Learning, Language, and Derived Behaviors:

Some Implications for a Process-based Approach to Psychological Suffering

The increasing focus on psychological processes in the post-DSM era, as exemplified in the current volume, connects rather oddly with a 50-year line of research that emerged in behavior analysis (hereafter referred to as behavioral science). Of course, behavioral science has always concerned itself with the behavioral processes of learning, adaptation, and so on, but until the late 1960s or early 1970s, a widely-held assumption was that behavioral processes, broadly speaking, were common to both nonhuman and human animals. This assumption was reflected in the earliest translational research associated with behavioral psychology. The famous study by Watson and Rayner (1920) in which they created and "treated" a phobia in a young child, using the processes of classical conditioning and extinction, which had been identified and studied by Pavlov using dogs (1897; 1902), provides a clear-cut example. Other examples, of course, abound in the literature, including the study of learned helplessness (Seligman, 1974), inhibition (Wolpe, 1958), and fear generalization (Lashley & Wade, 1946), each of which has been used in experimental analogs of both human and nonhuman "psychopathology". The continuity assumption, at the level of psychological processes, from animals to humans has not been without value, but it remains that – an assumption, not an empirical fact.

As noted above, this widely-held assumption was challenged around 50 years ago in behavioral science, when B.F. Skinner proposed the concept of instructional control/rule-governed behavior (Skinner, 1966; 1969), as a way in which humans could solve problems without direct contact with reinforcement contingencies. A few years later, another major figure in behavioral science, Murray Sidman, identified a phenomenon which he labeled "stimulus equivalence" (Sidman, 1971), that appeared to provide a behavioral process

underlying instructional control itself. This work, in turn, led to relational frame theory (RFT), which is a modern behavioral science attempt to deal with the psychological processes that appear to be largely unique to the human species. Within behavioral science, the connections amongst instructional control/rule-governed behavior, stimulus equivalence, and RFT, and understanding and treating the processes involved in human psychological suffering, are well-known. Outside of behavioral science, knowledge of this work is either limited or completely absent. The purpose of the current chapter is to highlight the modern behavioral science approach to the study of human psychological processes and the implications these processes have for understanding and treating human suffering.

In writing the current chapter, the authors fully recognize that many scientists assume that there are differences between human and nonhuman psychological processes (e.g., Premack, 2007). Within clinical psychology, however, there remains highly-regarded cutting-edge process-oriented research that fails to grapple meaningfully with these differences. For example, recent work by Craske and colleagues on an inhibitory learning approach to maximizing the impact of exposure therapy (Craske, Treanor, Conway, Zbozinek, & Verveliet, 2014) draws heavily on basic research conducted with nonhumans (e.g., Bouton, 1993). The underlying assumption thus appears to be that psychotherapy should be based on, and needs to target, inhibitory learning processes that are common to both human and nonhuman species. In pointing to the work of Craske, we are not questioning its quality or effectiveness, and indeed we applaud Craske's focus on processes in developing therapeutic interventions. But, we believe that a more complete process-based approach to human psychological suffering and its treatment should be informed by research that has sought to understand the lines of fracture that separate animal and human psychological processes. The current chapter will attempt to present an overview of this work.

Skinner, Instructional Control, and Semantic Relations

The continuity assumption could be seen as an important context for the first serious behavioral attempt to provide an account of human language. That is, Skinner's (1957) controversial book on human language, *Verbal Behavior*, drew heavily on a body of work that had been conducted with nonhumans. Thus, the book itself interpreted much of human language in terms of what were described as *verbal operants*. The concept of the *tact*, for example, referred to instances in which a speaker had learned to emit the correct name for an object, based on a history of reinforcement provided by a listener in the wider verbal community. Although the tact may have been reinforced socially (i.e., by a listener), the key process was an operant, which in principle could be observed in nonhuman species. Less than 10 years after the publication of *Verbal Behavior*, however, Skinner (1966) offered an account of problem-solving in terms of instructional control or rule-governed behavior that suggested a clear break in the continuity between human and nonhuman learning. Specifically, he suggested that humans could solve problems by following rules or instructions without having to contact reinforcement contingencies directly. In so far as only human language provided the basis for (complex) instructional control, the bedrock of the continuity assumption within behavioral psychology had started to crack.

Only five years later, seminal research by Sidman (1971) laid the foundation for seriously undermining the central role of the continuity assumption in behavioral psychology. Specifically, Sidman identified a process he called *stimulus equivalence*, which referred to the emergence of untaught or unreinforced behaviors that could not be readily explained using established behavioral principles previously wrought from animal research. The basic effect involved training participants to match arbitrary stimuli to each other (e.g., A-B and B-C) and then observing the emergence of untaught matching responses, such as B-A and C-A. The challenge to the continuity assumption became completely apparent with repeated failures to

demonstrate even the simplest emergent matching responses in nonhumans, including higher primates (Barnes-Holmes & Roche, 1996; Dougher, Twohig, & Madden, 2014; Dugdale & Lowe, 2000; Zentall, 1998). The circle was then closed when Sidman (see 1994) used the concept of stimulus equivalence to provide a behavioral account of semantic or symbolic relations in human language, that helped to explain how humans could construct, understand, and follow complex instructions.

Indeed, Sidman's insight and contribution were particularly timely for a line of research in behavioral psychology that had begun to draw heavily on the concept of rule-governed behavior in the clinical domain. Specifically, Hayes and colleagues (e.g., Hayes, 1989; Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986) had begun to argue that human psychological suffering resulted, in part, from excessive rule-following at the expense of more contingency-sensitive behavior. As a simple example, imagine a person with chronic pain who follows the rule "Exercise will make my pain worse", and thus never learns that exercise may often have the opposite effect on pain.

Although the focus on rules in the clinical domain certainly looked promising, in terms of basic behavioral processes, exactly how humans learned to understand, construct, and follow such rules remained unclear. However, Sidman's work on equivalence provided the foundation for a process-based account of instructional control itself. Specifically, Sidman suggested that rules have their impact on behavior because the words contained within rules entered into equivalence relations with the stimuli and events specified in those rules. This basic insight was instrumental in generating an account of human language and cognition, known as Relational Frame Theory (RFT; Hayes & Hayes, 1989; see Hayes, Barnes-Holmes, & Roche, 2001 for the first book-length treatment). This theory constituted a direct challenge to the continuity assumption in behavioral science in aiming to provide an account of human psychology that focused on psychological processes that appeared to be uniquely human. A

critical part of this new theory was based on the need to understand exactly how human language and cognition fed into human psychological suffering. It is for this reason that RFT and Acceptance and Commitment Therapy (ACT), also developed by Hayes and colleagues, may be seen as having co-evolved (McEnteggart, in press; Zettle, 2005).

Relational Frame Theory

As noted above, the extension of Sidman's seminal work to rule-governed behavior came with Hayes and Hayes' (1989) approach to stimulus equivalence as an operant class of *arbitrarily applicable relational responding (AARR).* According to this view, a history of reinforced relations among stimuli established particular patterns of over-arching or generalized relational operants, referred to as relational frames (Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000). For example, imagine a young child who learns to point to the family dog upon hearing the word "dog" and to say "dog" when someone else points to the dog. The child might also learn to say "Rover" when asked, "What is the dog's name?" Each of these naming or relational responses would be explicitly prompted, shaped, and reinforced initially by the verbal community. Across many such exemplars, involving other stimuli in other contexts, the operant class of coordinating stimuli in this way becomes abstracted, such that direct reinforcement for all of the individual components of naming are no longer required when a novel stimulus is encountered. So, if a child was shown a picture of an aardvark and the written word, and was told its name, the child may later say "That's an aardvark" when presented with a relevant picture or the word, without any prompting or direct reinforcement for doing so. In other words, the generalized relational operant of coordinating pictures, spoken, and written words is established, and directly reinforcing a subset of the relating behaviors (spoken word-picture and spoken word-written word) "spontaneously" generates the complete set (e.g., picture-written word).

When a pattern of generalized relating is established, that class of behavior is defined as always under some form of contextual control. Contextual cues are thus seen as discriminative for different patterns of relational responding or different relational frames. The cues acquire their functions through the types of histories described above. Thus, for example, the phrase "That is a", as in "*That is a* dog", would be established across exemplars as a contextual cue for the complete pattern of relational responding (e.g., coordinating the word "dog" with actual dogs). Once the relational functions of such contextual cues are established in the behavioral repertoire of a young child, the number of stimuli that may enter into such relational response classes becomes almost infinite (Hayes et al., 2001).

The core analytic concept of the relational frame proposed by Hayes and Hayes (1989) involved three common properties: mutual entailment; combinatorial entailment; and the transformation of stimulus functions. First, mutual entailment refers to the relation between two stimuli. For example, if you are told A *is the same as* B, you will derive that B *is the same as* A. That is, the specified A *is the same as* B relation mutually entails the (symmetrical) B *is the same as* A relation. Second, combinatorial entailment refers to the relations among three or more stimuli. For example, if you are told A *is more than* B and B *is more than* C, you will derive that A *is more than* C and C *is less than* A. That is, the A-B and B-C relations combinatorially entail the A-C and C-A relations. Third, the transformation of stimulus functions refers to the "psychological content" involved in any instance of derived relational responding. For example, if A *is less than* B, and a reinforcing function is attached to A, then B will acquire a greater reinforcing function than A, even though the function was directly attached to A and not B.

Whereas Sidman's work on equivalence relations focused on what may be considered the most basic type of symbolic relation, RFT developed and expanded the conceptual analysis in an effort to cover the richness and complexity of human language and cognition in

whole cloth. Equivalence relations were defined as just one type of symbolic relation with numerous other relations (defined above as relational frames) also being identified and studied from the early 1990s until the present day. These patterns of relational frames (e.g., coordination, opposition, distinction, comparison, spatial frames, temporal frames, deictic relations, and hierarchical relations) have been analyzed across numerous experimental studies, and across a variety of procedures. Some research has also explored the transformation of functions (see Hughes & Barnes-Holmes, 2016, for a recent review). In addition, empirical evidence supported the core RFT postulate that exposure to multiple exemplars during early language development is required to establish these relational frames (see Hughes & Barnes-Holmes, 2016b). As such, the argument that relational frames may be thought of as over-arching or generalized relational operants gained considerable traction.

Although RFT remains a work in progress as a behavioral account of the core processes involved in human language and cognition, the research it has generated appears to have broad-ranging implications for understanding and treating psychological suffering. To appreciate these implications, we will provide examples of how behavioral processes identified by RFT have been used in the clinical domain.

Transformations of Functions

The concept of transformation of functions has often been appealed to in order to explain the development and maintenance of irrational fears and phobias (e.g., Augustson & Dougher, 1997; Dougher, Augustson, Markham, Greenway, & Wulfert, 1994). Imagine a young boy who experienced a bad fall from a horse while horse riding for the first time and subsequently feared horses. Here, the fear of horses was directly conditioned. Now imagine that the boy develops a fear of cows, even though he has not experienced any negative event with a cow. Such a *transformation* of functions, wherein cows are now fear-inducing, could be based at least in part on the fact that horses and cows participate in a frame of coordination

in the context of "large farm animals." Because of this coordination, it is possible that the boy in time may show distress on a trip to the zoo because the fear-inducing function of large farm animals now spreads through 'symbolic generalization' (i.e., the frame of coordination) to all large four-legged animals.

The concept of transformation of functions can also be used to explain more complex examples of human psychological suffering. Imagine a woman who has begun to feel trapped in various areas of her life (e.g., work, relationships, and family). Her use of the word "trapped" in these contexts of her life results in bouts of claustrophobia and panic when she enters enclosed spaces, such as elevators, subways, and shopping malls. The emergence of claustrophobia and panic may have little to do with actual aversive experiences in any of these contexts, but is based instead on the transformation of functions of those contexts, because they are coordinated via the term "trapped" to the relational networks that describe work, relationships, and family responsibilities. In this case, relating entire relational networks to other relational networks is involved in highly abstract transformations of functions.

When human psychological suffering is interpreted or explained in terms of derived relations and the transformation of functions, this highlights the importance of focusing on the role of language during psychotherapy. In the case of the woman above who developed claustrophobia and panic in the context of feeling trapped in several domains in her life, it may be useful in therapy to explore the word "trapped" itself. For example, in exploring the functional properties of "trapped," the therapist might literally hold the client's wrists gently and ask her to describe how it feels to be trapped by someone else. Engaging in this physical metaphor may help the client to see the connections between her claustrophobia and panic and the wider unhappy features of her life, and to then explore her reactions to these in ways that are defined as values-driven, rather than values-disabling (e.g., consider changing jobs, sharing her fears with her partner, etc.).

Rule-governed Behavior

From an early age, we learn to follow rules that are given to us by others and which provide us with useful strategies for controlling our behavior and predicting the behavior of others. For example, parents pass onto their children rules about poisonous foods (e.g., do not eat yellow berries), in order to avoid serious illness, without the children having to make direct contact with the natural contingencies. According to the behavioral science literature, however, rule-governed behavior may be relatively insensitive to contingencies, which in turn *promotes* psychological suffering rather than protecting us from potentially harmful events in the environment (McAuliffe, Hughes, & Barnes-Holmes, 2014, p. 2). As such, excessive reliance upon rules in daily life can become problematic. Consider a man who follows rules such as: "I must always appear strong;" "People can never see me upset;" "Men shouldn't cry;" and so on. Following such rules may work well in his professional life as the CEO of a company. In a different context however, such as his relationship with his partner, following these rules may be problematic because he does not share things that upset him or that appear to make him vulnerable, thereby leading to a lack of intimacy in the relationship.

In the context of therapy, undermining excessive rule-following can be achieved by helping the client to identify instances of rule-following and by exploring the *workability* of these rules in various contexts. Using the previous example, the man may identify the rule "People can never see me upset" as controlling his behavior, so the therapist might then ask questions such as "Can you give me some examples of when you might use this rule?" The therapist can thus begin to target the behavioral control functions of the rule by asking questions, such as "Is it possible that this might actually be pushing your partner away from you?" These questions can offer an alternative perspective from which the client can view his own behavior in the context of the rule. The therapist might then try to encourage the man to engage in contingency-sensitive (rather than rule-consistent) behaviors, such as talking openly

to his partner about his feelings. Of course, these examples would hardly be unique to therapies generated within behavioral science, but the focus on rules or instructional control as basic behavioral processes, as identified within RFT, serves to maintain a close link between the basic science and its application.

Metaphor: The relating of relations

Another area in which RFT can be applied to therapy is in its account of analogy and metaphor, in which relating relations lies at the core (Stewart & Barnes-Holmes, 2001). Consider the simple analogy "Peach is to pear as cat is to dog," in which one coordination relation (peach-pear) is related to another coordination relation (cat-dog). One coordination relation relates two stimuli in the context of fruit, while the other coordination relation relates the stimuli in the context of domestic animals. The phrase "is to" is the coordination relation that relates the two relations with each other. Critically, the four stimuli (peach, pear, cat, dog) do not collapse into a single relational network in which they all become equivalent or coordinated. Rather, the network consists of two separate relations that are related to each other *as relations.*

One of the key functions of analogy and metaphor in natural language is to help listeners to use established knowledge in one domain to help understand information in another domain. For example, the analogy "The heart is like a pump" is often used in anatomy. Relating relations, as the basis of analogy and metaphor, can also be used to help clients to see their situation in a new or different way that may facilitate clinical change (see Foody et al., 2014). Consider one of the stock analogies often used in ACT, "Struggling with anxiety is like struggling in quicksand." This analogy contains three elements: (1) two coordination[1] relations (struggling with anxiety-panic and struggling in quicksand-drowning); (2) a

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[1] For the purposes of this example, these are described as coordination relations, which are simple relational networks, and once these networks are expanded within the context of therapy, the networks become more complex. Thus, we will use the terms relations and networks almost interchangeably.

coordination relation between these relations (struggling with anxiety *is like* struggling in quicksand); and (3) seeing the behavior of "struggling" as part of the problem. More technically, the analogy is designed so that the functions of struggling in quicksand transfer to struggling with anxiety through the coordination-coordination relation. Put simply, the analogy suggests that there is something about the way you struggle with anxiety that is similar to struggling in quicksand. Specifically, the urge to escape quicksand typically leads to more rapid drowning, just as struggling with anxiety may lead to a panic attack. This type of analogy could be useful in therapy if a client had not previously seen that attempts to struggle to control anxiety might actually increase the likelihood of panic. Asking the client to consider the analogy may thus encourage the client to respond differently to the experience of anxiety when it occurs. Relating relations, in the context of this analogy, thus suggests that it may be useful to expose oneself to anxiety, in much the same way as one survives in quicksand by lying relatively still and not struggling.

While attempting to use relating relations in therapy, it is important that the therapist does this along with a functional assessment of the client's key problem. For example, if the client's anxiety does not involve panic, or if they have never heard of quicksand, then the coordination with drowning in quicksand will likely fail. Critically, the closer the analogy matches the relevant relational networks for the client, the more likely it will produce the desired behavior change.

Deictic Stimulus Relations and the Verbal Self

The emergence of a stable sense of self is a critical feature of human development, and an assumed prerequisite for complex verbal behavior and psychological wellbeing (Dymond & Barnes 1997; Hayes 1984). Indeed, clinical researchers have proposed that fractured development of the self may be associated with psychological suffering (e.g., Ingram 1990; McEnteggart, Barnes-Holmes, Dillon, Egger, & Oliver, 2017). For RFT, verbal self

(sometimes referred to as the deictic-I) involves three functionally distinct deictic relational units: the interpersonal I-YOU relations; the spatial HERE-THERE relations; and the temporal NOW-THEN relations (Barnes-Holmes, 2001). According to RFT, the verbal community teaches a young child across time to distinguish him- or herself from others, and to locate the verbal self in space and time. For example, young children are frequently asked questions such as: "What are you doing now?"; "What did you do then?"; "Where are you going tomorrow?"; and "Did you go there with your dad or your mom?" As a child learns to respond appropriately to these questions, the verbal self, located in time and space and in relation to others, emerges out of the social/verbal contingencies within which the child is raised.

Some authors have argued that the verbal self may be central to psychological suffering (e.g., Barnes-Holmes et al., 2018), especially when the self participates in instances of what might be called excessive rule-following. For example, consider the rule or relational network "Only bad people end up alone." This may facilitate a negative evaluation of the verbal self in the context, for example, of a divorce. In more technical terms, the excessive rule-following in this case produces a transformation of negative evaluative functions of the self, based on coordinating the verbal self with "alone" and coordinating "alone" with "badness." In ACT, this effect may be referred to as fusion with negative thoughts and with feelings about the self. Critically, these negative self-evaluations, as instances of excessive rule-following, reduce the likelihood that future behavior will bring the individual into contact with reinforcement contingencies that would potentially undermine the problematic rule-following. For example, engaging in new social activities following a divorce may be less likely if the individual believes that they deserve to be alone because they are a bad, unlovable person.

The relationship between the verbal self and others. The development of the

relationship between the verbal self and others also appears to be critical in psychological

suffering (Barnes-Holmes et al., 2018; McEnteggart et al., 2017). Imagine a young boy who is

subjected to emotional abuse by a parent over a period of years. The parent will perhaps abuse

the child in one moment and then, in the next, say "You know that I love you." The fact that

the parent emits relational networks or rules pertaining to the child's verbal self (i.e., that he is

loved) in a way that is incoherent with how the wider verbal community responds to such

networks (most people do not routinely abuse people they love) may undermine the child's

ability to connect in a healthy way with others in adulthood. Specifically, this individual may

find it challenging in later life to form a close and intimate relationship with someone who is

not abusive toward him. In extreme cases, the levels of relational incoherence created by this

highly abusive parenting may alter the development of a coherent or stable verbal self,

resulting in severe psychological manifestations such as hearing voices, dissociation or

paranoia (McEnteggart et al.).

At this point, it should be clear that since the introduction of RFT, growing numbers of

behavioral scientists have concluded that the psychological processes involved in nonhuman

learning may be of limited value in understanding human language and cognition, and thus

human psychological suffering. In drawing such a conclusion, however, researchers in

behavioral science are faced with the ongoing challenge of developing increasingly refined

analyses of what appear to be psychological processes that are unique to the human species.

As argued at the beginning of this chapter, that work started with Skinner's focus on

instructional control or rule-governed behavior, and Sidman's discovery and development of

the stimulus equivalence paradigm, which then fed directly into the development of RFT. But,

RFT remains a work in progress and some recent conceptual developments in this area appear

to have important implications for understanding the dynamics of the behavioral processes

involved in human psychological suffering. Specifically, a multi-dimensional multi-level framework (MDML) has recently been proposed as a means of conceptualizing these very dynamics. In the next section, we will briefly review this framework (for a detailed treatment, see Barnes-Holmes, Barnes-Holmes, Luciano, & McEnteggart, 2017).

A Multi-dimensional Multi-level Framework

The MDML does not introduce any new process-based concepts to RFT, but rather attempts to bring some order to the myriad ways in which RFT researchers have analyzed human language and cognition, in both laboratory and applied settings. In doing so, the framework identifies what are described as 20 experimental units of analysis that, at this time, appear to be central to analyzing the dynamical interactions involved in the core process of derived relational responding itself. To assist the reader in understanding the MDML, a visual representation of the framework is provided in Table 1.

Table 1

A Multi-Dimensional Multi-Level (MDML) Framework Consisting of 20 Intersections Between the Dimensions and Levels of Arbitrarily Applicable Relational Responding.

LEVELS	DIMENSIONS			
	Coherence	**Complexity**	**Derivation**	**Flexibility**
Mutually Entailing	Analytic Unit 1	Analytic Unit 2	…	…
Relational Framing	…	…	…	…
Relational Networking	…	…	…	…
Relating Relations	…	…	…	…
Relating Relational Networks	…	…	…	Analytic Unit 20

According to the MDML, there are five levels of relational responding: mutual entailing (bidirectional relations between two stimuli); relational framing (simplest relational network); relational networking; relating relations; and relating relational networks. The framework conceptualizes each of these levels as having four dimensions: *derivation, complexity, coherence,* and *flexibility*. Each level intersects with each dimension, yielding 20 units of analysis for conceptualizing the dynamics of relational responding. In brief, *derivation* refers to how many times a derived response has been emitted - the first response is, by definition, high in derivation because it is derived entirely from a trained relation(s). Subsequently, however, derived responses gradually acquire their own history, and thus are less and less derived from the initially trained relation(s). *Complexity* refers to the detail or density of a pattern of relational responding, such as the number of relations and/or different types of relations in a given network. *Coherence* refers to the extent to which relational responding is generally predictable or consistent with previously established patterns of relational responding (whether directly trained and/or derived). *Flexibility* refers to the extent to which patterns of derived relational responding may be altered or impacted upon by various contextual variables (e.g., how readily a pattern of equivalence responding may change when the trained baseline relations are reversed).

To appreciate how the MDML serves to emphasize the dynamics involved in the processes of derived relational responding in basic experimental research, the reader should consult Barnes-Holmes et al. (2017). For present purposes, however, consider instead how the MDML connects to clinically relevant phenomena. Imagine a client who comes into therapy and during the first session the following exchange occurs.

> Client: I am a useless person.
>
> Therapist: Do you really believe that you're useless?
>
> Client: Without a doubt, I truly am useless.

Therapist: How long have you felt useless?

Client: Oh, for many, many years.

Therapist: What makes you think you're so useless?

Client: It's hard to say really, I just know that I am.

Therapist: I find it hard to believe that you're totally useless.

Client (defensively): But you don't know me, if you did, you'd know

how useless I really am.

How might we conceptualize this therapeutic interaction in the language of the MDML? First, when the client says, "I am a useless person," this may be defined as mutually entailing the verbal self with "useless." Second, when the client states, "Without a doubt, I truly am useless," the mutual entailing may be defined as high in coherence (i.e., it is highly consistent with the client's other self-descriptive statements). Third, when the client reports thinking this "for many, many years," the mutually entailing is defined as low in derivation (i.e., the client has been thinking this almost habitually). Fourth, when the client says "I just know that I am" as an explanation for being useless, the mutual entailing is defined as relatively *simple* (low in complexity) at that point in the therapeutic exchange. Finally, when the client reacts negatively to the therapist's suggestion that the client does not seem like a useless person, the mutually entailing may be defined as highly *inflexible*.

The MDML can be used to conceptualize relatively subtle differences in the type of therapeutic exchange presented above. Imagine, for example, that the client provided a long list of reasons for qualifying as useless (rather than simply saying, "I just am"). For example, imagine he said: "I'm a failed husband, I'm a useless father, and I keep getting fired." This "reason-giving" may be categorized as relational networking or relating relational networks. In terms of dimensions, the client's responding might be defined as *low* in coherence if the response to the therapist's question, "What makes you think you're so useless?" was, "I don't

know really, and sometimes I can see ways in which I am not completely useless." If the

client indicated having only recently self-identified as useless (rather than thinking this for

years), the network might be considered relatively *high* in derivation (i.e., as a verbal response

that had only emerged recently in the client's verbal repertoire). Because the client replied

with a long list of reasons why he is useless, the networking may be defined as *high* in

complexity. When challenged by the therapist, had the client replied with, "maybe you're

right, I'm probably not useless at everything" this may indicate a higher level of *flexibility*

than that presented in the example above.

At the time of writing, the MDML was relatively new in the literature on derived

relational responding. Nevertheless, it seemed useful to present this recent development here

because it illustrates how there are ongoing efforts to systematize and refine the experimental

and conceptual analyses of the processes involved in human language and cognition. On

balance, however, we recognize that RFT-based behavioral processes are not necessarily

therapeutic processes, although as we have just seen, they could well have important

implications for understanding human psychological suffering. It is also interesting to note

that the emphasis on behavioral dynamics and change that are so clearly inherent in the

MDML is also reflected in a recent definition of therapeutic processes articulated by Hayes

and Hoffman (in press):

> *Therapeutic processes* are the underlying change mechanisms that lead to the
> attainment of a desirable treatment goal. We define a therapeutic process as a set
> of theory-based, dynamic, progressive, and multilevel changes that occur in
> predictable empirically established sequences oriented toward the desirable
> outcomes. These processes are *theory-based* and associated with falsifiable and
> testable predictions; they are *dynamic*, because processes may involve feedback
> loops and non-linear changes; they are *progressive* in the long-term in order to be
> able to reach the treatment goal, they form a *multilevel system*, because some
> processes supersede others. Finally, these processes are oriented toward both
> immediate and long-term goals.

In drawing a parallel between the MDML and the definition of therapeutic processes provided

above, we are not suggesting that there is point-to-point correspondence. However, it is

encouraging that they both emphasize: dynamics and dimensions of change; non-linearity; nested units of analysis; conceptual or theory-driven analyses; and multiple levels.

Conclusions

Any attempt to provide a trans-diagnostic framework for psychological suffering will need to grapple with the fact that human learning processes appear to be so much more complex than those that have been studied in animals. We have attempted to show in this chapter that the tradition of behavioral science that is perhaps most closely associated with the continuity assumption has, for almost half a century, seriously challenged that assumption, empirically and conceptually. Indeed, behavioral science continues to struggle with what is perhaps the most significant challenge facing the post-DSM era and perhaps even psychology as a science. Specifically, in our view, there is a need to work out widely-agreed units of experimental and conceptual analysis of human language and cognition that can feed directly into a better understanding of the processes involved in psychological suffering and its successful treatment. Without serious progress in this regard, we are almost certainly destined to repeat the errors of the past.

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