illusory emotive character is what people call "I," or "me." By observing his own physical and

mental structure "objectively" (Goenka, 1987/2012, p. 33), he claimed to have discovered that his physical and mental structure is nothing but the aggregate result of countless *kalāpas*, or sub-atomic particles, which arise and pass trillions of times per second (U Ba Khin, 2014). Coincidentally, Gotama likely made this discovery within a few years of Democritus forming his atomic hypothesis, around 400-500 B.C. However, Gotama also claimed that the nature of these particles could be distinctly experienced if the mind was highly trained, an anecdote supported by serious lay practitioners today (Henderson, 2000). He also discovered that it is difficult for the mind to comprehend the complex and fluid nature of itself, and it creates the aggregate label "I" as a practical placeholder (Goenka, 1987/2012). Hart and Goenka (1987) write,

> He found that the entire material universe was composed of particles, called in Pāli kalāpas, or "indivisible units." These units exhibit in endless variation the basic qualities of matter: mass, cohesion, temperature, and movement. They combine to form structures which seem to have some permanence. But actually these are all composed of minuscule kalāpas which are in a state of continuously arising and passing away. This is the ultimate reality of matter: a constant stream of waves or particles. This is the body which we each call "myself." (p. 26)

The informational, or psychological, dissonance created by the disparity of what is accurate and what is inaccurate about the "I" label is called *taṇhā* (craving). A behavioral response that is in accordance with this informational dissonance is called *upādāna* (clinging). However, Gotama's most important discovery was that craving occurs in response to sensations and not to the sensory objects or information involved in generating bodily sensations. Building on that key discovery, he found that the way out of craving is to develop equanimity to sensations. The reasoning that developing equanimity to sensations leads to the natural cessation of all suffering is known as *nirodha-sacca*, the Third Noble Truth, or "the cessation of suffering." The Third Noble Truth states that cutting the feedback between sensation and craving affects the entire twelve-step loop of paṭiccasamuppāda by virtue of the reciprocal relationships between each of the steps (Goenka, 1987/2012; Macy, 1991).

Finally, Gotama discovered that the way to practice in order to initiate the Third Noble Truth is two-fold; to concentrate the mind to be sensitive enough to feel sensations literally throughout the body; to develop equanimity (*uppekkhā)* with bodily sensations which encompass the entirety of life experience. From those four integrated systems that comprise mind (*viññana*/consciousness, *saññ*a/perception/judgement, *vedanā*/sensation, *saṅkhārā*/action/reaction), it is decreasing the intensity of saññ*a* that is possible and effects the whole loop. Saññ*a* is the coefficient of reactivity. This is accomplished by observing the subtlest sensations throughout the body objectively, without reaction. "A meditator who has reached the end (has experienced the entire range) of sensations (and has gone beyond) is freed from craving, is fully liberated" (Goenka, 2006, p. 4). Gotama called this the practice of *satipaṭṭhāna* (foundations of mindfulness), known as the Fourth Noble Truth, or "the path to the cessation of suffering." Satipaṭṭhāna is synonymous with vipassanā, and encompasses the entirety of the Buddha's practical teaching as defined the Mahāsatipatthana Sutta, or Great Discourse on the Foundations of Mindfulness (Goenka, 2015).

The Practice of Satipaṭṭhāna/Vipassanā

Goenka describes in his discourses how any dhamma teacher would turn away new students who only want to cure one particular disease or symptom. When he first tried to join a course taught by his teacher Sayagyi U Ba Khin, Goenka was turned away because he only wanted to cure his migraine headaches. Instead, U Ba Khin encouraged him that symptoms or diseases may be cured as a side-effect of the practice, but the process only works if they work with the intention of understanding the nature of all symptoms (Goenka, 1990a). Otherwise symptom relief might make a change in the short-term but will cause more problems in the long run. According to Goenka, practicing vipassanā to cure a specific disease is "totally against vipassanā" (Goenka, 1990a). This orientation toward objective inquiry and away from mere symptom relief is a vital but often ignored

aspect of the practice. "In learning Vipassana from U Ba Khin, Mr. Goenka found a discipline that went far beyond alleviating the symptoms of physical disease and transcended cultural and religious barriers" (Hart, 1987, p. 1).

The application of this kind of inquisitive, detached and scientific attitude alters the loop of paṭiccasamuppāda at the one link that is possible: between bodily sensations and the craving that is conditioned by them. This is the practical reflection of Gotama's unique discovery. Moving further up the chain of paṭiccasamuppāda, it is not possible to stop sense objects making contact with their respective sense organs or to stop the physical and mental structure from causing/conditioning the sense organs, because these occur largely out of the observer's awareness and/or control. But it is possible to alter the generation of craving which is caused/conditioned by or sensations (Goenka, 1987/2012).

At the time of Gotama's birth, it was commonly understood that suffering occurs when there is craving for a sense object. The teachers at the time instructed students to stop craving material objects and stop craving for undesired objects or circumstances to go away. It was also known that craving was the product of what was known as "mind" and that the way out consisted of training the mind (Goenka, 1987/2012). Gotama's unique contribution, as he directly experienced it through his observational experiment, was the discovery that the mind does not "crave" the object but the sensations generated on the body as a result of receiving sensory information associated with the object. He attained the state known as enlightenment by optimizing the process of paṭiccasamuppāda to such an extent that it was not possible for craving to occur in reaction to bodily sensation. When sufficiently sustained, this application of the Third Noble Truth leads to the absolute maturation of the mind/body system to one which is irrevocably incapable of suffering (Bodhi, 2013). Vipassanā meditation involves replicating the experiment to discover these natural laws within the context of one's own physical and mental structure.

"One begins by learning to observe without reacting" (Goenka, 1987/2012, p. 39). As with modern science, this practice relies on the ability to observe concrete physiological phenomena *yathābhūta* ("objectively," "as it is") (Goenka, 1987/2012), or accurately as they occur with minimal intervention by the observer. Goenka (1987/2012) summarizes the notion of "objective" observation,

> It is a choiceless observation. Never try to select sensations; instead, accept whatever arises naturally. If you start looking for something in particular, something extraordinary, you will create difficulties for yourself, and will not be able to progress on the path. The technique is not to experience something special, but rather to remain equanimous in the face of any sensation. In the past you had similar sensations in your body, but you were not aware of them consciously, and you reacted to them. Now you are learning to be aware and not to react, to feel whatever is happening at the physical level and to maintain equanimity. (p. 33)

This kind of observation is simple, yet proves quite difficult. Goenka's instructions rely on the assumption that the only phenomena which can be observed directly and completely are bodily sensations because of the physiological connection with the mind that operates at a high enough frequency, or sample rate, to observe the rapid fluctuation of the subtlest sensations. Also, observation of bodily sensations provides a way to observe mental phenomena by virtue of their occurring simultaneously with sensations. Gotama's words for this theoretical principle were "vedanā samosaraṇā sabbe dhammā" (Mulaka Sutta, Anguttara Nikāya, VIII. ix. 3), which translates to "Everything that arises in the mind starts flowing with a sensation on the body" (Goenka, 2015, p. 26). That is, every thought has an accompanying bodily sensation which can be observed directly.

It is taught that observation of this kind reveals three basic facts about the physical and mental structure that are so basic that they pertain to all observable things in the universe. These three facts are sometimes referred to as the Three Marks of Existence: that all things are impermanent (*anicca*), and impersonal (*anattā*), and that clinging to phenomena as permanent or as personal invariably causes suffering (*dukkha*). This becomes more and more apparent to a meditator

as the mind becomes sensitive enough to detect subtler but very distinct collections of sensations which occur within gross-level sensations like searing leg pain from sitting for long hours in the same position. Eventually it becomes clear that even the most intense pain is only the aggregation of many subtle sensations which are constantly arising and passing with "great rapidity" (Goenka, 1987/2012, p. 55), and possess no singular character at all. By that point, what was once unbearable pain is no longer an obstacle (Goenka, 1990a), and a preliminary aspect of this stage is often experienced within a student's first 10-day vipassanā course. The basic realization that bodily sensations occur without initiation by the mind is the beginning of the discovery that all things have an impersonal nature and there is no unchanging core or soul that can be called "I," that everything, including bodily sensation which encompass the entirety of life experience, is anattā (Goenka, 1990a). While a meditator is developing awareness of sensations *sabbakāyapaṭisaṃvedī* (throughout the body) (Goenka, 2015, p. 29), and practicing non-reactivity and disidentification from sensations, their capacity for auto-regulation of affect can increase dramatically (Gürtler, Studer, & Scholtz, 2011; Zeng, Oei, & Lui, 2014; Zeng, Oei, Ye, & Lui, 2015).

The acceptance of the theory of vipassanā at a logical or intellectual level, as is the standard in modern science, as opposed to engaging with it as a system of rigorous personal practice, can transform vipassanā into a devotional or belief system that loses the practical element. The actual practice is the essence of vipassanā. Hart (1987) paraphrases Goenka's 10-day discourses,

> Through their own investigations, modern scientists have recognized and accepted this ultimate reality of the material universe [as ephemeral; impermanent]. However, these scientists have not become liberated, enlightened persons. Out of curiosity they have investigated the nature of the universe, using their intellects and relying on instruments to verify their theories. In contrast, the Buddha was motivated not simply by curiosity but rather by the wish to find a way out of suffering. He used no instrument in his investigation other than his own mind. The truth that he discovered was the result not of intellectualizing but of his own direct experience, and that is why it could liberate him. (pp. 25-26)

Throughout his discourses, Gotama repeated that his instructions only have value if they are actually put into practice (Goenka, 1987/2012). When performed as it was originally intended, the practice includes eight integrated steps or components. Together these form a highly integrated unit called *ariyo aṭṭhaṅgiko maggo*, or the Eightfold Noble Path, which is the Fourth Noble Truth of the "way to the cessation of suffering." If one of the eight pieces is missing from the actual practice, the integration of the complete unit is lost. Goenka explains, the Eight-Fold Noble Path "is noble in the sense that anyone who walks on the path is bound to become a noble-hearted, saintly person, freed from suffering" (Hart, 1987, p. 16). The eight components are divided into three categories, or fields, of morality *(sila),* concentration *(samadhi),* and wisdom (*paññа).* All three have to be combined together for the practice to work as intended. If concentration and wisdom is developed without morality, then the practice is not complete and will never produce the intended outcome. Similarly, if morality and wisdom are developed without concentration, then the wisdom will not be sufficient and will never produce the intended outcome (Goenka, 1987/2012).

The first field of Sila, or morality, involves right speech (*sammā vacā*), right action (*sammā kammanta*), and right livelihood (sammā ājiva). This means no stealing, killing, lying, and having a profession which contributes to the common good and does not harm living things. All of these are required to have enough peace of mind to progress to the second field of samādhi, or concentration of the mind. The field of samādhi involves right effort or exercise (*sammā vayāmā*), right awareness (*sammā sati*), and right concentration (*sammā samadhi*).

The word sati can be translated as "memory," and is often translated as "mindfulness." This is, in fact, the "mindfulness" that has become a well-known word and somewhat synonymous with "meditation" in Western popular culture. Similar to popular mindfulness literature, Goenka (1987/2012) describes sammā-sati in his discourse summaries,

> *Sammā-sati*—right awareness, awareness of the reality of the present moment. Of the past there can only be memories; for the future there can only be aspirations, fears, imaginations. You have started practicing sammā-sati by training yourself to remain aware of whatever reality manifests at the present moment, within the limited area of the nostrils. . . The habit pattern of the mind, as you have seen, is to roll in the future or in the past, generating craving or aversion. By practicing right awareness you have started to break this habit. Not that after this course you will forget the past entirely, and have no thought at all for the future. But in fact you used to waste your energy by rolling needlessly in the past or future, so much so that when you needed to remember or plan something, you could not do so. By developing sammā-sati, you will learn to fix your mind more firmly in the present reality, and you will find that you can easily recall the past when needed, and make proper provisions for the future. You will be able to lead a happy, healthy life. (pp. 21-22)

However, for Goenka, and also for the Buddha, sati, or mindfulness, is just one component of the Eight-Fold Noble Path which operates as an integrated unit. And sati is only sammā-sati, or right awareness when it is practiced on the reality of sensations, and at subtler and subtler levels. Goenka (1987/2012) describes this distinction,

> To begin, you gave attention to the conscious, intentional breath, then the natural, soft breath, then the touch of the breath. Now you will take a still subtler object of attention: the natural, physical sensations within this limited area. You may feel the temperature of the breath, slightly cold as it enters, slightly warm as it leaves the body. Beyond that, there are innumerable sensations not related to breath: heat, cold, itching, pulsing, vibrating, pressure, tension, pain, etc. (p. 22)

The initial act of formal meditation to develop in the field of samādhi, which is the ability to hold attention on a single point on the body and to become sensitive enough to feel extremely subtle but distinct sensations that were otherwise impossible to detect (Goenka, 1987/2012). However, it is only "right concentration" if the object of concentration is a naturally occurring phenomenon in the body and not a product of imagination, visualization, verbalization, or an object outside the body (Goenka, 1990a). Though this suggested level of concentration is extremely high relative to the concentration of an experienced person, it can be sufficiently developed over the course of three days to proceed to the third phase of pañña, or wisdom by direct experience. Development in the field of pañña is the ultimate goal of the Eight-Fold Noble Path.

Pañña involves *sammā saṇkappa* (right thoughts), and *sammā-diṭṭhi* (right understanding or view). Right thoughts means becoming so involved in the practice that the mind naturally generates more thoughts of leading a good life than of "hatred, aversion, ill will, and animosity" (Goenka, 2015, p. 101). Right view, or wisdom gained by direct experience, is possible after combining all seven of the previous parts of the Eight-Fold Noble path simultaneously. It is literally the rigorous objective investigation of the physical and mental structure "like a scientist who observes an experiment in his laboratory" (Goenka, 1987/2012, p. 39). The goal is to understand what it is made of, how it works, and how it comes to arise and pass away trillions of times every moment in the birth and death of the process of paṭiccasamuppāda just as it literally arises and passes away at the birth and death of this lifetime. As with science, sammā-pañña, which is right view or wisdom by direct experience, is the product of investigating every null-hypothesis to the end in an inductive effort to understand the law of nature.

Fleischman (Fleischman, 2016) describes the effect of vipassanā as multi-faced, and centering around improving the quality of relationship,

> As an expression of the peace that meditation often brings, interpersonal relationships may improve, increasing pro-social and altruistic feelings. Harmonious moods like gratitude may fill spaces vacated by the reduction of lesser concerns. Meditation is optimized when it is carried forward to create a positive feedback community in which individual meditation expands into interpersonal harmony which in turn nurtures individual meditation. For this to happen, there needs to be stabilizing traditions, agreed upon training, and teachers who exemplify wise life choices.

This section has summarized the entirety of Gotama's discovery and teaching. He only taught the way out of suffering by virtue of understanding the precise nature of suffering. Though this description includes esoteric terms which may at times seem mystical, Gotama's intention was for each person to prove or refute his hypothesis for themselves. The recognition of "Buddhism" as a world religion or belief system is likely an artifact of scholarship or a creation of sectarian groups and not of the original material. Gotama's intention was to develop a system which pertains to the

very same realm of reality that can be observed by any person willing to replicate his efforts, that is, a series of observations which exist within what is now called the realm of natural science.

Vipassanā Meditation as taught by S.N. Goenka in the tradition of Sayagyi U. Ba Khin

Satya Naryan Goenka was a successful business man born to an Indian family in Burma, where he met his teacher teacher Sayagyi U Ba Khin in 1955 (Hart, 1987). U Ba Khin in turn learned vipassanā from the Burmese lay teacher Saya Thet Gyi, who learned from the famous Burmese scholar-monk Ledi Sayadaw (Anālayo, 2006). Prior to the British occupation of Burma, vipassanā was only practiced by the monastic orders. This did not reflect the tradition of the Buddha which included lay practitioners. Ledi popularized the practice vipassanā to lay students in order to protect it from the destructive British occupation which attempted to purge "religious" systems from Burmese culture (Braun, 2013). He learned vipassanā from the unnamed lineage of monks who maintained it in its present form after the *arahants* (enlightened people) Sona and Uttara brought it to Burma. These two arahants were sent by the famous Indian king *Ashoka* in the second century B.C, two hundred years after the death of Gotama, the Buddha (VRI, 1988).

U Ba Khin was teaching to a small local audience in Burma in the 1950's and 1960's when Goenka was approved to teach and spread the practice 15 years after he began learning vipassanā from U Ba Khin. Goenka drew on his experience as a successful industrialist to construct the standardized international system of teaching that is found today. He eventually became the most widely recognized lay teacher of vipassanā in the world (Hart, 1987) and "wished to see *Dhamma* communicated with scientific concepts and language" (Fleischman, 2016, p. iv). In *Vipassana Meditation and the Scientific World View,* vipassanā teacher Paul Fleischman (2016) describes the unique aspect of Goenka's achievement,

> One of the important factors by which Acharya Goenkaji re-kindled Vipassana mediation in the second half of the Twentieth Century was his emphasis on the similarities between the world views of Vipassana and science. For many Vipassana

> students around the world, this emphasis facilitated their openness to giving meditation a fair trial. . . Once it is clearly presented, the scientific portrayal of reality can be easily understood to clarify such Pali terms as "Anicca," "Anattā," "Kamma," and "Dhamma." Science today not only clarifies some intellectual aspects of Vipassana, but it also adds momentum to the psychological and moral implications of meditation practice. (p. iii)

The practice only works as it was intended if all eight parts of the Eight-Fold Noble Path are practiced together as an integrated unit. Each step of the path, divided into three categories of sila, samādhi, and paññā, are developed in order but ultimately inform and condition each other. That is, they have precisely defined reciprocal relationships, and a particular property of the practice emerges from the integration of these three parts when practiced in sammā, or ideal, fashion (Goenka, 1987/2012). However, daily life makes it practically impossible to learn sila, samadhi, and paññā as an integrated unit as it was originally taught. Indeed, providing this kind of environment is a complex and difficult task.

For this reason, S. N. Goenka only taught new students within the context of a full 10-day courses. These courses are held at established centers or rented sites under the oversight of approved assistant-teachers to ensure that they provide the necessary conditions for students to work without interruption. All food, lodging, and course materials are provided by "old students" who have completed at least one ten-day course with Goenka. In this controlled environment, every need is provided so that students can concentrate completely on the practice, following the "code of conduct" organized to maximize the efficacy of the practice (Dhamma.org, n.d.). Students refrain from contact with others as much as possible in order to maintain unbroken focus on their body and to effectively work in isolation. Having an attitude of working alone enforces the principle that progress in vipassanā occurs when the focus is on oneself for oneself. This includes leaving all electronics and valuable possessions with the management, and refraining from reading, writing, eye contact and physical gestures with others. They are permitted to ask the teachers questions about the

practice at any time, or to address logistical problems with the management of the course. Every moment is accounted for in a repeating daily schedule of near constant guided meditation to develop samādhi in the first three days, pañña beginning on day four and continuing to the end of the course. The daily schedule is as follows (Dhamma.org, n.d.):

4:00 am	Morning wake-up bell
4:30-6:30 am	Meditate in the hall or in your room
6:30-8:00 am	Breakfast break
8:00-9:00 am	Group meditation in the hall
9:00-11:00 am	Meditate in the hall or in your room according to the teacher's instructions
11:00-12:00 noon	Lunch break
12 noon-1:00 pm	Rest and interviews with the teacher
1:00-2:30 pm	Meditate in the hall or in your room
2:30-3:30 pm	Group meditation in the hall
3:30-5:00 pm	Meditate in the hall or in your own room according to the teacher's instructions
5:00-6:00 pm	Tea break
6:00-7:00 pm	Group meditation in the hall
7:00-8:15 pm	Teacher's Discourse in the hall
8:15-9:00 pm	Group meditation in the hall
9:00-9:30 pm	Question time in the hall
9:30 pm	Retire to your own room--Lights out

Even the published summaries of Goenka's discourses from his 10-day courses are intended to be taken in the context of a full course, as described in the discalimer by editor William Hart (1987/2012),

> The [discourse] summaries should not be treated as a do-it-yourself manual for learning Vipassana, a substitute for a ten-day course. Meditation is a serious matter, especially the Vipassana technique, which deals with the depths of the mind. It should never be approached lightly or casually. The proper way to learn Vipassana is only by joining a formal course, where there is a suitable environment to support the meditator, and a trained guide. If someone chooses to disregard this warning and tries to teach himself the technique only from reading about it, he proceeds entirely at his own risk. (p. 4)

This strict but practical system for teaching vipassanā has the purpose of creating an environment that is free from distraction and allows students to maintain "perfect sila" when developing samādhi and pañña (Goenka, 1987/2012). That is, students don't have the opportunity

to lie, steal, kill, embellish sexual desires, or consume intoxicants. They are effectively "living the life of a monk or a nun" (Goenka, 1990a) in order to learn the Eight-Fold Noble Path as a complete, integrated unit. They are encouraged to "refrain from all rites and rituals" from previous systems during the ten days in order to give the technique a "fair trial" (Goenka, 1987/2012, p. 15) and to work exactly as the practice was intended. At the same time, they are encouraged to decide for themselves after the course is over whether or not they want to continue the practice, but only based on giving it a truly fair trial free from confounding the results with other practices (Goenka, 1990a). Those who decide to include the practice in their daily lives are encouraged to practice a minimum of one hour, twice daily.

As of this writing, there are about 180 autonomous, non-profit vipassanā centers conducting courses on Goenka's behalf world-wide (Dhamma.org, n.d.). Each center and vipassanā course is supported entirely by donations and volunteer efforts of students of S. N. Goenka who have completed at least one 10-day course. Though highly experienced, teachers and assistant teachers receive no compensation and are lay "householders" who hold jobs to support themselves. Every center follows the same daily schedule, plays the same recorded discourses, which ensures that an old student can attend a center anywhere and operate in the same system of practice and communication with people of all races and backgrounds. It also provides a standardized way to roughly assess a student's progress and minimize the resources required to conduct a course. A center typically conducts a 10, 20, 30, 45, or 60-day course, followed by a short service period, followed by another course and service period, and so on throughout the year. All activity in the centers is dedicated to the practice or supporting the practice of vipassanā, and nearly all 10-day courses hold waiting lists of one or two months (Hart, 1987).

Goenka claims that the courses must be taught at a minimum of ten days because this is the minimum-average amount of serious practice required for new student to discover crucial facts

about the physical and mental structure required to facilitate an unsupported practice for the rest of their lives. He also claims that only allowing the centers to receive donations from students who have successfully completed a 10-day course prevents the system from losing the purity of its mission by becoming a commercial interest, and increases the value of the system's own survival to stand as evidence of the efficacy of the practice (Goenka, 1987/2012). He claims that a system of this kind allows the teaching to be taught "in its pristine purity" as a non-sectarian and purely scientific practice, with all vital aspects of the practice combined as the complete, integrated unit that they were originally intended to be (Goenka, 2015, p. 9). This distinction separates this form of teaching vipassanā from other forms which typically involve looser restrictions to accommodate popular demand. It is important to note, however, that historical evidence for this bold claim of "pristine purity" has not been provided, and so the efficacy or authenticity of the practice is mostly left to the anecdotal or scientific study of the practice itself.

Use of the term vedanā.

There is debate about the meaning of the term vedanā among vipassanā scholars, and the various understandings of the term have significant implications for the actual practice of satipaṭṭhāna/vipassanā. In Goenka's case, vedanā is defined as "experience, a feeling, a sensation," (Goenka, 1990a), and "anything that one feels at the physical level … any natural, normal, ordinary bodily sensation, whether pleasant or unpleasant, whether gross or subtle, whether intense or feeble" (Goenka, 1987/2012, p. 33). Emphasis is given to vedanā as physical, bodily sensations, where activity in the mind can also be experienced through physical sensations as described earlier. In Goenka's technical exposition of the Mahāsatipaṭṭhāna sutta where the Buddha lays out the entire practice of satipaṭṭhāna/vipassanā, he describes how an advanced meditator can eventually process the four divisions of physical and mental vedanā together as a single stream, and that beginning with bodily sensations is the easiest way. He gives a particularly important description of the technical

reasoning behind the importance of vedanā as concrete, distinct sensation throughout the entire body in a 1990 essay entitled *Why Vedanā and What is Vedanā?* found in the 1990 publication of a seminar proceedings entitled *The Importance of Vedanā and Sampajañña*, published by the Vipassana Research Institute in the same year. Though a difficult read for an untrained meditator, this essay defines the precise understanding of this term which distinguishes Goenka's way of teaching vipassanā from others.

It should be noted that Anālayo (2006), a German monk who does not practice in Goenka's tradition, determined through scholarly review that Goenka's use of the term vedanā and its implications for practice are as plausible, but no more (or less) supported by the historical evidence than differing views.

Conclusions on Vipassanā Meditation

This chapter provided an outline of the historical Buddha's discovery of the Four Noble Truths: that life is suffering, how suffering arises, the conditions required for it to cease, and the instructions for how to cause it to cease. It covered the aspects of the theory pertaining to how suffering arises, with emphasis on the elements of the life process and their place in an objective reality. It then finished with the description of S.N. Goenka's system of teaching vipassanā meditation with emphasis on the non-sectarian, and scientific investigation into the dhamma, or "law of nature," via the Eight-Fold Noble path as a complete, integrated unit. The theory of vipassanā described was taken entirely from this particular tradition. This was done partly because this tradition is hypothesized to be uniquely appropriate for the research question, and partly to support the suggestion that research into Eastern traditions should clearly differentiate which traditional context is used to define their respective research terms.

The ideas in this chapter were articulated in a fashion that would highlight their compatibility with the philosophy and research in the natural sciences in order to ask the question, "To what

extent did the Buddha define a natural system?" Embedded in this question is the notion of a natural system, which points to a particular paradigm of natural science. In a nutshell, this paradigm is one in which prioritizes observation of phenomena "as it is" in nature over influencing those phenomena, and one which organizes those observations in a way which can scale to increasing complexity. While on the surface these paradigmatic principles appear fundamental to natural science, there remains a paucity of research on human behavior in terms of natural systems. Murray Bowen provided one natural system theory of human behavior which remains the only well-developed example of such a theory. This study hypothesizes that the thinking that Bowen brought into his work is unique and subtle, and that aspects of this mode of thinking may also be evident in vipassanā meditation as taught by S. N. Goenka. The next chapter will outline how this study will systematically examine the literature from these two perspectives on human behavior to tease out the principles that define mode of thinking, and any scientific consilience found between them.

Chapter 5: Method

Bowen's theory stands alone as a research effort on the human family as a product of nature. The kind of thinking that went into this effort appears to remain unique in the study of human behavior today. Efforts at family theory, and even Freud's psychoanalytic theory, were developed using a priori assumptions based on therapeutic goals. The primary objective of these theorists was to change the natural phenomenon as opposed to merely understanding it. What set Bowen apart was his objective to understand human behavior as a natural phenomenon and not a human-created phenomenon. He wanted to understand the processes that determined behavior and not just the content or description of the behavior itself. This "research attitude" (Papero, 1990, p. 71) based in systems thinking sets Bowen apart from his fellow family theorists and from many clinical theorists today.

The present study asks the research question "To what extent did the Buddha define a natural system theory?" Asking this question requires an exemplary natural system theory from a similar or adjacent domain to compare against the Buddha's theory. Bowen theory provides such a natural system theory. The question will be addressed by means of a systematic theoretical-paradigmatic comparison of vipassanā meditation as taught by S. N. Goenka with Bowen's natural system theory of the family as an emotional unit. This comparison will not look for conceptual equivalence but begin to frame a way in which a natural systems approach to human behavior might relate to vipassanā.

For example, there is little evidence that the Buddha taught a theory of the human family as an emotional unit. Rather, if the Buddha discovered something which could be considered a natural system theory which relates to human suffering, then it may contribute something to Bowen theory. However, both approaches do appear to share many essential concepts: reducing human suffering through the understanding of problems instead of simply trying to make the problems go away; the

primacy of human relationship; a single construct for individual health; the tempering of emotions toward the development of objectivity; increased awareness of one's self and surroundings; the absolute interdependence of all of life; the importance of becoming an ardent researcher; and that progress for the collective begins and ends with progress for oneself.

This study will adopt S. N. Goenka's view of what was and was not taught by the Buddha. This will no doubt generate statements and concepts which are in philosophical conflict with other Buddhist traditions, particularly the reformist Mahāyāna traditions. However, a hermeneutic analysis of the validity of the traditions is a task for only the most experienced meditators and falls outside the scope of this study. As such, the term "vipassanā" will refer to the non-sectarian style of satipaṭṭhāna as taught by Goenka. This tradition teaches that satipaṭṭhāna, which is also called vipassanā meditation, comprises the entirety of the teachings. Therefore, if the practice of vipassanā meditation itself is said to be scientific in nature, or that vipassanā operates on something like a natural system theory, then it is assumed that the entirety of the Buddha's theory and style of teaching are scientific in nature and operates on something like a natural system theory.

Subsequent research which specifies a different traditional context may therefore define the scope of the Buddha's teachings differently, and statements within this study should then be interpreted accordingly. The terms *Buddhist* and *Buddhism* will be assumed to indicate either the ethnic Asiatic religions claiming allegiance the same historical figure, or the Western conception of the non-sectarian practices as a religion. Instead, we will simply use the terms dhamma for the "law of nature" and vipassanā for the practical teachings to develop an understanding of the law of nature and live in line with it.

Because this project aims to determine the extent to which vipassanā theory defines a natural system theory of a living system as defined in Bowen theory, a conceptual comparison is needed between Goenka's teaching of vipassanā theory and Bowen's approach to a science of human

behavior. This comparison should be interpretive to bridge the semantic gap between the traditions, inductive to produce a synthesis which may contribute to an integrative theory, and systematic to increase accuracy and transparency. The qualitative research method *meta-ethnography* defined by ethnographic researchers Noblit & Hare (2011) fulfills all of these requirements.

Meta-ethnography was designed to be an inductive and interpretive method which produces a synthesis beyond mere description in a conventional narrative literature review. Meta-ethnography is a form of "systematic comparison" that "involves the translation of studies into one another" (Noblit & Hare, 2011, 1.2, pp. 2), and makes use of "metaphoric reductions" to "achieve both abstraction and complexity, and create translations that preserve the relations between concepts" (1.2, pp. 12). Noblit & Hare describe the method as comparing existing ethnographic studies in order to synthesize theory from which to derive further research. However, the method is highly generalizable and has been successfully applied to research that does not use the ethnography method (Britten, Campbell, Pope, Donovan & Morgan, 2002; Morton, Dennison, May, Murray, Little, McManus & Yardly, 2016).

One notable difference in the way this study will adapt meta-ethnography is that the present study is a positivist study, and Noblit and Hare specifically defined meta-ethnography as an interpretive method. The present study is positivist in that it adopts the notion of objective truth as it seeks to understand its subject. That is, it is assumed that there is an accurate and an inaccurate way to understand Goenka and Bowen, and the synthesis will be as true to the accurate way as possible while "interpreting" one with respect to the other.

This study seeks to understand the relationship between vipassanā and Bowen theory and does not necessarily seek to integrate them. Therefore, it is necessary for the research method to leave concepts from each tradition intact while also presenting areas where they agree or disagree with each other. Noblit and Hare (2011) suggest that an adequate translation in meta-ethnography

"maintains the central metaphors and/or concepts of each account *in their relation to other key metaphors or concepts* in that account" (1.2, pp. 3). "It also compares both the metaphors or concepts and their interactions in one account with the metaphors or concepts and their interactions in the other accounts." (1.2, pp. 4). In terms of Kuhn's criterion of taxonomic-commensurability (Kuhn, 2000) mentioned in chapter one of this document, the taxonomies of each account must be left intact. In this study, this requirement means that translations which reconcile concepts from one school with concepts from another school must be valid both internally to the school they came from and externally to the school they are compared against. If the aim were to combine each theory into a new integrated theory, then it would not be necessary to adhere to this taxonomic criterion. Instead, theoretical taxonomies will be preserved because this study aims to understand how these theories and their respective paradigms relate to one another as they are.

Meta-ethnography is defined as having six phases. These phases are represented here using titles defined by Noblit and Hare (2011), but with the descriptions adapted for this study|:

1. *Getting started*: choosing an appropriate topic. This step has already been completed and is represented by the research question, "To what was extent did the Buddha define a natural system theory?"
2. *Deciding what is relevant to the initial interest*: Define the literature to be examined. This step has already been completed. Literature on vipassana meditation and Bowen theory will be used to represent the theoretical principles and paradigmatic thinking that organizes them. Literature on vipassana meditation will be selected using Pariyatti Publishing's designation for works that pertain to the tradition of S. N. Goenka and Sayagyi U Ba Khin. Literature on Bowen theory will be selected from authors within the Bowen Network as organized by the Bowen Center for the Study

of the Family in Washington D.C. Exclusionary criteria are outlined in the subsequent sections in this chapter.

3. *Reading the studies*. Read through the material and build a list of key concepts and paradigmatic principles from either body of literature which pertain to the research question. Each item need not be found in both bodies of literature. Whereas Noblit & Hare specifically define this phase as interpretive without the imposition of an objective notion of which selections are "correct," item selection in this study should be as objective as possible. A more accurate set of selections will increase reproducibility of the study.
4. *Determining how the studies are related*. Create a table with three columns. Add each item from the previous step to the first column in the table. Each cell in this column will serve as the label for that row. This step leaves two empty columns, one for each body of literature considered. Whereas Noblit & Hare only include items which are common to all bodies considered, this study will also include pertinent concepts found in only one body of literature.
5. *Translating the studies into one another*: Complete the grid, pulling quotes from each body of literature which exemplify a key concept or principle in the first column. Terminology used in each body of literature is preserved in the grid.
6. *Synthesizing translations:* Create a new "synthesis" table which again includes key concepts in the first column, reciprocal translations of the quotes in the second column called "second-order translations," and a third column with the synthesized theoretical concept called "third-order translations." This study is in agreement with Noblit & Hare's argument that the act of translation is inherently interpretive.

Nevertheless, objectivity will be emphasized in this step to maximize the validity and reproducibility of the translations.

7. *Expressing the synthesis:* Tailoring the results for a particular audience through writing, presenting, etc. This step is covered through the answering of the research question, publication of this study, subsequent publications, talks, etc.

In summary, this study will make use of the meta-ethnography to perform a systematic theoretical and paradigmatic comparison of Bowen theory and vipassanā in order to answer the research question. Instead of a meta-synthesis of ethnographic studies, this study will examine the bodies of literature, videos, and interviews deemed to represent the state of each theory and paradigm as described in the next sections on exclusionary criteria. Key concepts will be drawn from the literature, tabulated (step 4), compared (step 5), and synthesized (step 6). The product of the sixth step of synthesis will be interpreted to answer the primary research question. It will then be possible to answer secondary questions, for example what each theory may have to offer the other.

Exclusionary Criteria for Literature on Bowen theory

The selection of primary source material on Bowen theory is fairly straightforward, as the works of Bowen and his successors provide a reasonably coherent set of works to draw from. Bowen scholars make an effort to maintain collaborative communication with other scientific disciplines, namely biology, ecology, and the study of evolution. Literature on Bowen theory will be selected from authors within the international Bowen network and its Center (https://thebowencenter.org). Generally speaking, authors who are also Bowen Center faculty will be considered authoritative sources on theory. Bowen produced one book, *Family Therapy in Clinical Practice* (1978), and co-authored *Family Evaluation* (1988) with Michael Kerr. There also exists a voluminous collection of audio/video interviews and clinical recordings with Dr. Bowen in which he elaborates the purpose behind his thinking and implications of his theoretical approach which are

available through the Bowen Center archives. These works are still considered mostly canonical and remain as relevant today as they were at the time of their publishing. At times it may be necessary to assess the currency of the material in these sources against the state of the theory today.

Exclusionary Criteria for Literature on Vipassanā Meditation

One challenge of scholarly study of any "Buddhist" tradition is determining which texts actually represent "Buddhism." While the primary goal of this study is to consider a purely non-sectarian perspective on the teachings of the historical Buddha, it will avoid the use of the label "Buddism," and will avoid literature from traditions which do not sufficiently differentiate their tradition from religion. In effect, this leaves works from what is considered by some to be the "pre-sectarian" phase of the Buddha's teachings which occurred before his followers divided into Mahāyāna, Theravada, and other "Buddhist" sects.

As with Bowen theory, selection of literature from vipassanā as taught by S.N. Goenka is an easy task because this tradition has made an exceptional effort to define which works adhere to the non-sectarian perspective on the dhamma and the teaching of the Eight-Fold Noble path as an integrated unit. These topics were discussed at length in chapter 4. Therefore, this study assumes that S. N. Goenka is an authority on the non-sectarian nature of vipassanā. Pariyatti Publishing, the North American publisher for the tradition clearly distinguishes works which pertain to the tradition and works which may pertain to but are not generated within the tradition.

This study will organize vipassanā literature into a prioritized stack. First, it will look to the tradition of S. N. Goenka, which includes Sayagyi U Ba Khin, Ledi Sayadaw and other authors in this tradition as the authoritative commentarial source on the Buddha's verbal discourses recorded in the Pāli Canon. Second, it will look to works in the general Theravada tradition. Lastly, it will look directly to the Pāli Canon which is widely regarded by nearly all "Buddhist" traditions to be the actual words of the Buddha himself. While Goenka claims the Pāli Canon as his own authoritative

source, the Canon will not be referenced directly unless Goenka himself makes reference to it or he fails to address a particular topic that is covered clearly in the Canon. These references will be taken with extreme care. The reason for this is that nuances in the English translations and application to the actual practice may produce widely varying analogies and comparisons with other systems of thinking.

This study will make an effort to include all relevant sources from the tradition of S. N. Goenka, but will only refer to Theravadin sources or the Pāli canon in areas to which Mr. Goenka does not speak directly. If there is disagreement between two sources, then the order of priority is enforced to determine which is the accepted interpretation for the use of this study. For example, if Goenka says that paṭiccasamuppāda arises and passes away trillions of times per second, and a Theravadin teacher says that the loop occurs once per lifetime, then Goenka's interpretation will be used.

It would be a mistake not to include *Mutual Causality in Buddhist and General Systems Theory* (1991) by Joanna Macy, as it is the one work which directly addresses on of the most fundamental theoretical points that underpin the purpose of this project. In the book which was the product of her own dissertation research, Macy shows that systems philosophy and paṭiccasamuppāda apparently agree on a perspective of causality. As mentioned in the overview on vipassanā meditation in chapter 4, paṭiccasamuppāda is the conceptual kernel of the Buddha's theory of suffering which has much overlap with the nature of the rest of the universe. Explanations of the semantics of the appropriate passages of the Pāli canon are given, making this book a useful starting point for validating the premise of this project against canonical literature. Care will be taken where Macy's interpretation of the Pāli passages may conflict with Goenka's interpretations, and in the end Goenka's interpretations will be given priority.

Limitations of the Study

While this project is an intellectual exercise to test for validity of comparing a natural systems approach to Vipassanā, problems exist in a purely intellectual examination before actually conducting the practice of Vipassanā for oneself. This project will include literature that is intended for use by "old students" of Vipassanā who have completed at least one 10-day course with SN Goenka, and it must be understood that these literary sources should not be taken out of the context for practice. As this dissertation is a scientific exercise for the author to obtain an academic degree, some level of logical argumentation is necessary at a level beyond that available to the uninitiated reader, and it is for this reason alone that these sources and advanced concepts are used. Thus, the reader should hold in mind that any references to Goenka's style of teaching vipassanā and his discourses should be taken as relatively superficial logical argument and does not in any way supplement learning about the technique through actual practice. Hart (1987) provided a similar disclaimer in his book that he co-authored with Goenka. This passage is included in chapter 4 and repeated here,

> This book is not a do-it-yourself manual for the practice of Vipassana meditation, and people who use it this way proceed entirely at their own risk. The technique should be learned only in a course where there is a proper environment to support the meditator and a properly trained guide. Meditation is a serious matter, especially the Vipassana technique, which deals with the depths of the mind. It should never be approached lightly or casually. If reading this book inspires you to try Vipassana, you can contact the addresses listed at the back to find out when and where courses are given.
> The purpose here is merely to give an outline of the Vipassana method as it is taught by S. N. Goenka, in the hope that this will widen the understanding of the Buddha's teachings and of the meditation technique that is their essence. (pp. 7-8)

Chapter 6: Review of Literature on Bowen Theory

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Chapter 7: Review of Literature on Vipassana Theory

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Chapter 8: Synthesis, New Construction, Findings

Chapter 9: Conclusions and Proposals for Future Research

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Appendix A

Taxonomy of the Four Noble Truths; *cattāri ariyasaccāni*

1. Life is Suffering; *idam dukkham*
2. The Cause of Suffering; Dependent Origination; *paṭiccasamuppāda*
    - The Mental Four Aggregates (Short Form; Practical)
        1. Sense data (*viññana*)
        2. Evaluation of sense data (*sañña*)
        3. Generate bodily sensation (*vedanā*)
        4. Automatic reaction (*saṅkhāra*)
    - Twelve "causal" steps in the loop of *paṭiccasamuppāda* (Long Form; Theoretical)
        1. Ignorance *(avijjā)*
        2. Karma/action/reaction (*sankhārā*)
        3. Consciousness (*viññana*)
        4. Body/mind (nama/rupa)
        5. Sense organs (*salāyatanam*)
        6. Contact w sense organ (*phassa*)
        7. Sensation (*vedanā)*
        8. Craving *(tanhā)*
        9. Clinging *(upādāna)*
        10. Becoming *(bhava)*
        11. Birth *(jāti)*
        12. Sickness, old age, death, other miseries (*jarā-marana*)
3. How suffering ceases; *nirodha-sacca*
    - Reprogramming the automatic craving of sensations triggers a systemic shift throughout the twelve links of *paṭiccasamuppāda.*
4. The way to the cessation of suffering; Eight-Fold Noble Path; *ariyo aṭṭhaṅgiko maggo*
    - Morality (*sila*)
        1: Right speech
        2: Right action
        3: Right livelihood)
    - Concentration (*samadhi)*
        4: Right effort
        5: Right awareness
        6: Right Concentration
    - Wisdom (*pañña: heard, rational, experiential)*
        7: Right thoughts
        8: Right understanding
            - All phenomena are impermanent (*anicca*)
            - All phenomena have no self (*anatta*)
            - All phenomena are suffering (*dukkha*)