

From Package to Process: An Evidence-based Approach to Processes of Change in Psychotherapy

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For the last half a century, researchers have sought to improve the effectiveness of psychotherapy. The most typical approach has been to test the efficacy of psychotherapy packages (e.g., Beck's cognitive therapy) for treating specific disorders (e.g., major depressive disorder or generalized anxiety disorder). Frequently, researchers treat different packages, say cognitive behavior therapy (CBT) versus psychodynamic therapy, as if they are in a "horse race" with each other, with the goal to determine which one is the best to treat a specific disorder. For example, researchers may pit "third wave" therapies like Acceptance and Commitment Therapy (ACT) against "second wave" therapies like CBT (Arch et al., 2012; Forman et al., 2012a,b). While there is nothing wrong with this approach in initial stages of evaluation, without additional features it is difficult to turn it into a progressive research program. Comparative differences in outcomes are often small or unclear, with many therapies receiving moderate evidence of effectiveness (Cuijpers et al., 2020). Treatment packages are complex and often target many different processes. Some of these processes may be useful, some less so. Processes of change may overlap, even in comparative studies, muddying the comparisons (e.g., Wolitzky-Taylor et al., 2012).

Even more distressing, there is not clear evidence that intervention packages are improving. Meta-analyses suggest that the effects of psychotherapy may be falling (Johnsen and Friberg, 2015; Jones et al., 2019; Weisz et al., 2019), or, staying the same (Ljótsson et al., 2017). In the meantime, the prevalence of mental health problems have remained high (Richter et al., 2019). In a given year, 20% could be diagnosed with an anxiety disorder, 10% with depression, and 10% with alcohol dependence (Moffitt et al., 2010).

The number of psychotherapy packages seems to expand every day, each one like a "new horse" entering an ever-more chaotic horse race. This list includes CBT, ACT, behavioral activation, hypnotherapy, psychodrama, biofeedback, eye movement desensitization and reprocessing, stress inoculation, mindfulness-based stress reduction, compassion focused therapy, dialectical behavior therapy, metacognitive therapy, schema therapy, narrative therapy, gestalt therapy, existential therapy, and so on. The list becomes even larger if we consider intervention packages that target the "normal" population, such as those focused on building resilience (Ungar et al., 2017), emotional intelligence (Ciarrochi and Mayer, 2013), social and emotional learning (Taylor et al., 2017), or positive feelings and character strengths (Ciarrochi et al., 2016).

Why the Package-For-Disorder Approach is not Progressive

The package-for-disorder approach is not improving the general efficacy of therapy. We believe that a core problem is that many researchers have viewed psychotherapy through a medical lens. They treat the package like a "pill" and the diagnosis like a "disease". This metaphorical way of viewing psychotherapy has led to two major problems, which we discuss below. First, we have not clearly specified the ingredients of the psychotherapy pill or the elements of the "disease". Thus, if we continue the medical metaphor, we are giving clients unknown drugs for unknown disorders.

Let's look at these two ideas.

Psychotherapy is nothing like a pill that we can deliver in an exact dose with equal ingredients. First, even if two therapists are administering the same therapy to clients with the same diagnosis, the actual processes they put into play with their clients may vary dramatically, because of variations in the therapist's personality and clinical competence, the social environment, the specific characteristics of the client, and an immeasurable number of other variables (Waller and Turner, 2016). There is no one protocol that will effectively treat all people diagnosed with depression. Second, two therapies may be referred to by a similar name, but have radical process differences. For example, many therapies fall under the umbrella of CBT, including Beck's cognitive therapy, ACT, and Mindfulness-based stress reduction, but referring to these therapies as CBT hides key differences in mechanisms (Burns, 2016). Further, two therapies with different names, such as behavior therapy and ACT, may in fact be similar in some of their key mechanisms of change (Hayes et al., 1999). In addition, labeling a therapy with an umbrella term shifts the focus from the idiosyncratic processes and relationship between client and therapist in the room to a comforting label which implies standardization when it is likely there is none (Hayes and Hofmann, 2017; Hofmann and Hayes, 2019; Hofmann et al., 2016). Giving names to psychotherapy packages often increases confusion, rather than reducing it.

The second barrier to intervention progress is that diagnoses are assumed to reflect latent diseases. For example, depressed mood, fatigue, self-reproach, and sleep problems may all be considered symptoms of a disease that we call "depression." These symptoms are viewed in the same way as a medical expert might view headaches and memory loss as symptoms of a brain tumor.

However, there are important differences between the medical and the psychotherapeutic diagnosis (Borsboom and Cramer, 2013; Hayes et al., 2019). In medicine, one can separate the symptoms from the disease. One could have a brain tumor without having the symptoms of headache and memory loss, or the symptoms without having a brain tumor. In contrast, psychotherapy research has struggled to separate the symptoms from the so-called disorder. What is a biological picture of depression independent of the symptoms of depressed mood? Past research has failed to answer this question. For example, large genomic analyses have not found a direct genetic basis for depression (Major Depressive Disorder Working Group of the Psychiatric GWAS Consortium et al., 2013). We are not suggesting that there is no biological or genetic basis for some aspects of what we call mental disorders; rather, we argue that it is unhelpful to assume that DSM symptoms link to latent diseases.

Another problem with applying the medical disease model to diagnoses is that the link between symptoms and so called disease are not asymmetric (Borsboom and Cramer, 2013; Hayes et al., 2019). In the medical universe, a brain tumor sometimes causes both headaches and memory loss. In contrast, we struggle to find a disease that causes the symptoms of depression. For example, the death of a spouse may lead to a symptom we'd call depressed mood. This "symptom" may cause fatigue which then causes concentration problems which then causes chronic stress. The so-called symptoms are causally linked and may mutually influence each other, but there is no latent disease separate from these symptoms.

To summarize, packages with similar names can often involve different processes, and people with a similar diagnosis, say depression, may differ in terms of the subset of processes involved in maintaining that diagnosis, and the causal relations between those processes.

This creates the problem depicted in **Table 1**. Let's say, for the sake of simplicity, we have three intervention packages designed to decrease depression. Each package involves different processes of change represented by capital letters. A might be mindfulness, B might be cognitive restructuring, C might be behavioral activation, D might be promoting emotional acceptance, etc. Lastly, E we will call ineffective positive thinking, in that for a subset of people this intervention leads to unhelpful emotion control. Further, given the population of depressed people consists of heterogeneous subsamples (Lynch et al., 2020), let's assume that the subsamples are influenced by different processes. Thus, subsample "a" and "b" are influenced by process A and B, respectively.

We see that the three packages have different processes (process column, **Table 1**) and have a positive influence on different subsamples. For example, package one helps client subsamples 'a' and 'b', but does not benefit samples client samples 'c', 'd', and 'e'. Thus it benefits 40% of clients, what we call "efficacy" in the table. Further, package 3 involves a process that harms a subset

Table 1 Contrasting three therapy packages targeting five sub-samples of depressed people

Package	Process	Subsamples influence by different processes	Percent helped, unaffected, or harmed	% Efficacy
Package 1	A B	a b c d	~e 40% helped, 60% unaffected	40%
Package 2	C D F G H	a b c d	~e 40% helped, 60% unaffected	40%
Package 3	A C D E	a b c d	~e 60% helped, 20% unaffected, 20% harmed	40%

Note: ~e is a process that if executed in an intervention causes harm. Subsamples in bold are influenced by the procedure.

of people. We would evaluate the packages as having the same efficacy, if it were a calculation on the average number of people helped, minus those that are hurt (40%). This would imply that they are equally valid and could be substituted for each other, a dodo bird effect (Wampold, 2002). Clearly, the therapy packages are not equivalent.

A focus on process alerts us to important data: Package 2 includes many unnecessary elements and package 3 has harmful elements. We would never progress to a therapy that has all four key elements-ABCD, or to an intervention that efficiently targeted A for the A subsample, B for the B subsamples, and etc. It is hard to see how this package/horse race model leads to progress.

In 2003, Rosen and Davison (2003) argued that psychology should list empirically supported principles of change (ESPs) rather than treatment packages. Since that time, the call for a process-based approach has only grown louder (Barnes-Holmes and Barnes-Holmes, 2020; Hayes et al., 2020a,b; Hofmann and Hayes, 2019; McCracken, 2020).

Focusing on Processes Rather Than Packages

The key question a process-based focus seeks to answer is this: Given a particular client, in a specific situation, in this stage of intervention, what biopsychosocial processes should we target and how can we best change them? (Hofmann and Hayes, 2019). At the psychological level, processes of change are sequences of biopsychosocial events in areas such as affect, cognition, attention, self, motivation, overt behavior, biophysiology, or sociocultural features that lead to important desired changes in outcome. Said in another way, processes of change are functionally important biopsychosocial patterns such as being mindful, cognitive reappraisal, or anticipating barriers to goals; epigenetic regulation of gene expression or brain connectivity patterns; social support, or dyadic intimacy. Processes of change are theory-based, dynamically linked to other processes, progressive, contextually bound, modifiable, multilevel, and occur in predictable, empirically established sequences oriented toward desirable outcomes (Hofmann and Hayes, 2019, p. 38)." We contrast processes with therapeutic procedures, defined as a series of actions that a practitioner takes to alter client processes. Examples include exposure and acceptance procedures. Let's now consider each element of processes of change.

Processes are Theory-based. Processes of change need to be embedded in theory that suggests clear predictions and methods of influence. Consider "mindfulness" as a process of change. Although often viewed as a unitary construct, it has different facets and can have many functions, depending on the theory. A mindfulness intervention might focus on increasing relaxation or emotional awareness, or decreasing reactivity to thoughts, or helping people to let go of unhelpful attachments (Sahdra et al., 2016). Thus, there needs to be a clear theory about how the mindfulness procedures influences change processes which, in turn, promote positive outcomes.

Processes are dynamically linked to other processes. Once we drop the syndromal assumption that all processes are caused by a latent disease, we need to be open to the possibility that processes influence each other in a causal network (Hayes et al., 2020a,b). Such a network can have features like stability and tipping points. For example, let's say a man has lost his job and is experiencing hopeless thoughts. He is also likely to be experiencing rumination about how this outcome could have been different, low energy, and a lack of behavioral activity. Assume further that these processes influence each other as illustrated in **Fig. 1** (larger arrows indicate stronger influence).

In this network, hopeless thoughts, rumination, and low energy maintain each other. Low behavioral activation also feeds into hopeless thoughts and low energy. The strongest link (largest arrow) is from behavioral activation to hopelessness. This suggests that if we could increase behavioral activation, we may disrupt the hopelessness-rumination-low energy cycle. In contrast, if we focus on hopelessness, we will only have an indirect and probably small effect on behavioral activation.

A network like this would have both inertia and tipping points. Inertia would occur when small amounts of behavioral engagement would be inhibited by hopelessness, rumination, and sadness. Thus, increases in engagement might have no immediate, observed effect. However, if behavioral activation could be sufficiently increased, then the network might "flip" into a positive cycle of hopefulness and low rumination. That is, just as negative cycles can have inertia, so too can positive cycles. This network model

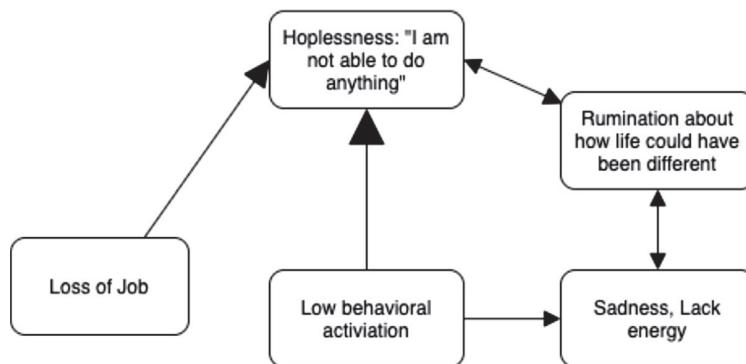


Fig. 1 Example Client Process network.

can help explain why psychotherapeutic change can be sudden and nonlinear (Hayes et al., 2007). Such a network model may also provide valuable theoretical direction for treatment planning and sequencing.

Processes are progressive. We may need to arrange processes in a particular order to reach the treatment goal. In the above example, we suggested that behavioral activation would be a good starting point because it has a strong effect on processes "downstream".

Processes are contextually bound and modifiable. We need to consider the modifiable processes in the context of an individual's history and circumstances. Processes that are functionally important pathways of intervention outcomes are, by definition, changeable, and since external change agents can only alter the context of action, the situated nature of change processes needs to be clear.

Finally, **processes are multilevel.** Some processes are hierarchically related to other processes. Thus, physiological processes are nested inside every cognitive process and cognitive processes are nested within a wider social-cultural context.

A Meta-framework for Understanding Change Processes

There are many therapeutic orientations, all with their own constructs and ways of describing key processes. Psychodynamic therapy often focuses on transference and unconscious conflict, CBT on automatic negative thoughts and dysfunctional beliefs, ACT on psychological flexibility, and humanistic psychotherapy on need satisfaction and self-actualization. If we were to describe a process-based approach from within one of these orientations, we would see pushback from the other orientations. The key then is to pick a framework that is not nested within any therapeutic orientation and that has widespread acceptance across orientations.

One framework that is sufficiently well developed and broadly applicable is an extended evolutionary synthesis (Hayes and Hofmann (2020a,b; 2019)). The Extended-Evolutionary Meta- Model (EEMM) is based on that idea (Hayes et al., 2020a,b). It is "extended" because it seeks to apply evolutionary principles beyond the narrow confines of genetics to all aspects of human development. It is a "meta-model" because it seeks to provide a common language and framework for understanding all psychological models of intervention.

Evolution is a theory about how change comes about, and is accepted by almost all life scientists. While the early focus of evolution was on genetic change, much research has now shown that genes are not destiny. For example, large scale genetic research has failed to show that specific genes cause psychological disorders (Border et al., 2019; Cross-Diorder Group of the Psychiatric Genomics Consortium, 2013). Genes are important but only in the context of a multi-level system that includes epigenetic regulation, environment, behavior, physiological processes, and social context (Hayes et al., 2020a,b).

Jablonska and Lamb (2006) have shown how evolutionary principles can be extended to epigenetic, behavioral, and symbolic change. Importantly, these change processes do not have to be left to random variation and chance survival; the change can be intentional (Wilson et al., 2017).

Practitioners can directly influence behavior, epigenes, and symbolic activity, and thereby indirectly influence genetic expressions. Thus all of the major evolutionary strands are available to psychotherapists. Let's consider now how the EEMM might provide a unifying framework for intervention science.

We began with the three key evolutionary principles: Variation, selection, and retention. We can use these principles intentionally to promote change. Variation starts the wheels of evolution moving. If dog breeders want to create a dog with a flat nose (e.g., a pug), they can start with a population of dogs that have different sized noses. Without that variation, they would be unable to select the dogs with the flattest noses and breed them so that the genes that support flat noses are more likely to be passed down to the next generation of dogs. Similarly, if clinicians want to help clients alter a behavior, they will need to support the client to do something new. For example, imagine that a client's usual response to distress is to engage in excessive drinking. The first step of the practitioner is to help the client vary or change their behavior (See middle column, [Table 2](#)).

Notably, "behavior", in this case, does not refer only to overt behavior, but includes everything a client does, including feeling, thinking, being motivated, self-esteeming, and attending. All these behaviors, types, or "dimensions", could be the target of change.

Interventions seek to promote four types of variation, or new behavior. First, they often seek to alter the form or frequency of the behavior. For example, we might help clients who suffer from alcoholism to reduce the intensity and frequency of the distress that triggers the drinking. In the EEMM, we would be targeting the affective dimension at the individual level. We might also alter the situational specificity of the distress, so, for example, we might target processes that facilitate the client feeling less angry when their boss unfairly attacks them. Finally, we may seek to create new patterns of behavior. Clients could be encouraged to respond in new ways to the distress, say with acceptance, mindfulness and non-reactivity.

Once clients are engaging in new behavior, we can help them to select which behavior works best for them. One client may find that relaxation helps reduce distress and thereby reduces alcohol consumption. Another client may struggle to manage distress through relaxation, but is able to learn to engage in some alternative, non-alcoholic behavior in response to the stress, say exercising.

Furthermore, for any client, the adaptive alternative behavior is likely to differ across environmental context and time, thus a core goal is flexibility in having alternative behaviors available for the client to utilize. This example highlights how the EEMM focuses on the function of the process in the context of a specific client at a specific time. Once a value-consistent behavioral pattern has been identified, the practitioner would encourage the client to retain it, through practice (e.g., regular mindfulness training), stimulus control (e.g., by removing alcohol from the house), social support, and other interventions.

Table 2 Clinically-relevant questions to explore Extended Evolutionary Meta-Model

Antecedents	Process of change	Clinically-relevant consequences
Clinician-as-context: What interventions will you use? How will you act toward the client?	Level: Are you focusing on the biological, individual, and/or social level?	Are you seeking to reduce negative indices of social, emotional, and physical functioning (e.g., anxiety, cortisol level, loneliness)?
Relevant features of context: What factors might moderate the efficacy of the intervention? Client history, facilitators and barriers to behavior in current environment, social support, severity of presenting condition, comorbidity	Dimension(s) targeted: What dimensions are you targeting? Affect, cognition, attention, self, motivation, overt behavior	Are you seeking to increase positive indices of functioning (e.g., energy, vitality, positive relations, glucose levels)?
What features of the environment might be altered. Stimulus control, altering social environment, niche construction, activity schedules	Variation: Are you seeking to increase or decrease variation in form, frequency, situational specificity or pattern of behavior.	Are you seeking to alter overt behavior: Reduce maladaptive behavior, increase adaptive behavior?
	Selection: What values and/or environmental consequences will select or inhibit behavior (e.g., short versus long term consequences; adaptive versus maladaptive consequences)?	
	Retention: Once a behavior is selected, what will you do to ensure it is repeated across time and context?	

Returning to **Table 2**, variation, selection, and retention are bound by context, the existing historical and situational features that predict whether variants will be selected and retained. Any intervention delivered in a fashion that does not consider context could be harmful. For example, helping an abused woman in a dangerous and violent relationship to be more assertive might fail until she is supported through escaping from the abusive situation.

Finally practitioners can target multiple-levels of the client's life, including biology (e.g., get more sleep; eat less junk), psychological factors (practice mindfulness) and social factors (increase social support). Because the processes of change in the EEMM are known to be functionally important to outcomes, they can be used to select treatment processes that are highly tailored to the needs of the individual.

Table 2 provides one example of how the EEMM can help the practitioner clarify which interventions to try, which dimensions to target, and the outcomes the practitioner and client are hoping to achieve. Most practitioners are familiar with their procedures and outcomes, but are less familiar with the processes that lead to change, that is, which sequences of events are likely to lead to important outcomes. To explore this issue in more detail, we now consider how research has sought to identify the critical mediators, or processes, of therapeutic change. Once we have addressed this as a scientific issue, we will return to a pragmatic discussion of therapeutic change processes and provide empirical examples of processes for each dimension and level of the EEMM. But first, let's consider how we might decide if something is a process in the first place.

Processes, Mediators and Moderators of Treatment

We now move to a more technical discussion of mediation and moderation, because these concepts are the foundation of process-based therapy. If we are to have processes become the guide to our therapeutic behavior, we need to measure our processes and ensure that they mediate outcomes (Hofmann et al., 2020).

A mediator variable explains the functional relationship between an independent variable and a dependent variable. Because contextual features and third variables are always possible, it is preferable to speak in terms of function rather than "cause" per se. In treatment research, a mediator is part of the mechanism that explains the effect of intervention on outcome. In contrast, a moderator variable explains the strength of a relationship between two variables. For example, cognitive therapy is hypothesized to reduce dysfunctional thinking (the "mediator") and reduced dysfunctional thinking is hypothesized to reduce depression (the "outcome"). However the strength of the relationship between therapy, mediator and outcome may depend on the extent that clients practice what was taught in therapy or do homework (the "moderator"). The more a client does homework, the stronger the link between therapy and positive outcomes (Kazantzis et al., 2016).

Fig. 2 illustrates the standard model of mediation and moderation. We focus here on mediation and return to moderation later. Baron and Kenny (1986) proposed the initial classic test of this model. To establish mediation, they suggested that: (1) the treatment has to have a significant impact on outcome (path C), (2) the intervention has to account for significant variance in the mediator (path A), (3) variance in the mediator has to account for significant variance in the outcome, when controlling for intervention (path B), and (4) the link between intervention and outcome in the mediational model (the C' path) has to be significantly smaller than C. If path C' is no longer significant, then one can claim that the mediator fully explains the link between intervention and outcome. A moderator can influence the strength of any of these paths. The diagram also illustrates moderated-mediation: The strength of the link between intervention and mediator (A) and mediator and outcome (B) can be moderated by a third variable.

Since the publication of the classic Baron and Kenny (1986) article, theorists and researchers have made several conceptual and statistical improvements for testing the mediational models (Hayes and Preacher, 2014; Holmbeck, 1997; Kraemer et al., 2002; MacKinnon et al., 2002). We now review improvements in our understanding of each aspect of the model.

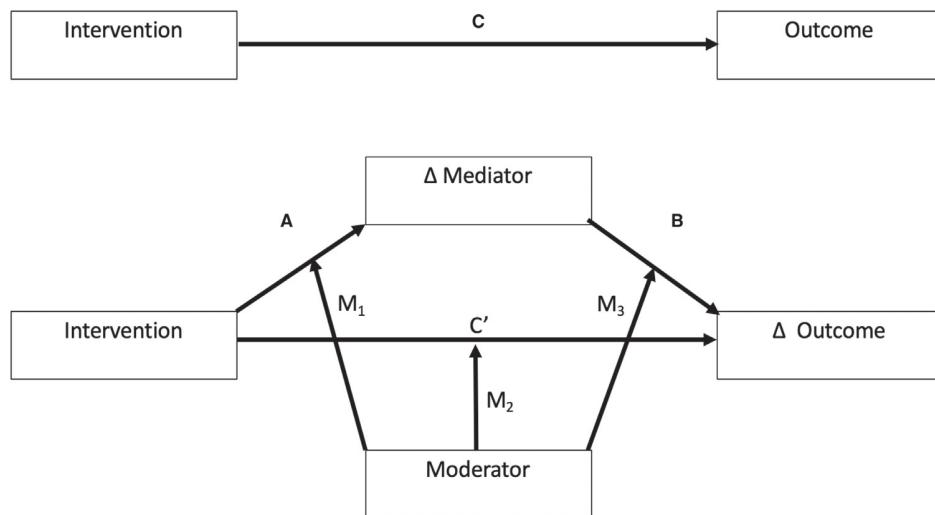


Fig. 2 A model of mediators, moderators and therapeutic outcomes.

The Complex Link Between Intervention and Outcome

Step 1 in Baron and Kenny's mediational analysis is the demonstration that an intervention has an effect (path C, **Fig. 2**). If an intervention is not significant, then there seems to be "nothing to explain". However, a significant C path is unnecessary for there to be significant mediation between intervention and outcome. For example, an intervention may influence two mechanisms of change, one positive (e.g., optimistic thinking) and one negative (e.g., increasing avoidance of negative content). The negative effects may mask the positive effects and therefore produce a net null effect, but we would not want to argue that the intervention is inactive. Similarly, the combined effect of an inhibitory and an excitatory neuron might not produce an action potential in the receiving neuron even though these neurons are the mechanisms of information transmission.

That being said, we would not generally be interested in researching interventions that had a net null effect on outcomes, so let's assume that we have showed a clear positive effect. The significant C path would mean that, on average, the intervention did more benefit than harm. Despite our familiarity with thinking in terms of averages, we need to remember that any effect may not be equally distributed among individuals. For example, perhaps only three individuals in a sample of 50 experience benefit from the intervention, but the benefit was substantial for those three individuals. This would result in an average positive effect. Would we conclude that the intervention is generally effective? Probably not. Researchers have typically dealt with this potential problem by reporting the number of clients that experience clinically significant positive and negative change, as well as those who experience no change. This approach highlights individual level heterogeneity, but still does not model this heterogeneity.

This section illustrates that even the simple starting point of traditional mediational analyses, namely a significant link between intervention and outcome, is fraught with complexity. For this analysis to produce an accurate model, we must assume that there are no unmeasured mediators that would affect the estimate of the link between intervention and outcome; relationships need to be unidirectional, only a very few variable can be considered, and the intervention has to have the same effect on the mediator and the outcome for every individual. The first three assumptions are clinically untenable and the last is mathematically untenable, as we will discuss below. Behavioral sciences have not yet appreciated how poor a fit exists between classic mediational analysis and the clinical situation (Hofmann et al., 2020).

Baron and Kenny's original steps to test for mediation never directly compared the path between C and C'. Path C' was assessed as either significant (partial mediation) or not significant (full mediation). However, it is possible for the C' path to drop to non-significance, but still not differ from path C, suggesting that the mediator adds no significant explanatory benefit. Sobel's test (1982) offered a solution to this problem by providing a direct test of whether the cross-product ($A \times B$), or mediation effect, was significant. However, this test assumed that the cross-product was normally distributed. This led to the development of non-parametric tests of the cross-product coefficient (Hayes and Preacher, 2014; MacKinnon et al., 2002), as well as structural equation model methods (Emsley et al., 2010).

It is important to note that the test of the C' path, like the test of the C path, assumes no important, unmeasured variables. If this assumption is true, then significant mediation should involve a drop in the size of C'. However, if this assumption false, then including the mediator in the model may increase the size of C' if the included mediator is a suppressor variable (masks the beneficial effects of the intervention). Again using the example above, let's say an intervention increases both optimism and avoidance, but the negative effect of avoidance is the only variable modeled in the mediational model. This would mean that the remaining positive variance would be explained in the C' path, and thus the positive effect of the intervention would seem to increase. This is because the negative effects of avoidance have been statistically "removed" from the intervention effects, leaving only the positive aspects of the intervention predicting outcome (C').

Various researchers have further tightened the logic needed to establish that mediators are causally related to outcomes by emphasizing temporal precedence (Kraemer et al., 2002; Stice et al., 2007). Specifically, they suggested that: (1) the proposed mediator correlates with treatment choice; (2) the mediator has either a main or interactive effect on outcome; and (3) changes in the mediator variable precede changes in the dependent variable. The ideal mediational design involves a minimum of three measurement points (preferably more) to evaluate the Fig. 2 mediator model. First we would like to show that the mediator changes because of the intervention (Time t baseline to time $t + 1$ mediator). Then we need to show that the outcome changed after the mediator changed (Time $t + 1$ to time $t + 2$).

Even if we have this ideal mediational design and we find evidence as illustrated in Fig. 2, we still do not have sufficient evidence to "prove" the mediator caused the outcome. We can conclude that the intervention influenced the mediator (Path A) and the outcome (Path C), but because we did not directly manipulate the mediator, we cannot say changes in the mediator caused the outcome. We can only say mediator changes predicted the outcome. Like all longitudinal relationships, the relationship between mediator and outcome may be explained by a third variable. Still, if we found evidence for Path A and B, we could say that the mediator is a *lead indicator* of changes in outcome. Pragmatically, this would mean that the practitioner could use a measure of the mediator to identify which clients are and are not responding well to therapy. This may allow the practitioner to change course and improve outcomes (Boswell et al., 2015; Lambert and Shimokawa, 2011).

The last problem is more profound, and undermines the relevance of group-level mediational analyses to individual cases. The "ergodic theorem" has been mathematically established since 1931 when Birkhoff worked out the proof, and since then the physical sciences have known that the behavior of collectives (e.g., a volume of gas) can be used to model the behavior of individual elements in that collective (e.g., gas molecules) only under extraordinary circumstances: Namely, that individual elements are identical and unchanging. These conditions are rare in the inanimate world (limited to a few noble gases and the like) but they do not exist in the life sciences, since living systems are not ergodic and it is mathematically implausible to assume that traditional mediational analyses of any kind apply to individuals within the collectives studied (Molenaar, 2008). Instead, processes of change need to be studied ideographically.

Moderated Mediation

We are now ready to talk about moderation and its path to mediation. A moderator is a variable that influences the strength of relationship between two variables. For example, homework practice has been shown to moderate the path between treatment and outcome (C), with the relationship between treatment and outcome being stronger among those who complete higher quantity and quality of homework (Kazantzis et al., 2016).

Moderated-mediation occurs when the moderator affects the relationship between intervention and mediation (Fig. 2 above; Path A) and/or mediator and outcome (Path B; Preacher et al., 2007). If it occurs at A, this might suggest that the intervention influenced a mediator like dysfunctional thinking only among those who do their homework. If moderation occurs at B, this suggests that the beneficial effects of changes in the mediator on outcome occur only for a subset of people, for example only for those with severe depression among. Finally, if it occurs at C', this would mean that the intervention influenced some aspect of the intervention-outcome link that is not because of the mediator.

In practice, some studies measure the mediator at one time point, and so cannot argue that change in the mediator was the essential factor. Other studies measure mediation and moderation at the same time point, and thus can not establish that the change in the mediator occurred before change in outcome. Finally, some studies seek to isolate the active intervention ingredients by utilizing a decompositional design (e.g., behavioral activation versus behavioral activation + cognitive restructuring), but do not measure the processes of change (Jacobson et al., 1996). All these interventions provide valuable insight into mechanisms of change, but have important limitations (we will discuss this in more detail in the next section).

There are few meta-analyses of mediational studies. In part this is because the literature on mediation itself is not voluminous in many wings of intervention science. Early summaries in this area have instead focused on the degree to which interventions modify putative processes of change. Recently, Kazantzis et al., (2018) conducted a review of the 30 meta-analyses they could find since 2000 that have examined processes of change in CBT. Newer forms of CBT were included in the search strategy but the set of meta-analyses was dominated by traditional CBT. They found that CBT had generally medium to large effects on cognitive processes such as reappraisal, reframing, and restructuring. For example, CBT modifies self-efficacy in panic disorder (Fentz et al., 2014), trauma related cognitions in PTSD (Diehle et al., 2014), imagery rehearsal in PTSD (Casement and Swanson, 2012), and problem solving for anxiety and depression (García-Escalera et al., 2016). CBT also appears to have small to large effects on behavioral strategies such as activity scheduling, exposure, and contingency management (Ale et al., 2015; Chu and Harrison, 2007; Sánchez-Meca et al., 2010). Finally, people have posited that therapeutic alliance is an essential mediator of outcome (Priebe and McCabe, 2008). Correlational meta-analytic research suggests that alliance has small to moderate associations with therapy outcome (Flückiger et al., 2012).

Concerning moderators, a wide variety have been studied (Spielmanns and Flückiger, 2018), but only a few have consistently emerged across studies and meta-analyses as important. Pretreatment severity is a good example. Generally, the more severe symptoms at baseline, the less effective therapy is (Katz et al., 2019; Levy et al., 2018; Porter and Chambless, 2015; Turner et al., 2018; Walczak et al., 2018). However, this is not universally found. For example, Walczak et al. (2018) found that youth with more symptom severity and social anxiety comorbidity respond slightly better to CBT. There are also studies showing differences on

this variable within the CBT family of methods. In a study on mixed anxiety disorders, [Wolitzky-Taylor et al. \(2012\)](#) found that single problem patients did better with traditional CBT, while multiple problem patients did better with ACT.

Therapeutic Relationship as the Primary Mediator

The construct of therapeutic relationship is so central and controversial in clinical intervention research that it warrants its own section. Therapeutic relationship is sometimes cast as a moderator ([Spielmanns and Flückiger, 2018](#)), that is, a positive therapist relationship is hypothesized to improve the strength of the link between intervention and outcome. In this conception, intervention is thought to work better when clients form an alliance with a clinician. A more controversial claim is that the therapeutic relationship is the critical *mediator* of therapeutic change ([Budd and Hughes, 2009](#); [Priebe and McCabe, 2008](#)). In this conception, perhaps all interventions, whether they are traditional CBT, psychodynamic, or ACT, work through a common core process: by building a strong therapeutic relationship. At the extreme, some argue, techniques specific to each therapy are unimportant – the so-called dodo effect. If true, one would expect the same outcomes regardless of intervention after adjusting for this process.

Although there is clear evidence that therapeutic relationship is associated with better outcomes ([Cameron et al., 2018](#)), we must test whether it follows that therapeutic relationship is the key mechanism of change in all therapy. We can use a process-based lens to view this issue. What processes are involved in forming a positive relationship? Does it matter whether the process is something your grandma might do (bake cookies) or a therapist might do (build psychological flexibility)?

It is important to distinguish between the direct impact of a positive therapeutic relationship, and the impact of processes that promote positive relationships. This is the classic third variable issue in a new form. The therapeutic relationship could be a formative factor, as illustrated in [Fig. 3](#).

Positive therapeutic relationships may be caused by effective implementation of key processes of change that also impact outcomes. Note that if this model is correct, then the therapeutic relationship will be a predictor not because it is the only important process of change, but because it is a marker or other processes of change. The key advantage of a process model like [Fig. 3](#) is that it gives clear instruction to the therapist on how to build a positive therapeutic relationship.

There is indirect evidence for the model presented in [Fig. 3](#). Therapists who embody mindfulness processes have high working alliance scores ([Johnson, 2018](#)). Clinicians who engage in a brief mindful centering process before session increase in effectiveness ([Dunn et al., 2013](#)). Most of the processes described in [Fig. 3](#) might be subsumed under the construct of “psychological flexibility”, which involves the ability to contact the present moment, accept difficult experiences, and engage in valued action even in the presence of difficult internal experiences such as pain and distress. In other words, a strong relationship may model or encourage such clinically important processes as acceptance, non-judgment, mindfulness, or values and clients benefit when they internalize those messages. After adjusting for this effect, what is left of the working alliance is no longer linked to outcomes. The data support this idea. Past research shows that controlling for changes to psychological flexibility in clients eliminates the effect of therapeutic relationship on outcomes, at least in newer forms of CBT such as ACT ([Gifford et al., 2011](#)). Thus, we would argue that therapeutic relationship is itself a reflection of the successful implementation of therapeutically relevant change processes.

A Dynamic Systems Approach to Mediation

Given the limitations of past mediational research, what is the best way forward? Is it to double down on the classic mediation testing strategy captured in [Fig. 2](#), which typically involves measuring one or two mediators between 1 and 4 times, and modeling a unidirectional relationship between mediator and outcome? There are several limitations to this traditional mediational approach ([Hofmann et al., 2020](#)), namely: (1) the mediational model assumes average effects apply to individuals, but newer research is challenging this assumption. For example, greater levels of avoidance may lead to reduced negative affect for some, but increased negative affect for others ([Brockman et al., 2017](#); [Fisher, 2015](#)). (2) Traditional mediational models assume that the effect of the change

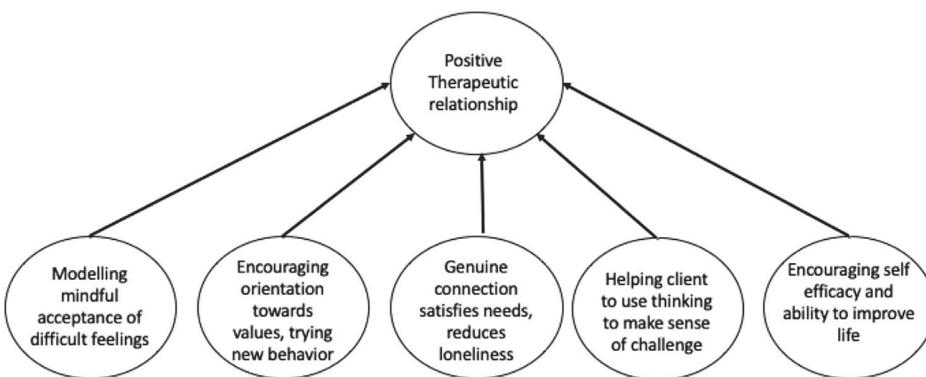


Fig. 3 Positive therapeutic relationship as the consequence of effective implementation of therapeutic change processes.

process on outcome is stable across time. However, research suggests that change processes may be relatively more important at different stages of therapy (Gloster et al., 2014; Gryczkowski et al., 2013). (3) Traditional mediational analysis often assumes simple relationships between mediator and outcomes, but the outcome and mediator may be bi-directionally related (Gloster et al., 2014). In addition, change processes may influence each other, and the direction of influence may differ within the individual (Fisher et al., 2019). (4) Finally the traditional approach violates ergodicity and thus the results of traditional mediational studies may not apply to individuals. All of these assumptions and issues are rarely stated but they are implicit in mediational models like those in Fig. 2 (Hofmann et al., 2020).

We now turn to an alternative approach, one that begins by seeking to understand what drives each individual to change and improve his/her life, and then builds from that individual level data to general principles that apply to many people. These approaches view mediators and outcomes as a network of interrelations, rather than a simple linear system.

The Complex Network Perspective

A classification system of psychiatric disorders is an example of a complex system, because each disorder is defined by a number of interrelated symptoms, and no symptom is specific to any disorder (Hofmann et al., 2016, 2020). In any complex system, a better understanding of the pieces of the system cannot solve the complexity problem (Barabási, 2012). For example, the bodily response to cancer cannot be reduced to a single synaptic activity or mutations of a single gene, but is associated with hundreds of genes and billions of synapses, resulting in an elusive combinatorial problem. Understanding the workings of individual genes or synapses does not advance our understanding of the system as a whole (Barabási, 2012).

Traditionally, there are two primary models - the *reflective* and the *formative* model - for relating psychological attributes to observable variables (e.g., Schmittmann et al., 2013, for further discussion). An example of a formative model is socio-economic status. In this model, the indicators define the construct and changing the indicators will also alter the formative construct. In contrast, the reflective model, which is the model of the DSM, assumes that different attributes (e.g., symptoms) are caused by the same latent construct (e.g., a mental disorder). In other words, a mental disorder is thought to be a reflective construct that causes the observable symptoms. This model is also consistent with *causal essentialism in kinds* (Ahn et al., 2013), because clinicians are more likely to believe that symptoms result from a single cause, that all patients with the disorder have this cause, and that the causal relations among symptoms are similar among patients with these disorders if the symptoms are correlated.

The primary conceptual problems with these traditional approaches include the uncertainty about causal pathways and processes between the latent construct and symptoms, and the disregard of the causal relationships between the symptoms (Schmittmann et al., 2013). Adopting a complex causal network approach provides the opportunity to study the entire complexity of the system and has the advantage of not being limited to the assumption that symptoms of a psychiatric disorder are caused by the same latent disease (as for the reflective model) or are merely labels for an arbitrary set of symptoms (as for the formative model). Instead, disorders are assumed to exist as systems, rather than as entities (Borsboom and Cramer, 2013). A simple and illustrative example is the causal link between fear and avoidance: some people worry about having future panic attacks in certain situations after having experienced panic attacks in the past. This leads them to avoid certain places.

Thus, some symptoms (avoidance) depend causally on the presence of other symptoms (having experienced panic attacks in the past and worrying about future attacks). Interestingly, the DSM-5 separated agoraphobia from panic disorder, ignoring the causal relationship between concerns about experiencing panic attacks and avoidance of certain situations or places, which will likely introduce a high comorbidity between the two newly created distinct diagnostic categories, panic disorder and agoraphobia.

Adopting a complex causal network approach would further pave the way toward personalized medicine. Between-subjects networks are useful for investigating the general structure of psychiatric disorders because they can generate testable hypotheses about trajectories toward developing a psychiatric disorder that are shared by individuals. However, such patterns of individual differences provide limited information about how and why individuals develop psychiatric problems and how to best intervene. Each individual shows specific vulnerabilities and unique experiences, leading to particular problems, thus forming individual networks. Analyzing such individual, person-specific networks requires methodologies to capture the relevant variables to gather an individual's thoughts, experiences, and behaviors in situations with specific triggers.

In contrast to the latent disease model, the contemporary CBT perspective distinguishes between initiating factors (factors that contribute to the development of a problem) and maintaining factors (factors that are responsible for the maintenance of a problem), and these factors are typically not the same. Unlike the medical disease model of mental disorders, the CBT perspective is much more concerned about the maintenance factors of problems and much less concerned about the initiating factors. Therefore, from a cognitive-behavioral perspective, classifying individuals based on maintenance factors is of greater importance than categorization based on vulnerabilities (i.e., genetic factors or malfunctioning brain circuits), because CBT is focused on changes that can be made in the here and now.

Network Case Conceptualization

To illustrate the network approach, let's assume we collected daily diary data on clients and repeatedly measure five variables: being present, engaging in a meaningful challenge, connecting with others, and helpful thinking (the "change" mechanisms) and mental

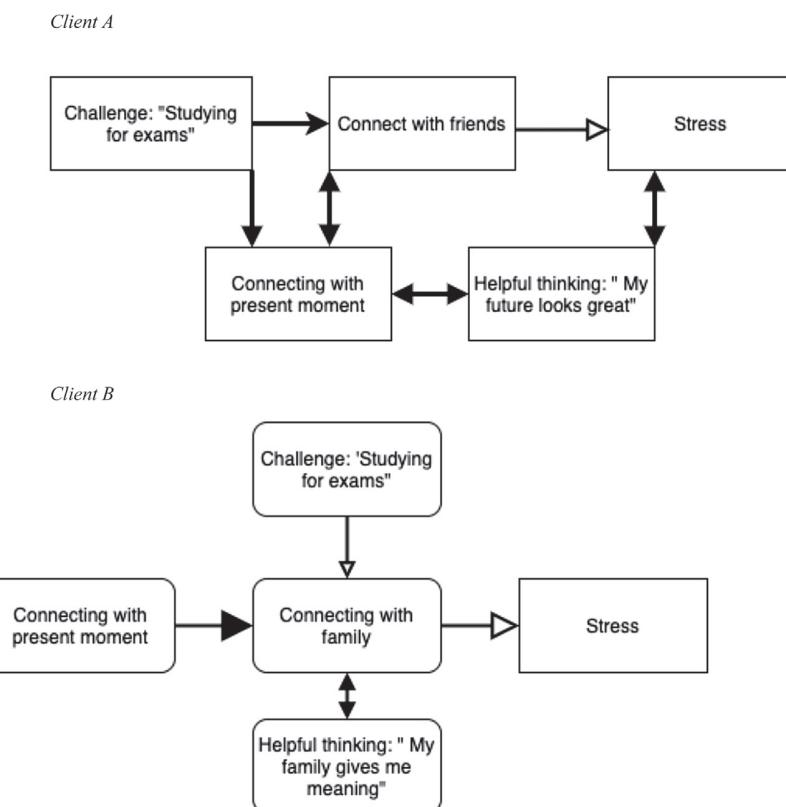


Fig. 4 Two hypothetical networks for two different clients.

health (the outcome). Repeated assessment of the variables would allow us to address two key within-person questions: What is the structure of the mediators, and how do the mediators influence each other as well as influence the outcome.

Fig. 4 provides two hypothetical mediator and outcome networks for two clients. The strength of the relationship is depicted by the size of the arrowhead. Excitatory relations are depicted by a full black arrowhead, inhibitory relations by a hollow white arrowhead.

We can see from these networks that engaging in study has opposite effects on the thinking, attention, and behavior of the two clients. On days that client A studies, she experiences greater connection with friends, helpful thinking, and reduced stress. In contrast, on days that client B studies, she experiences less connection with family, which in turn leads to higher stress. Networks like these might be generated during the early stages of therapy and case conceptualization period. The value of network thinking is that it has direct implications for intervention. If we were to encourage Client A to challenge herself through study, we might expect this to positively influence the other processes and reduce stress. In contrast, if we encourage client B to practice mindfulness and connect with the ordinary moments of family life, then we would expect greater connection with family, more positive thinking, and reduced stress. For client B, we might also want to disrupt the negative link between study and family life by, for example, teaching time management skills.

A recent study illustrates the practical potential of the network approach. Fisher et al. (2019) uses an intensive diary method which had clients report anxiety and depressive symptoms and other clinically relevant symptoms and behavior. Participants made ratings four times a day for thirty days. This allowed Fisher et al. to conduct factor and causal analyses within subjects. Each participant was assumed to have a different factor structure (symptoms clustered differently) and causal structure (what was an antecedent variable for one participant was not for the other). Fisher et al. could develop personalized treatment plans based on symptom predominance (factor analysis) and explanatory power of identified factors (causal analysis). The resulting intervention produced a larger effect (Hedges' $g = 2.33$) than what was found in a previous CBT meta-analysis (Average Hedges' $g = 1.72$ (Johnsen and Friborg, 2015). This suggests that the network approach added pragmatic value.

Exploring the Dimensions of the Extended Evolutionary Meta Model

We now return to the goal of helping to orient the practitioner to the likely processes they put into play in their own interventions. To accomplish this, we will describe evidence-based processes for each of the six individual psychological dimensions of the EEMM:

cognition, affect, motivation, attention, self, and overt behavior. We will also provide examples of processes at different levels (biophysiological and sociocultural) in which the psychological level is embedded. Despite the limitations discussed in the previous section, mediational analyses make up the vast majority of findings related to potential processes of change at the group level. We therefore focus our discussion on processes that have been shown to mediate the link between therapy and group outcome. Where appropriate, we also discuss longitudinal findings that demonstrate a purported mediator is an antecedent to change in outcome, an essential condition for a variable to be considered a process.

Processes are often multidimensional and overlapping. For example, "emotion regulation" may involve processes that are affective (acceptance), attentional (shifting attention away from threat), and cognitive (reappraising a threat) (Brockman et al., 2017; Gratz and Roemer, 2004).

Psychological flexibility involves affective processes (acceptance of difficult feelings), cognitive processes (disengaging from difficult cognitive content), self-processes (observer self), and overt behavioral processes (e.g., persisting at goals in the presence of distress) (Hayes et al., 1999). From a process-based perspective, the key is to recognize when what we are sometimes referring to as a single construct, e.g., emotion regulation, often consists of multiple processes. It is also important to remember that the processes are always part of a network involving other processes at multiple levels. Thus, when we speak of these processes separately, we do this more for explanatory ease than to imply pure distinctions between processes.

Affective Processes

Affective interventions target two general categories of process: the intensity or frequency of affect (e.g., relaxation) and the function of affect (e.g., acceptance/low experiential avoidance; see Table 3). Studies have sought to directly reduce negative affect (Mahoney and Solomon, 2016; Strong et al., 2009) and/or increase positive affect (Hart et al., 2008), as a way of increasing positive parenting interactions with youth (Mahoney and Solomon, 2016), reducing cigarette smoking relapse (Strong et al., 2009), and increasing positive benefit finding in multiple sclerosis (Hart et al., 2008).

Other antecedent focused emotion regulation interventions seek to alter the likelihood of the affect occurring in the first place, through for example, reappraisal (see cognitive section) or attention shifting (see attention section).

Concerning the function of affect, interventions often seek to promote acceptance of emotions, as an alternative to destructive emotion regulation strategies (Gifford et al., 2011; S. Hayes, 2019; Nila et al., 2016; Stafford-Brown and Pakenham, 2012). Sometimes these functional interventions fall under the name of emotion regulation, which includes components such as acceptance and goal directed behavior in the presence of emotion (Gratz et al., 2015; Hesser et al., 2017). Mindfulness interventions may also be viewed as improving emotion regulation (Josefsson et al., 2019), especially the components involved in acceptance, nonjudgment (Haenen et al., 2016), and non-reactivity to negative emotions (Waters et al., 2018).

Cognitive Process

The cognitive process category is the most diverse, perhaps because of the empirical dominance of cognitive behavioral therapy but also perhaps because of the specificity of cognitions. (See Table 4). One could have measures of dysfunctional thought focused on health, depression, life, the future, other people, oneself, being perfect, and etc (Table 5).

Table 3 Affective processes

Process	Example labels used in research
Emotion regulation-antecedent	Attentional bias; situation appraisal
Emotion regulation-Consequence	Mindfulness: Non-reactivity, acceptance. Nonattachment to positive feelings Use of down-regulation strategies (e.g., relaxation) Psychological flexibility: Acceptance of inner experience Suppression Dysfunctional emotion regulation strategies (e.g., drinking to cope with anxiety) Emotion focused coping
Intensity or frequency of affective state	Mood, positive and negative affect, loneliness; intolerance of uncertainty, shame; emotional closeness

Table 4 Cognitive processes

Process	Example labels used in research
Provide information	Psychoeducation, knowledge
Problem solving	Problem solving skills. Problem focused coping
Managing unhelpful cognitive content	Thinking, beliefs, reappraisal, interpretation, pain catastrophizing, perceived norms; hope, attributions, bias
Managing unhelpful cognitive function	Psychological flexibility: Defusion mindfulness: Non-reactivity nonattachment to unrealistic ideals
Disengage unhelpful cognitive process	Rumination, worry; intrusive thoughts (overlaps with attentional process)

Psychoeducation is a common cognitive intervention that seeks to increase knowledge (Farrell et al., 2003), for example, of depression (Gitlin et al., 2014) or relational aggression (Splett, 2012.). Other interventions seek to improve problem solving skills at the psychological (Manne et al., 2008) or social level (e.g., family problem solving; DeGarmo et al., 2009). There are a substantial number of interventions that seek to alter the form or frequency of unhelpful cognitions, including processes related to reappraisal (Garland et al., 2011; Newton and Barbaree, 1987), frequency of negative thoughts (Moldovan et al., 2013; Newby et al., 2014), dysfunctional attributions ((Katzmann et al., 2017), dysfunctional attitudes (Quilty et al., 2008), and hopelessness (Acosta et al., 2017; Geisner et al., 2006).

Mindfulness-based therapies tend to target the function of thoughts, rather than the content. For example, defusion interventions in Acceptance and Commitment Therapy seek to reduce the extent that negative thoughts are linked to unhelpful behavior (Blackledge and Hayes, 2006; Forman et al., 2012a,b; Lundgren et al., 2008). Similarly mindfulness-based interventions often seek to promote nonreactivity to cognitions (Waters et al., 2018).

Finally, interventions often seek to diminish rumination/worry processes (Harvey et al., 2017; Nguyen-Feng et al., 2015; Topper et al., 2017). These processes are likely to overlap with attentional processes, as when for example attention bias modification interventions are used to reduce rumination (Yang et al., 2015).

Attentional Process

Attentional processes (Table 5) relate to present moment awareness, or mindfulness treated as a single dimension (Brockman et al., 2017; Garland et al., 2016; McClintock et al., 2015). We know from previous sections that mindfulness interventions involve affective (acceptance) and cognitive (defusion) components. They can also involve overt behavior, or acting with awareness (Ciarrochi et al., 2011). Thus, mindfulness interventions rarely focus exclusively on attention; although there are interventions that are more exclusively attentional, including those that simply seek to improve some aspect of visual attention (Lanfredi et al., 2017), seek to reduce attentional bias (Badura-Brack et al., 2015; Fodor et al., 2020; Kuckertz et al., 2014), and/or improve adaptive attention shifting (Goldin et al., 2016; Callinan et al., 2015).

There are a number of interventions that might be best described as a combination of affect, cognition, and attention. These seek to improve emotional clarity (Caldwell and Shaver, 2015; Cooper et al., 2018; Kauer et al., 2012; Leung, 2015), emotional awareness (Ciarrochi et al., 2003), and emotion identification skill (Ciarrochi et al., 2008; Rowsell et al., 2016). These processes involve both an attention to feelings, an acceptance rather than avoidance of feelings (affective), and an ability to apply appropriate labels to feelings (cognition).

Table 5 Attentional processes

Process	Example labels used in research
Identify and label inner experience	Emotional awareness; emotional clarity; emotion monitoring; mindfulness: Describing feelings. Alexithymia
Disengage and shift from unhelpful stimuli	Attentional skill; attentional bias
Present moment focus	Mindfulness: Observing, acting with awareness; distracted; visual attention Psychological flexibility: Contact with the present moment

Self-Processes

Self interventions (Table 6) often focus on changing self-evaluations, such as self-efficacy (Opdenacker et al., 2008; Turner et al., 2007) and self-concept (Truax et al., 1966). This type of "selfing" behavior has clear overlap with the cognitive process category. Other self-interventions focus on one's relationship to content, rather than altering the content itself. These interventions often utilize perspective taking (Montoya-Rodríguez et al., 2017), such that the self ("I") is viewed as if from an observer's perspective, as in "I, the observer, in the present moment, see myself, in the past, having negative thoughts." For example, self-compassion interventions might encourage people to observe themselves as a person who suffers and deserves kindness (Boyle et al., 2017; Ferrari et al., 2019; Inwood and Ferrari, 2018; Kuyken et al., 2008). Growth mindset interventions might encourage people to observe how much they have changed and grown and might still change and grow (Miller, 2019). Finally, self-as-context interventions help people to see themselves as the one who holds or watches all inner content, and so is not equivalent to that content (Yu et al., 2017). All of these interventions are intended to help people disengage from unhelpful self-content, such as "I should beat myself up to motivate myself", "I can't change", or "my past mistakes define me."

Table 6 Self-processes

Process	Example labels used in research
Promote functional self-concept	Self-efficacy, self-esteem, self-concept nonattachment to ego
Promoting view that person can change and improve	Growth mindset
Promote kind perspective of self	Self-compassion
Promote experience of self-as-observer, rather than self-as-content	Mindfulness, self-as-context

Motivational Processes

Motivational interventions (Table 7) often help people to identify behavior that is personally important (autonomous motivation), rather than done exclusively to please others or out of guilt or a sense of pressure ("controlled motivation" (Crane et al., 2016; Powers et al., 2012). Autonomous motivation is linked to higher well-being, more sustained behavior, and higher performance (Ryan and Deci, 2017). Some motivational interventions focus on specific topic areas, such as motivation to quit smoking (McCarthy et al., 2008). Still others treat motivation as something that is more or less present or absent, as in "amotivation" (Schmidt et al., 2018). Values interventions seek to help people identify important sources of autonomous motivation (Levin et al., 2017; Lundgren et al., 2008; Viskovich and Pakenham, 2018). Other motivational constructs include readiness to change (Lewis et al., 2009), cravings (Witkiewitz and Bowen, 2010), and maladaptive perfectionism (Handley et al., 2015) (Table 6).

Nonattachment (Bhamhani and Cabral, 2016; Ciarrochi et al., 2020; Sahdra et al., 2015, 2016) may be an important process of change (Ciarrochi et al., 2020; Sahdra et al., 2010, 2016). Attachment is the motivation or drive to hold on to positive feelings ("I don't want this positive feeling to end"), unrealistic ideas ("life should always be fair"), unrealistic expectations ("I should be able to anticipate all future dangers"), things ("I need valuables to feel valuable"), and self-concepts ("I need to feel more important than you"). Consistent with nonattachment being a potential process of change, longitudinal research suggests that nonattachment proceeds the development of mental health (Ciarrochi et al., 2020).

Table 7 Motivational processes

Process	Example labels used in research
Clarifying values	Values; personal strivings
Reducing excessive outcome focus	Maladaptive perfectionism
Undermining excessive compliance, promoting authentic motivation	Self-determination theory: Autonomous vs controlled motivation, amotivation
Readiness and intentions	Readiness to change; intentions
Cravings and urges	Cravings, urges, withdrawal symptoms
Attachment to ego, youth, power, positive feelings, or an idealized version of life	Nonattachment

Overt Behavioral Processes

This category includes interventions that seek to increase engagement in activity (Gitlin et al., 2014; Hesser et al., 2014.; Richards et al., 2016.) or the development of behavioral habits (Table 8). Behavioral processes include adherence to routines or medical regimes (Crain et al., 2018; de Bruin et al., 2010), goal setting and goal directed behavior (Stacey et al., 2016; Slee et al., 2008.), avoidance and safety behavior (Desnoyers et al., 2017; Godlen et al., 2016), positive behavioral activation (Dimidjian et al., 2017).

Table 8 Overt behavioral processes

Process	Example
Increase pleasurable or valued activities	Activity engagement/frequency; leisure activities
Goal setting	Goal setting behaviors, focus on goals
Adherence	Treatment adherence; adherence to recommended health behaviors
Improve behavioral activation in presence of distress	Psychological flexibility: Emotion as barrier to activity; exposure
Increase functional behaviors	Health behavior
Decrease dysfunctional behaviors	Safety seeking behaviors; protective behaviors; sleep problems

Biophysiological and Sociocultural Level

What we have reviewed above focuses on the individual psychological level. However, processes of change also occur at the biophysiological or sociocultural level. As an example, CBT has been shown to reduce cortisol which may improve immunity (Antoni et al., 2005), and change brain responses which affects social anxiety symptoms (Måansson et al., 2016). Behavioral strategies have been shown to improve sleep problems which reduces ADHD (Hiscock et al., 2015) (Table 9).

Table 9 Social level mediators

Process	Example
Social support	Social support; family support; partner support; family cohesion; number of relatives; partners mutual support
Effective parenting	Parenting skills, dysfunctional parenting; harsh parenting; parent-child coercion; parental responsiveness
Social skills	Social skills
	Interpersonal effectiveness assertiveness
Features of social network	Affiliation with deviant peers; friend drug use behavior; peer relationships; caregiver strain; family coping; family flexibility; marital adjustment; modeling; teacher behavior
Therapeutic relationship	Therapeutic alliance, working alliance; resistance
Other adaptive social behavior	Helping behavior

Concerning the sociocultural level, process variables are not yet organized into separate dimensions. Social process variables that have been identified as mediators of therapeutic outcome include social support (Acosta et al., 2017; Barrera et al., 2006; Costanzo and Walker, 2008), parenting (Kling et al., 2010; McDonald et al., 2011), social skills (Hektner et al., 2014), features of social environment, such as family functioning (Fang and Schinke, 2014; MacPherson et al., 2016), affiliation with deviant peers (Castellanos-Ryan et al., 2013; Orlando et al., 2005), therapeutic relationship (Gifford et al., 2011 Maitland et al., 2016), helping behavior (Caprara et al., 2014) and assertive behavior (Kramer et al., 2016) (Table 9).

Conclusion

The last five decades has seen the package-for-disorder paradigm dominate intervention science. This paradigm has resulted in substantial progress, producing many intervention procedures that are likely to be beneficial to at least a subset of clients. Mediational research has also progressed, identifying candidate process variables across multiple levels of analysis (biological, psychological, social), and across all of the major psychological dimensions: Cognition, emotion, attention, self, motivation, and overt behavior.

The progress in the package-for-disorder paradigm may now be slowing. Therapy packages are overlapping, and proliferating. They are often complex and target multiple processes that may have different effects on different people, or that may be helpful to some more than others.

Furthermore, clinical disorders are complex, overlapping, often fail to lead to a functional understanding, and can present with radically different patterns of symptoms under the same label. To say that two people are depressed is almost uninformative, because there are so many different ways to be depressed. Further, when we cast people's suffering as a biomedical problem, we undermine people's agency and grossly overstate what is scientifically known.

A new paradigm is emerging, one that focuses on therapeutic processes of change, rather than packages, and on change within individuals, rather than across groups. This paradigm will allow us to answer a core clinical question that has immediate treatment relevance: How can we best target processes of change that are most likely to help a specific individual within a specific context to accomplish their goals? The extended evolutionary meta-model (EEMM), presented above, provides researchers and practitioners with a common framework and set of terms to answer this question. We hope the next few decades of research will see researchers from every therapeutic orientation come together to create a psychology that is more effective at reducing human suffering and promoting thriving.

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