

Chapter 11

Building a Process-Based Diagnostic System: An Extended Evolutionary Approach

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In the first chapter of this book, we argued that the world of evidence-based therapy was changing. In the pages that have followed, all of the chapter authors have, in one way or another, agreed.

Few intervention scientists still believe that an adequate field of evidence-based therapy will emerge from the continued evaluation and deployment of psychosocial protocols and medications focused on psychiatric syndromes. That era created progress, but it is hard to imagine that a decade or two on the same course will create much more. Do we really need the scores of new protocols that will undoubtedly emerge? Will the reorganization, elimination, and emergence of various sub-syndromes matter? Evidence suggests that effect sizes have fallen over the last three or four decades (e.g., Friborg & Johnsen, 2017; Johnsen, & Friborg, 2015; Hofmann, Curtiss, Carpenter, & Kind, 2017), and no one would argue that the effectiveness of intervention is *improving*. But isn't improvement what we should expect of a progressive field of applied science?

Researchers and practitioners are shifting away from the "protocols-for-syndromes" strategy because intervention science has stagnated. The shift is palpable to any unbiased observer. Heralded by the Research Domain Criteria approach of the National Institute of Mental Health (RDoC; Insel et al., 2010) described in Chapter 2, this shift has shaken the field of evidence-based therapy to its roots. The field needs a new way forward, and as of yet, there is not agreement on a viable alternative.

The present volume is part of a larger effort to create this new path. It marks a return to the roots of evidence-based intervention. With respect to the roots of the behavioral and

cognitive therapies, at least, it did not matter much which wing one came from. The message from the founders was similar.

Consider these quotes from the 1960s and 70s.

From the cognitive wing, Aaron Beck admonished therapists to “distinguish between a system of psychotherapy and a simple cluster of techniques,” noting that such a system should have “a clear blueprint of the general principles and specific procedures of treatment” and that “a well-developed system provides (a) a comprehensive theory or model of psychopathology and (b) a detailed description of and guide to therapeutic techniques related to this model” (1976, p. 278 for all quotes).

The behavior modifiers of the time agreed. In their initial defining article on behavior analysis, Don Baer, Mont Wolf, and Todd Risley said that a defining quality of evidence-based behavioral interventions is that “the published descriptions of its procedures are not only precisely technological, but also strive for relevance to principle,” and they warned against the use of a mere “collection of tricks” unrelated to basic principles because these “historically have been difficult to expand systematically” (1968, p. 96 for all quotes).

Behavior therapists of the time likewise wanted to know “what treatment, by whom, is most effective for this individual with that specific problem, under which set of circumstances, and how does it come about?” (Paul, 1969, p. 44), and they defined behavior therapy as experientially tested intervention methods linked to and explained by “operationally defined learning theory” (Franks & Wilson, 1974, p. 7).

Every wing of the behavioral and cognitive therapies began its scientific and practical journey with a commitment both to evidence-based procedures and to evidence-based

theories, models, principles, and processes of change. Syndromal diagnosis interrupted that journey, but we should remember that these original purposes were not cancelled out or obliterated by the syndromal strategy. Intervention science still hoped to get to processes of change, functional diagnosis, and intervention kernels. The detour into “protocols for syndromes” was not homegrown by evidence-based psychotherapists—its origins were in academic psychiatry—but at the beginning, one could plausibly hope that it could have been the needed impetus to achieve the vision of the founders of evidence-based therapy.

Syndromes and the Purposes of Diagnosis

Topographically focused diagnosis and classification is a primitive scientific strategy sometimes deployed early in the development of a scientific field when functional knowledge is limited. With academic medicine, theorists cluster problems into sets of empirically related complaints (“symptoms”) and formal features (“signs”) with the hope of identifying etiological causes of these sets, mechanistic details of their course, and coherent responses to different types of treatment, gradually producing a *functional* understanding in place of a mere topographical description. When these features are clear, we are no longer dealing with syndromes but with functional entities called diseases.

Topographical classification had shown itself to be a useful beginning strategy in the history of science, but it faltered when few functional processes gave rise to a variety of topographies, or when a topography could be produced by a variety of functional processes. The fields of botany and oncology contain well-known examples of these limits.

In botany, consider toadflax and peloric toadflax. These two plants look similar except for their completely different flowers. Carl Linnaeus argued in the 1700s that they were

different species. In the mid 1800s, Darwin showed that the peloric variety bred true, supporting Linnaeus.

We now know these plants are genetically identical. They have a dramatically different appearance and can breed true because of heritable *epigenetic* differences. Appearances could never have resolved this issue or directed researchers to its source. The epimutation responsible for peloric toadflax was apparent only when scientists identified epigenetic mechanisms in the lab and developed accurate assessments of these mechanisms. Then, it was a simple matter to test the two flowers and understand why genetically identical plants could look so different.

In a similar example, treatment success with many varieties of cancer did not soar until the underlying mechanisms of tumor growth were better understood. Mere appearances of different tumors and lesions did not lead to this understanding—it came from studying oncogenes and other processes that lead to the development of cancer. Appearances did not direct researchers toward the underlying processes because they led to far too many topographical appearances.

Our point is that syndromal classification is merely a strategy. That strategy is not hostile to the ultimate scientific and practical goals of evidence-based therapy, but it is largely orthogonal to them in fact. Mental health research has been galvanized for half a century by the assumption that human suffering reflects different latent diseases that might be functionally understood by studying categories of syndromal diagnosis. At this point in the volume, it is worth reviewing what we would hope for from diagnosis so we can assess the viability of the process-based alternative and compare it to the progressivity in a syndromal

approach (for more on the broader context of a process-based approach see Hayes & Hofmann, 2018). Syndromal diagnosis promised progress in every area that diagnosis hoped to address, but it only delivered in one or two.

A Common Language

One promise of a diagnostic nosology is having a common language that funders, providers, researchers, and the public can use to describe people and their problems. In principle, any reliable diagnostic system can provide this. The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) was indeed successful in getting its terms adopted, but a more granular examination shows clear signs of difficulty in this area. For example, the most common DSM-IV diagnosis in clinical practice was “NOS” or “not otherwise specified” (e.g., Fairburn & Bohn, 2005), and a similar pattern is unfolding in the DSM-5 with a new manifestation of this term known as “not elsewhere classified” (American Psychiatric Association, 2013). Further, in many areas, the DSM still shows low reliability of diagnostic categories and high levels of unexplained comorbidity (Hyman, 2010; Jacobi et al., 2004).

Destigmatization and Empowerment

Theorists have frequently argued that the latent-disease assumptions that are built into syndromal diagnosis reduce enacted and self-stigma and thus empower people who are facing mental health issues. The actual data are less supportive. People are indeed less likely to blame the individual when they believe that mental health issues are the result of latent disease (Corrigan et al., 2002).

That benefit, however, comes at a very high long-term cost. Over time, belief in a latent disease *increases* some aspects of stigma and self-stigma, such as feeling that it is impossible to

change, fearing that a person is dangerous, or reducing life horizons (Ben-Zeev, Young, & Corrigan, 2010; Corrigan & Watson, 2004). Patients can also experience “diagnostic overshadowing,” in which physicians misattribute physical health problems to mental health issues (Thornicroft, Rose, & Kassam, 2007).

We can lay many of these problems at the feet of reification (Hyman, 2010). Syndromes are abstractions, but we treat them as concrete entities people *have*. The latent-diseases connotation exacerbates this tendency by giving syndromes pseudoscientific causal power for the very patterns of behavior that led to the diagnostic labels themselves. In the popular mind, if not in that of therapists, depression is a cause of depressed mood, obsessive-compulsive disorder (OCD) is a cause of obsessions, panic disorder is a cause of anxiety, and so on.

Once people are in this mindset, it is easy to think medications are a required treatment since latent diseases are a biomedical concept. In the United States, over ninety percent of those suffering with mental health issues receive medications, and two-thirds of those receive nothing else (Olfson & Marcus, 2010). Given the known and long-lasting side effects of psychoactive medications, these ratios are upside down from what an objective analysis of treatment benefits would lead us toward. Meanwhile, whereas psychosocial interventions for DSM syndromes and sub-syndromes are ever more specific, there is hardly a category of syndromes for which selective serotonin reuptake inhibitors (SSRIs) are not prescribed, undermining the supposition that syndromes are biomedical diseases in hiding.

Conceptual Utility and Causal Understanding

The hope of syndromes is that we will learn about etiological causes, mechanistic details of their course, and coherent responses to different types of treatment. A clear sign of success

would be for at least a few syndromal entities to transition to diseases status. That never happens. The last condition to undergo that transition was general paresis, and untreated syphilis is not a modern issue. Because of the widespread use of a few medications, response to treatment in a statistical sense has become less and less related to diagnosis over time, not more.

The DSM-5 workgroup concluded that there were no sensitive and specific biomarkers for any of the DSM syndromal entities (Kupfer, First, & Regier, 2002), a situation that remains unchanged. A recent study with full genomic analyses of up to a quarter of a million people found that the thirteen most commonly studied “candidate genes” relevant to major depression were no more likely to relate to this condition than were thirteen randomly selected genes (Border et al., 2019).

The billions of dollars of funding that have been poured into syndromal research have yielded interesting and useful data about how mental health problems often unfold, as well as data on how processes of change can lead to their exacerbation or amelioration, but these findings do not, on the whole, line up with syndromal classification per se. Furthermore, in the absence of a clearer focus on processes of change, many of these data are buried and given little attention.

Treatment Utility and Progress

Ideally, diagnosis would help providers select treatments that maximize outcomes (the “treatment utility” of assessment; Hayes, Nelson, & Jarrett, 1987) and also allow them optimize and tailor their interventions. It would also allow for the development of new and more effective treatment methods with better outcomes (“treatment progress”). With syndromal

diagnosis, that simply has not occurred. The DSM itself declares that the system does not have known treatment utility.

Building a Process-Based Alternative

In chapter 1, we laid out the bones of a process-based alternative to the DSM. The chapters that followed have supported the basic outlines of such an approach. In this section, we review the process-based proposal and how it connects to current trends before we return to the Extended Evolutionary Meta-Model (EEMM) to see if we can use it as a beginning framework for process-based diagnosis.

In chapter 1, we argued that processes of change are theory-based, dynamic, progressive, contextually bound, modifiable, and multilevel changes or mechanisms that occur in predictable, empirically established sequences oriented toward desirable outcomes. We argued that in order to assemble known processes into a useful process-based system, we need to focus on those processes of change that are high in precision, scope, and depth; that are immediately and repeatedly measurable; that have been vetted ideographically and not just at the level of collectives; that have been shown to be functionally important in the achievement of outcomes; and that have coherent moderators. We proposed a meta-model of both adaptive and maladaptive sets of processes of change with six psychological dimensions and two additional levels of analysis crossed with the four key evolutionary issues of variation, selection, retention, and context. We can understand specific models of change processes in terms of this meta-model. At their best, process-based models assemble a variety of existing processes of change into sets that are philosophically consistent and clear, that are potent and relatively comprehensive in the range of dimensions and levels they can adequately address, and that are

broadly applicable across problem and prosperity goals—that is, they are “transdiagnostic” and beyond. These models are “versatile” in that they address **Variation and Retention** of what is **Selected in Context** at the right **Dimension and Level** (VRSCDL; Hayes, Stanton, Sanford, Law, & Ta, in press) and can be used to ask evolutionarily sensible (Tinbergen, 1963) questions regarding the *function, history, development, and proximal mechanisms* of processes of change and how they can combine to produce particular behavioral conditions or phenotypes.

The RDoC initiative described in chapter 2 also took a multidimensional and multilevel approach. The emphasis in that chapter was on physical and psychosocial elements that might contribute to neurodevelopmental processes that RDoC presumes to underlie psychopathology. That emphasis can be seen in Figure 2.1, in which neural development involving genes, molecules, and cells is linked to behavioral dimensions via brain circuits. This is a bet on the progressivity of an elemental realist view of human complexity driven by a “back-to-the-lab” strategy to uncover the processes that lead to latent diseases. The jury is still out on this approach, and while we applaud the focus on processes of change, we are concerned that it would be better to link these processes from the beginning to practical issues of treatment selection and impact.

Chapter 3 began this pragmatic approach by exploring a social constructionist and systems perspective on a process-based approach. While not explicitly linked to an extended evolutionary synthesis, it is worth noting the many overlaps. Chapter 3 emphasized the role of context and of the dynamical systems nature of psychopathology. From the evolutionary perspective described in chapter 1, psychopathology refers to a set of self-sustaining biopsychosocial processes that restrict healthy variation, selection, or retention, and these

processes are sensitive to context and occur in a variety of dimensions or levels relevant to psychological functioning. In brief, it is an adaptive peak that prevents further positive behavioral development via normal evolutionary processes. Chapter 3 takes a very similar stance, even though it begins from a different philosophical viewpoint. In particular, chapter 3 emphasizes that psychopathology involves “solutions” that create problems in a vicious cycle. The author presents mastery by avoidance as an archetypal example. He suggests that all successful models and therapies note, interrupt, and redirect vicious cycles in order to note, create, and support virtuous cycles. This idea fits fully within the functional and contextual approach encouraged by an extended evolutionary perspective.

Chapter 4 distinguished vulnerability mechanisms (established and relatively unchangeable susceptibilities to stress) from processes of change or “response mechanisms.” Vulnerability mechanisms are moderators of change processes. We agree that moderators are key, although only extensive research will allow this sorting, and some of the vulnerability mechanisms listed—such as distress tolerance or even some personality traits (see Roberts & Mroczek, 2008)—are on a continuum with change processes.

Chapters 5 and 6 explored how human cognition might impact other dimensions of psychological functioning. There is a good reason that we call mental health problems “mental”: Almost always, language and cognition play some role in psychopathology. We see this in the pervasive impact of cognitive expectations, which therapists can alter to increase treatment impact in areas such as anxiety and depression (chapter 5). We also see this in how cognitive processes establish and alter one’s sense of self—a dimension of known importance

to psychopathology (chapter 6). These chapters make it clear that any adequate process model needs to include verbal and self-related processes.

In chapter 7, the authors explored individual variability in emotions and how this variation is influenced by temperamental, social, and cultural factors. They argue that biologically established temperamental factors interact with familial and cultural factors to shape emotion and its role across the lifespan in a specific, idiographic way. Emotional problems are themselves bound by these interactions. The chapter provides support for the idea that process models need to be vetted idiographically and not just at the level of collectives (Hayes, Hofmann, ... & Ciarrochi, 2019).

Chapter 8 showed how a complex systems approach offers conceptual and methodological tools to create a process-based diagnostic system. Evolutionary theory is a special case of complex network analysis, and thus it is not surprising that the theoretical concepts that flow from a complex network (e.g., resilience, fluctuation, tipping points, and so on) all resonate with issues of contextually situated multidimensional, multilevel variation, selection, and retention. Chapter 8 underlined issues of self-sustaining cycles (both vicious and virtuous, as discussed in chapters 1 and 3) and the need to create system perturbation.

Chapters 9 and 10 explored one of the better-known process-based models: psychological flexibility (PF). The PF model has core sets of change processes focused on each of the six psychological dimensions in the EEMM. These chapters give rigidity and flexibility (issues of variation) clear attention with measures and intervention kernels noted. Accordingly, we view research on PF as a “proof of concept” of a process-based approach. Chapter 9 explored

its success in chronic pain, while chapter 10 showed how a contextually bound, idiographic, longitudinal, and multilevel approach is yielding applied progress.

We did not select the authors of this volume with consilience as an explicit goal, but the review we have just done shows that this is very much what emerged. A process-based approach thought of in extended evolutionary terms naturally extends across the empirical and conceptual issues that we need to face in a process-based approach to diagnosis. However, two questions remain: Can we turn it into a practical system? And, importantly, would such a system be acceptable to different wings of psychotherapy (e.g., psychodynamic, cognitive-behavioral, acceptance-based)? If we can say yes to both questions, then we have a diagnostic pathway forward that could transcend theoretical and philosophical orientations. It would allow people to communicate across islands and work together to build an intervention science more adequate to the human condition.

The Deathstar Project

Our first major step to see if this is possible has been to conduct a massive meta-analysis of mediators of treatment outcomes. We included every known major (and often minor) therapy in the search terms. This allowed us to address two important questions: First, what do different psychotherapies consider to be the key mechanisms of action? And, second, can we understand these mechanisms within the evolutionary process umbrella?

Mediation is the primary way researchers have examined processes of change in treatment outcomes. As a method, it admittedly leaves much to be desired (Hayes et al., 2019), as mediation can only handle a tiny number of variables (generally only one mediator is examined empirically), and researchers assume processes of change are related in a linear, non-

recursive way to treatment and, subsequently, to outcome. We only consider change processes at the level of the collective, despite the non-ergodic nature of human processes of change, thus violating a key assumption of process-based analysis (Hofmann, Curtiss, & Hayes, in press). Despite the weaknesses of mediation analysis, though, we have committed to a complete meta-analysis of the world's scientific literature on mediation to help launch a process-based diagnostic alternative to the DSM because of the important attributes of mediational results and the strengths of a comprehensive meta-analysis in this area.

Before we describe the project in more detail, as well as the data it is yielding, it is worth thinking through how different this approach is to syndromal diagnosis. By starting at the pragmatic end of the hoped-for outcome of classification—that is, treatment utility—and then backing up into a conceptual and categorical scheme, we can design a process-based alternative from the beginning to achieve all of the key goals of diagnosis we reviewed earlier in this chapter. We can note them in reverse order.

A process can have treatment utility only if we can reliably measure it and show it to mediate the link between clinical intervention and outcome. This is a major reason we focused on mediational research. To this day, syndromal diagnosis does not have known treatment utility. Mediators, in contrast, are processes of change with proven treatment utility: by definition, they are functionally important pathways to outcomes that have been differentially moved by intervention and that have been shown to relate to outcomes when controlling for treatment.

If we can systematize these processes underneath the umbrella of an extended evolutionary synthesis, then we will have concepts of known pragmatic importance that can

take advantage of the consilience that evolutionary theory provides (Wilson, 1999). Coherent concepts leading to pragmatic outcomes is a virtual operational definition of conceptual utility. If we can examine proposed mediators of change from a wide variety of clinical frameworks, and yet understand them within the EEMM, then we will have demonstrated conceptual consilience.

What about destigmatization and empowerment? Focusing on moderators combined with multilevel, multidimensional change processes found in history and circumstance is a destigmatizing way to consider a life story. Biomedicalization of human problems, by contrast, is inert or harmful to reduced stigma (Pescosolido et al., 2010). Furthermore, because processes of *change* are (by definition) not passive entities, process-based diagnosis is far less likely to be disempowering to the person than is syndromal diagnosis. Most often, processes of change are things people *do*, not things people *have*. Moderators and context alter how these processes of change apply, allowing greater cultural and individual sensitivity.

Our process-based model gives us a common language. We see no reason that it cannot quickly lead to ways of describing “disorders” based on adaptive peaks. For example, we can see the time coming when people may speak of cognitive inflexibility disorders, experiential avoidance disorders, and so on.

The What and Why of the Deathstar Project

We named the Deathstar project after the Star Wars artificial planet that was gigantic, took forever to build, loomed in outer space, and could severely disrupt ongoing activities. Deathstar is a large meta-analysis that seeks to identify the known mediators of intentional behavior change in mental and behavioral health. It addresses several questions, such as: What

mediators have the strongest support? Can we organize mediators in terms of evolutionary theory? What moderates mediator effectiveness?

The review is inclusive. It includes all bona fide psychotherapeutic intervention/experimental studies, as well as all psychotherapeutic orientations and major therapeutic outcomes, including anxiety, depression, behavioral change, work effectiveness, psychosocial disability, valued living, quality of life, and recidivism/relapse. Using very broad search criteria, we identified nearly 55,000 potential mediational studies. Multiple raters conducted abstract screenings, resulting in nearly 110,000 independent ratings from which they identified approximately 1,500 articles that potentially meet criteria for mediation.

We are now reading and categorizing the studies that may contain mediators. The screening will determine the final number, but we already know that some of these studies will not be legitimate mediational studies and that the same mediator will be identified in several studies. Thus, although the number is not yet known, we will likely be dealing with many scores (if not hundreds) of mediators drawn from several hundred studies of mediation.

Categorizing Studies of Mediation

We will categorize each of these studies according to the EEMM. We also plan to consider all mediators sorted into physiological or sociocultural level to see if a dimensional system emerges for these levels.

Because our approach to the construction of a process-based alternative to the DSM has been largely empirical (other than seeking a way to do so within the potential consilience provided by an extended evolutionary account), we can only broadly characterize where this approach is taking us. Consider the following six mediators, each of which we identified in the

first dozen studies to be fully screened: change in obsessive beliefs, cognitive defusion, mindful awareness, change in intrusive thoughts, anxiety sensitivity, and frequency of mindfulness practice. These six concepts apply easily to cognitive, attentional, and affective dimensions. With the exception of the last concept, each is focused on fostering healthy variation. Mindful awareness and anxiety sensitivity carry with them issues of positive and negative contextual sensitivity; frequency of mindfulness practice addresses a retention process in the form of habit formation.

When we develop a reliable scoring system, based on the meta-model, for all identified mediations, we suspect that most of the cells will contain several processes to consider. If we identify moderators, and dynamical or interactive features, then we will link each of these change processes in a cell to other dimensions, levels, or columns. The assessment tools used for each process will provide a preliminary form of assessment for researchers and practitioners to consider. At that point, we can consider the degree to which existing models of therapeutic change can bear on a coherent summary of these processes.

Because every single process identified by the Deathstar project will have already been shown to move by a specific form of treatment, we will also then have a list of interventions methods that researchers have shown to move processes in each cell. Thus, it seems likely that we will be able to link most cells to measures, processes of change, and intervention methods or kernels, at least broadly. All other things being equal, models that efficiently cover more of this matrix way will be more useful; those that cover less of it will be less useful.

Even before we can present a fully organized empirical account of the world's literature on mediation, however, we can still explore what such a system might yield. Even with a limited set of processes to consider, the EEMM approach suggests a way forward.

Process-Based Diagnosis and Therapy: The Basic Approach

We have defined *therapeutic processes of change* as a set of theory-based, dynamic, progressive, context-dependent, and multilevel changes that occur in predictable, empirically established sequences oriented toward the desirable outcomes (Hofmann & Hayes, 2019). As we noted in chapter 1, these processes are:

- *theory-based* because they are associated with a clear statement of relations among events and lead to testable predictions and method of influence;
- *dynamic* because processes may involve feedback loops and nonlinear changes;
- *progressive* because they may need to be arranged in an order to reach the treatment goal;
- *contextually bound and modifiable* to focus on their implications for practical changes and intervention kernels within reach of practitioners; and
- *multilevel* because some processes supersede or are nested within others.

In this process-based approach, psychological problems are not person-invariant expressions of a latent disease. Instead, we understand psychopathology as context-specific problems in variation, selection, and retention issues that can occur in a variety of dimensions and levels. This is the core idea of the Extended Evolutionary Meta-Model shown in Figure 11.1

(repeated from chapter 1) that we base on evolutionary science, adapted to psychopathology and psychotherapy.

[[INSERT FIGURE 11.1 ABOUT HERE]]

Because we need to link processes of change to the idiographic level, a good place to begin in process-based diagnosis is to link identified problems by using a complex network approach to foster a functional analysis of an individual's presenting problems. We can then apply the EEMM framework while considering all relevant past and present contributing factors, such as early life history, attachment styles, traumas, medical issues, beliefs, behavioral patterns, and so on.

We can provide a practical example. In one of our process-based therapy workshops, a participant sent the network shown in Figure 11.2. She listed the features of the case and guessed about what led to what with a variety of directional arrows. The specific problems are depicted as nodes connected through arrows (what are called "edges" in complex networks) that can form unidirectional and bidirectional relationships.

When developing such client-based networks, we encourage clinicians to begin with descriptive language and even the words of the client to capture the essence of the primary concerns. Some of the edges and nodes might be emboldened to illustrate the centrality of a problem and its functional connection with other nodes. At this point in the process, linking the network to data and sequence is more important than a process-based interpretation. Before we return to process, let's consider the treatment purpose of network thinking.

[[INSERT FIGURE 11.2 ABOUT HERE]]

We think of treatment as a dynamic change of the complex network from maladaptation to adaptation. In such dynamic networks, we encode temporal information in the edges or arrows. This conveys insight into the time-series relationships between nodes. Temporal networks can provide information about relationships between nodes across different measurement windows, which might reveal whether certain nodes predict other nodes.

We can do this conceptually but also empirically during a high temporal density baseline assessment. When done empirically, we specify directed edges to represent partial regression coefficients connecting different nodes. Both autoregressive and cross-lagged effects are possible because each node is regressed onto both itself and other time-lagged nodes.

We thus find processes of change in the “edges” (the arrows) or in larger sub-networks. In accord with the ideas in this volume, a focus should be on parts of the network that could be self-amplifying (negatively so in problem diagnosis, but positively so in treatment planning). Any double-headed arrow can be self-amplifying. So too can any network of three or more nodes in which an output from one could be an input to another, and then to another, and then back to the first one in a kind of merry-go-round fashion. We focus on these self-amplifying parts because, in resonance with the systems approach described in chapter 3, we view psychopathology as context-specific problems in variation, selection, and retention issues. In considering maintaining factors, diagnosis thus needs to focus on self-amplifying aspects of the network.

So too does treatment planning. Network changes can happen suddenly when repeated (or single) strong perturbations cause the complex network to lose its resilience, going over a

tipping point into a different attractor state. We can depict such a change in the stability of a network as a ball rolling across a valley and hill (see Figure 11.3).

[[INSERT FIGURE 11.3 ABOUT HERE]]

A network is more resilient and stable if the valley is deep (position 1) because it requires more effort to move the ball out of the valley and over the hill. Once the ball reaches the tipping point (position 2), a sudden and dramatic shift can occur even after a small additional perturbation. As a result, the network undergoes a dramatic shift, leading to a new, alternative, and stable state (position 3). Depending on a variety of factors, the new state may be more or less resilient to change. The example shown in Figure 11.3 suggests that the new network structure is relatively less resilient to change because the valley is shallow (position 3), and we require less effort to move the ball out of the valley. If this is applied to a psychopathological network, it would be good news for our client because less effort is necessary to reinstate the non-pathological state.

Example

To illustrate how a network analysis could feed a new form of diagnosis, one might imagine a client who became depressed after a recent relationship break-up. As depicted in Figure 11.4, suppose a client has experienced a break-up and is ruminating and experiencing low mood, low self-esteem, and loneliness. In this network, the last two problems are more central for the client. Both variables have edges (relationships with other nodes) that are stronger in magnitude than other nodes, as reflected by the thickness of the arrows depicted. In addition, these nodes are more influential than the other variables in accounting for the functioning of the network, as shown by the thickness of the node borders. These variables can

also be bidirectionally related, as shown by the connections between loneliness and low self-esteem and between low self-esteem and low mood. Thus, the client's break-up led to more loneliness, which then entered a recursive and self-amplifying relationship with low self-esteem and low mood.

[[INSERT FIGURE 11.4 ABOUT HERE]]

From an EEMM approach, repertoire narrowing issues of self, affect, and social dimensions occupy critical nodes. Given this, the therapist may decide that it is important to intervene on the client's low self-esteem and loneliness, as these are the two influential nodes in the network.

Suppose the therapist believes that a key feature of this network is that loneliness is leading to a narrow, negative, and rigid view of the self as being unworthy or unlovable, fostering both a self-amplifying process with depressed mood (with depressed mood being both a result of this view of the self and a goad to it exacerbating) and a further sense of social disconnection and feelings of loneliness.

Focusing on this process account, several techniques might be conceivable to perturbate the system. Suppose the therapist introduces self-compassion meditation as a treatment strategy and teaches the client to apply this skill when he feels lonely, perhaps while remembering how he felt as a lonely child, so as to be more kind to himself. The goal might be to introduce another competing view of the self in which loneliness is not proof of being unworthy or unlovable; instead, it is an indication of a time when the client needs greater self-kindness and compassion. This perturbates the system by changing the functional roles of the needed nodes in the network. Suppose that the client's network now reflects the presence of

this more adaptive processes. It might change the network significantly, undermining the relationship of loneliness to depression and negative views of the self, and fostering its relationship to self-compassion. If self-compassion, in turn, reduces a sense of loneliness and poor self-image, and moderates the relationship between worry and depressed mood, then a new and more adaptive network arrangement might emerge with self-amplifying adaptive features (see Figure 11.5).

[[INSERT FIGURE 11.5 ABOUT HERE]]

This example illustrates how a new form of functional analysis might emerge from process-based diagnosis. Maladaptive nodes, edges, and self-amplifying sub-networks become weaker, as suggested by (a) thinner borders and (b) a reduction in the existence or strength of harmful edges (i.e., low self-esteem leading to rumination, loneliness leading to low self-esteem, and low mood leading to low self-esteem). The two features that were originally most influential (i.e., loneliness and low self-esteem) have lost their dominance in this network except as inputs to the now dominant node of self-compassion.

It is important to feed complex network analyses the right information, assessed with high fidelity and frequency. Thus, the practitioner needs both adequate theory and assessment technology to mount the use of dynamical systems in case conceptualization. To date, many of the network analyses have been based on assessments focused on self-reports of syndromal features (e.g., signs and symptoms), as distinct from contextual factors, biological measures, overt behavioral measures, or measures focused specifically on change processes, such as cognitive flexibility or emotional openness. We need high temporal density measures for change processes to be modeled as nodes in complex networks. Traditional psychometrics is

likely not an adequate filter since it too is based on implausible ergodic assumptions (Molenaar, 2008). Any weakness in assessment limits a network-based case conceptualization and its treatment utility. Thus, this new form of process-based diagnosis will inexorably lead to a number of major changes in evidence-based therapy.

Applying the Extended Evolutionary Meta-Model in Clinical Situations

Even before the results of the Deathstar project become known, the EEMM combined with idiographic network analysis provides a structure for a treatment-relevant approach to process-based diagnosis. We can organize an approach to *process-based diagnosis* with the following nine steps:

1. Select a theory or model within which to conduct treatment-relevant process-based diagnosis, focusing on models that are reasonably comprehensive as considered within the EEMM and that best fit the setting, population, and background of the practitioner.
2. Using case description and the formal practical repeated measurements that best fit the case (including measures drawn directly from session transcripts and client behavior in session), and—considering the client’s goals—describe the longitudinal relationships among the features of the case. Wherever possible, rely on empirically established relationships at the idiographic level. Be relatively inclusive of features, provided they may be relevant to known processes of change and to client goals and fit with provider competence as specified by step 1.
3. Assess a range of strengths and weakness in the client’s repertoire linked to processes of change in the relevant dimensions and levels in the meta-model, within the theory or model being applied by the practitioner.

4. Considering the client's goals, organize the network of features of the case into known change processes and moderators of these processes, focusing in particular on self-amplifying sub-networks within the network. Add measure of process and outcomes as needed. Collect additional information if needed.
5. Organize these processes into an integrative, process-based account of the development and maintenance of the maladaptive network. This account is the functional analysis of the case. It is the process-based diagnosis.
6. Consider how to perturbate the dominant features of the network expressed in process-based terms, either directly or indirectly, but make particular consideration of changes that are available, known to respond to intervention, likely to be retained, likely to alter the idiographic functional relations within the maladaptive parts of the client network, and likely to enter idiographically, self-amplifying features of a new adaptive network.
7. Considering the therapeutic context and relationship, select a series of intervention kernels or methods that are most likely to perturbate the network in that fashion.
8. Intervene while continuing to repeatedly measure key change processes, the therapeutic context and relationship, and progress toward client goals.
9. Recycle based on both process and outcome impact.

As knowledge of processes of change increase and measures become more sophisticated, many of these steps can become more automated and empirical. For example, as automated measures of outcomes or settings (or repeated measures of processes of change) advance, step 2 may become more routine, and steps 3 through 7 may be more driven by big data. In just a few months, we hope to offer a comprehensive empirical list of processes of

change within specified dimensions and levels. We expect to find some overlap in more conceptual attempts, such as that expressed in chapter 4.

Our existing clientele cannot wait for the future. Thus, in process-based training, we have found it useful to teach idiographic conceptual network analysis and to then link the self-amplifying parts of these networks to the meta-model and repeated assessments.

Consider the network shown in Figure 11.2. You will notice that the nodes of this network are simply features of the case that seem possibly important. Any well-trained practitioner could generate the bones of such a network for any of their clients. We have not changed so much as a word from the network we were sent.

Because chapters 9 and 10 were on the PF model (Hayes, Strosahl, & Wilson, 2012), it is not difficult for us to try to apply that model to this network. We show the psychopathological version of PF in preliminary form within the EEMM in Figure 11.6. Each of the six inflexibility processes restricts healthy variation in each of the six dimensions in the meta-model. They also all alter healthy selection, retention, and context-sensitivity processes, but they appear to do so most especially in the areas we have indicated. If we apply these concepts to the network in Figure 11.2, then Figure 11.7 is relatively easy to generate. Three self-amplifying edges or sub-networks stand out, each interlinked and connected to plausible moderators.

[[INSERT FIGURES 11.6 AND 11.7 ABOUT HERE]]

In the context of Figure 11.6, a person-specific process-based diagnosis is now possible. This person shows affective, self, and cognitive inflexibility, likely initially fostered by abuse. Avoidance is used in the affective domain to a pathological degree and has self-amplified. Yelling, fighting, cutting, and drug use all dampen excessive emotional reactions at the cost of

feeling out of control and exacerbating emotional responses themselves. Meanwhile, this core negative process is supported by a dominant core set of thoughts that craft a view of the self and others: *I'm useless, no one cares, and people are untrustworthy*. The behavioral impact of these change processes on school leads to a sense of lack of motivation and a "just be happy" stance that actually fosters drug use and other destructive forms of self-soothing. Said in a few words within the model shown in Figure 11.6, this case represents an abuse-fostered experiential avoidance and social trust disorder that is supported by a fusion with a conceptualized self and conceptualized others and an absence of chosen values.

In session, the therapist might test this analysis even before intervention. For example, the therapist might watch out for avoidance of emotional content in session by the client through the situational equivalent of "yelling and fighting," such as quarrelling with the therapist when difficult material is raised. If the therapist shows concern and caring in such situations, then it might be worth noting if this leads the client to exhibit a "you don't care about me" posture with the therapist. Thus, in-session behaviors might become de facto measures of change processes and be integrated into the evidence-base for a process-based diagnosis.

In terms of treatment selection, it is worth emphasizing that unlike traditional syndromal diagnosis, all of these processes are changeable. The therapist could directly target core features of destructive emotional avoidance—perhaps by teaching and modeling acceptance or distress tolerance skills. An alternative might be to enter into a deep values-based conversation, perhaps even linking it to the past abuse so issues of trust can be shifted from "I can trust people" to "I can trust myself to add in my deepest interests." That might

increase school-based behavior, reduce the excesses of “yelling, fighting, cutting, and drug use,” and maintain healthy friendships. If the therapist chooses to focus on either acceptance or values-based work, then they could use both the therapeutic relationship and intervention kernels to change these processes, and then assess the impact on processes and outcomes.

Conclusion

We believe the field of intervention science already has the elements of a process-based alternative to the DSM in its hands. In this chapter, we have shown how we can proceed empirically and conceptually, beginning with what we know about processes of change and combining that knowledge with empirical and conceptual idiographic network analysis. Many aspects of the nine-step process-based diagnosis approach have already been tested. For example, we know that basing interventions on empirically established idiographic functional relations leads to better clinical outcomes (e.g., Fisher, 2015; Fisher, Medaglia, & Jeronimus, 2018). We know that using intervention kernels linked to client need, rather than entire named protocols, is more efficient and effective (e.g., Weisz et al., 2012).

What we want from a diagnostic system is not what we are getting from psychiatric syndromes. It is time to take the field in a bold new direction.

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Figures

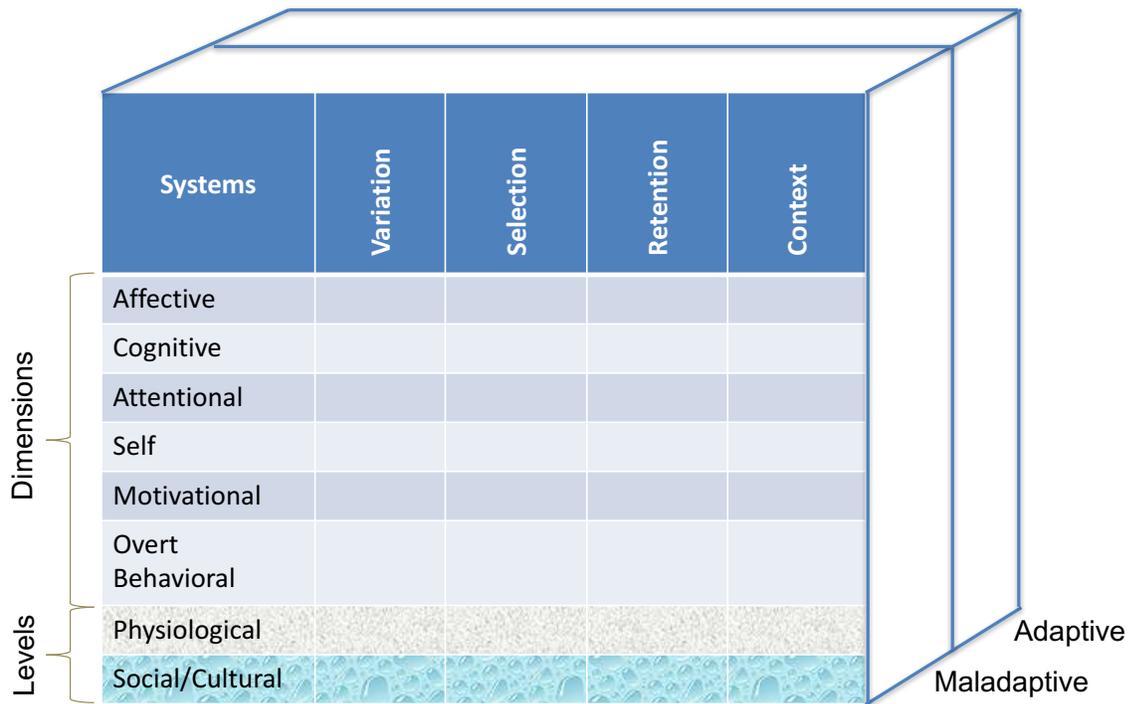


Figure 11.1. The Extended Evolutionary Meta-Model of Processes of Change

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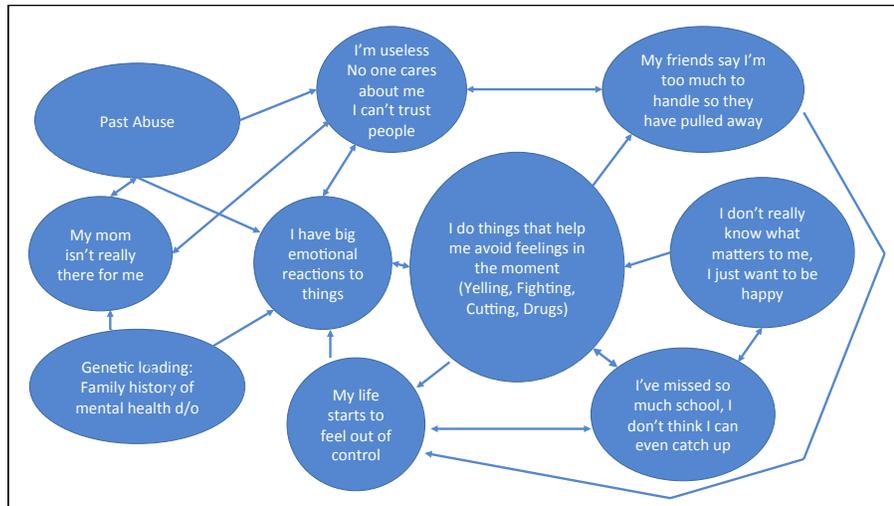


Figure 11.2. A Client Network

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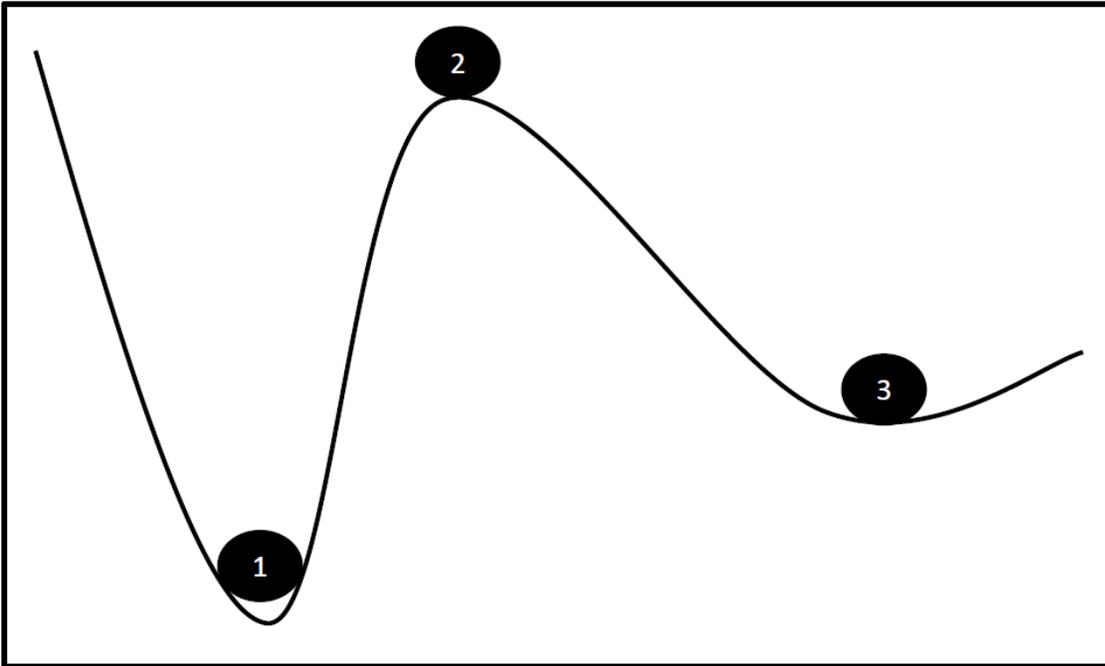


Figure 11.3. Changes in Network Stability. From a complex network perspective, change from a non-pathological to a pathological stage may be depicted by a ball moving from one stable state (position 1) over a tipping point (position 2) to another stable state (position 3).

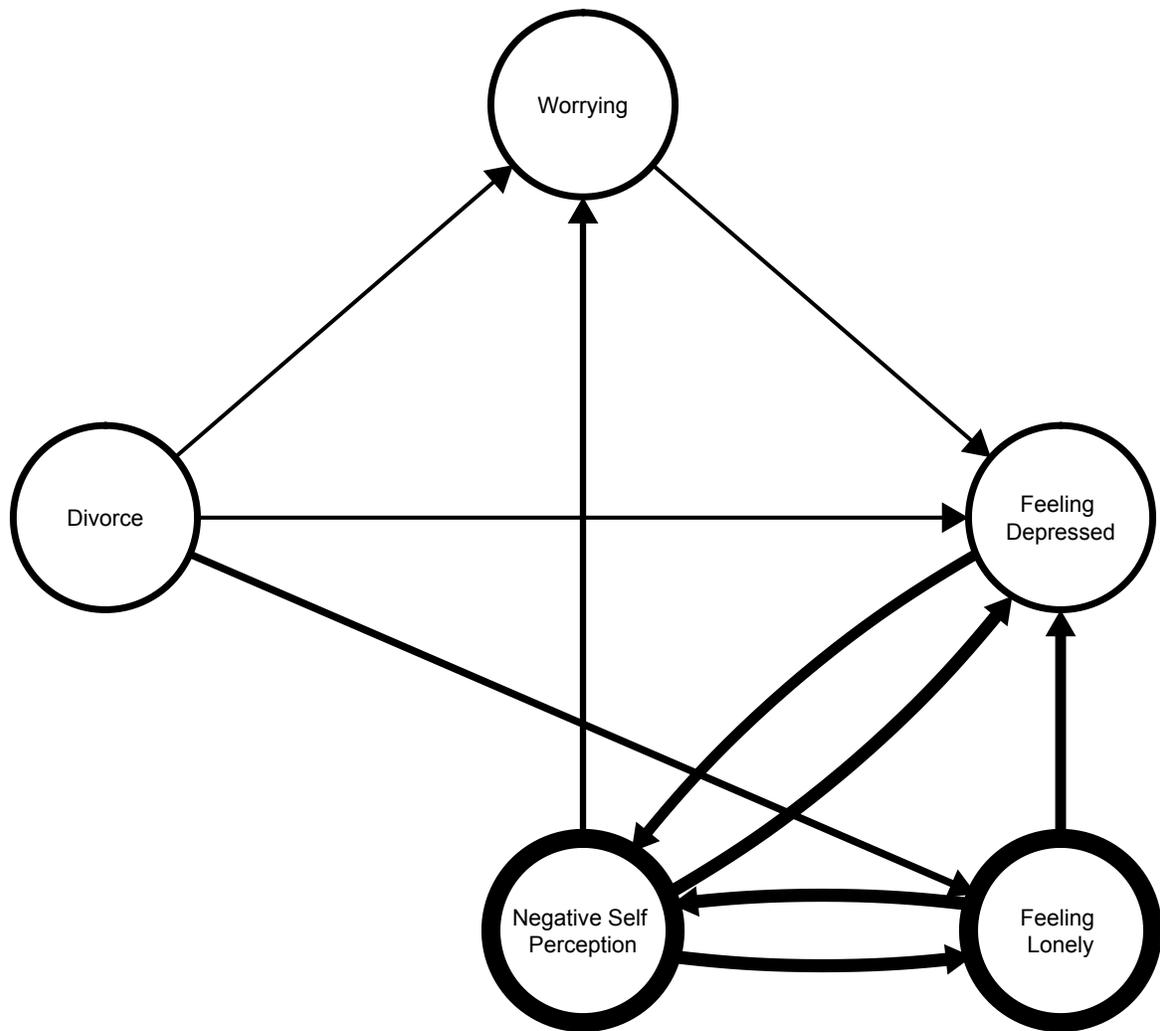


Figure 11.4. Network Structure of an Example Client

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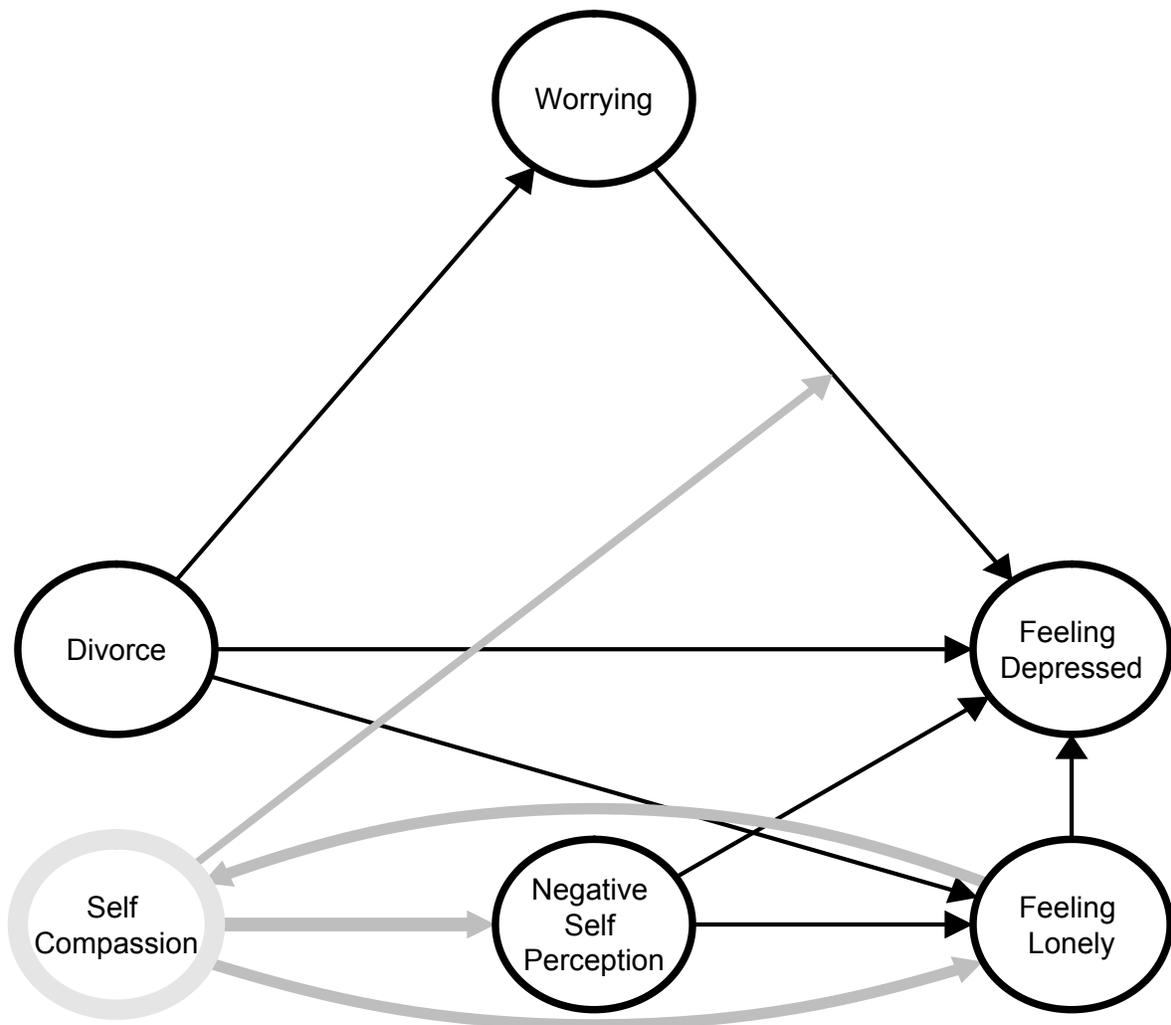


Figure 11.5. Applying Network Thinking to the Example Client

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	Systems	Variation	Selection	Retention	Context
Dimensions	Affective	Experiential Avoidance	X	X	X
	Cognitive	Fusion	X	X	X
	<u>Attentional</u>	Inflexible Attention			X
	Self	Conceptualized Self			X
	Motivational	Absent or Unclear Values	X		
	Overt Behavioral	Impulsivity / inaction / Avoidant Persistence		X	
Levels	Physiological				
	Social/Cultural				

Maladaptive

Figure 11.6. The Maladaptive Version of the Psychological Flexibility Model, Organized in Terms of the EMMM. .

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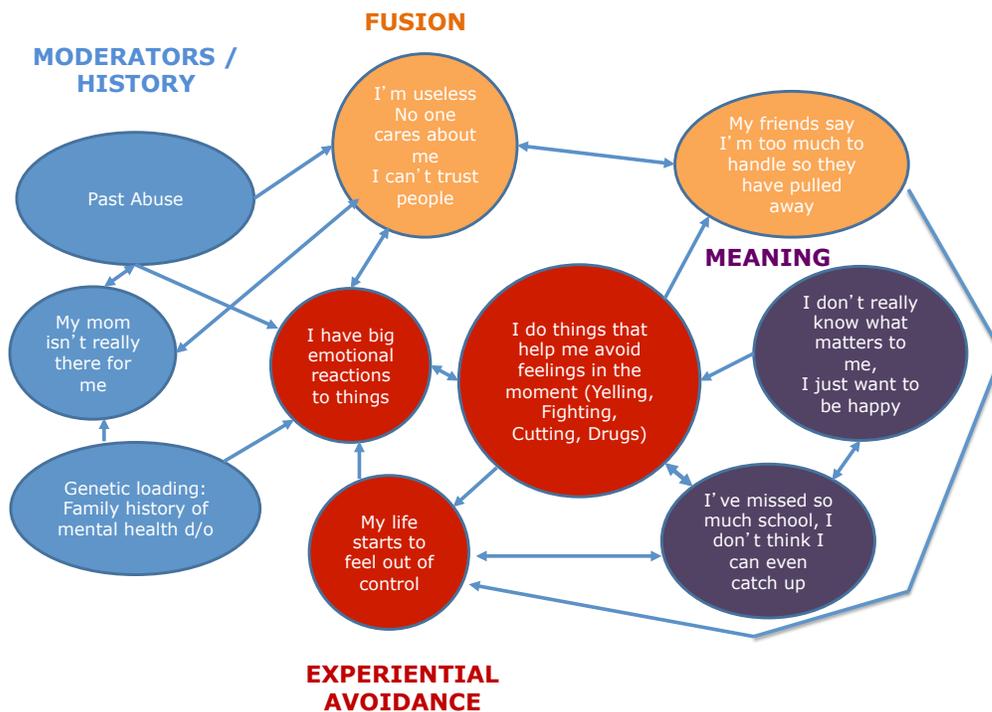


Figure 11.7. The Client Network in Figure 11.2 Considered in Terms of the Model Shown in

Figure 11.6

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