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Process-Based Cognitive Behavioral Therapy: A Framework for Conceptualization and Treatment

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Abstract

Process-Based Cognitive Behavioral Therapy (PB-CBT) is the integration of biological, psychological, and social factors into idiographic structural models used to conceptualize patient problems and select transdiagnostic, evidence-based procedures for clinical intervention to improve well-being. Despite the clinical utility and applicability of this transdiagnostic approach to case conceptualization and treatment, little research or formal guidance exists on how to create individualized structural models in clinical practice. Traditional clinical psychology, on the contrary, employs a diagnosis to treatment matching system. While useful, diagnosis to treatment models of intervention neglect contextual factors that contribute to patient problems and have led to a proliferation of treatment manuals for specific diagnoses. The current case study described a college male who coped with emotional difficulties through avoidance, isolation, food restriction, and alcohol use. In addition to psychopathology, the patient also identified as bisexual in a predominantly homophobic social environment, which exacerbated psychological distress. These various factors were integrated into a structural model that aided the selection of transdiagnostic interventions. At the conclusion of treatment, the patient reported meaningful reductions in psychological symptoms, in addition to various functional gains consistent with his values, such as an increased ability to tolerate difficult emotions, increased mindfulness skills, and an openness to discuss emotions with peers. Structural models and transdiagnostic interventions may help conceptualize patients presenting with multiple forms of psychopathology.

Keywords

process-based therapy, structural equation modeling

Theoretical and Research Basis for Treatment

Since the Task Force on Promotion and Dissemination of Psychological Procedures called for the identification of research-supported treatments in 1994 (Hayes & Hofmann, 2018), researchers and clinicians sought to classify and disseminate evidence-based services. The successful dissemination and adoption of the Task Force's criteria for establishing evidentiary support contributed to a perhaps unintended diagnosis to treatment matching system. This was efficacious in

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environments with tight controls but neglected contextual and common factors contributing to psychological problems (Hofmann, 2014). As a byproduct of trials assessing treatment efficacy at the level of the manual (Chorpita & Daleiden, 2009), a wide range of manuals emerged for similar forms of psychopathology (Chorpita et al., 2005), which caused confusion for treatment selection. Diagnosis-specific manuals also had difficulties when implemented in applied environments, in that they were not designed with comorbidity in mind (Bunaciu & Feldner, 2013). A consequence of these limitations was the further development of additional models and interventions incorporating research findings from multiple domains of study, including the Distillation and Matching Model (Chorpita et al., 2005), modern transdiagnostic interventions (Barlow et al., 2017; Chorpita & Weisz, 2009), and attention to core etiological processes and mechanisms of change (Hayes & Hofmann, 2019).

The latter concept forms the framework for much of the case study that follows and the model that gives it shape. Process-Based Cognitive Behavioral Therapy (PB-CBT; Hayes & Hofmann, 2018) is a contemporary cognitive behavioral approach emphasizing transdiagnostic case conceptualization and intervention and is best understood as the integration of biological, psychological, and social factors into structural models to aid clinicians in understanding patient psychopathology and applying transdiagnostic interventions in idiographic fashion to improve well-being. Hayes and Hofmann (2018, p. 2) defined PB-CBT as the "contextually specific use of evidence-based processes linked to evidence-based procedures to help solve the problems and promote the prosperity of people." As examples of etiological processes and nomothetic knowledge, classical and operant conditioning within the context of direct contingency learning are long-standing in the field of clinical psychology (De Houwer, 2020). Classical and higher-order conditioning facilitate fear conditioning through associative learning, while principles of operant conditioning such as negative reinforcement perpetuate psychological problems through escape and avoidance behaviors. Biological factors, such as neuroticism, also account for a large percentage of the variance in clinical presentations across heterogeneous psychological disorders (Barlow et al., 2014). Social factors, too, are relevant to consider (Gilbert, 2019). For example, in patients with social anxiety disorder, a hallmark symptom is the fear of negative evaluation by others embedded in the patient's social context; cultural norms and standards are central to the manifestation of social anxiety symptoms (Hofmann et al., 2010). Together, psychological, biological, and social processes influence the expression of symptoms and are important to consider for case conceptualization.

Aside from relevant etiological processes, the debate on the primary mechanism of therapeutic change is unclear. Traditional exposure therapies implicated habituation as the core mechanism of therapeutic change in psychotherapy (Foa & Kozak, 1986). Craske and colleagues asserted that successful exposure occurs during the presence of new learning (i.e., inhibitory learning), which is a byproduct of competing danger and safety associations (Craske et al., 2008; Davies & Craske, 2018). According to the inhibitory learning model, symptom reduction is conceptually not necessary for functional improvement in psychotherapy; new learning is the hypothesized mechanism responsible for therapeutic change. Similarly, in Acceptance and Commitment Therapy, psychological flexibility, or the willingness to tolerate difficult thoughts and emotions in the service of values, is the hypothesized mechanism of change in psychotherapy (Hayes et al., 2011; Wiggs & Drake, 2015). From a Dialectical Behavior Therapy perspective, deficits in emotion regulation perpetuate psychological problems (Gratz et al., 2015), and corrections to ensure greater emotional stability in turn enable enaction of more adaptive behavioral strategies. These various mechanisms are not mutually exclusive and can be targeted with different clinical interventions adjusted to be effective across contexts. Ultimately, the goal of PB-CBT is to enhance psychological well-being and promote behavior consistent with an individual's goals and values, while not necessarily placing the emphasis of treatment solely on symptom reduction (Hayes et al., 2019). As examples of techniques used to achieve these goals, PB-CBT

references the following evidence-based practice elements, although this list is not exhaustive: mindfulness, exposure strategies, valued living, emotion regulation (Hayes & Hofmann, 2018).

Process-based cognitive behavioral models are gaining traction for case conceptualization, despite the primary driver of therapeutic change and contextual predictors or moderators of such remaining up for debate. Given the crossroads at which the field of clinical psychology finds itself in terms of shifting the focus back to the level of the individual (i.e., individualized methods dominated clinical research until the 1950s; Barlow et al., 2009) as opposed to the level of the manual, additional research and clinical case studies are needed to understand the underlying mechanisms of change in PB-CBT and how to apply these mechanisms to the individuals' unique risk factors.

Given attention to numerous internal, environmental, and social variables, process-based models may benefit from visual depiction to facilitate overall interpretation. Structural equation models provide a ready means of doing so in a way that allows connections between individual constructs pursuant construction of a whole clinical conceptualization. Of course, utilizing concepts from structural equation modeling for case conceptualization does not necessarily facilitate fitting the data to a specified model in this case. However, structural equation modeling concepts provide a framework for understanding individualized biological, psychological, and social variables, as well as their relationships and interactions. In general, these statistical approaches include visual display of both manifest (i.e., directly observable) and latent (i.e., non-observable variables). Manifest and latent variables are further categorized as either (1) exogenous (i.e., without a direct cause) or (2) endogenous (i.e., with a direct cause). Exogenous variables are synonymous with predictors in traditional regression models, while endogenous variables represent outcomes. In many cases, manifest and latent variables are multidirectional and covary (Beaujean, 2014). Structural models allow for a comprehensive interpretation of different variables hypothesized to impact symptom presentations, as well as simple description of potentially complex interactions between them. When cases are conceptualized this way with attention to biological, psychological, and social processes, patterns and understanding of individual symptom profiles may become evident. Likewise, these methods may be useful for designing idiographic structural models based on transdiagnostic, evidence-based procedures hypothesized to produce the highest level of functional change in the given context (i.e., consistent with the paths in a structural model). Thus, the entire conceptual approach (described further below) allows the application of nomothetic knowledge to at an idiographic level that is entirely consistent with the central tenets of PB-CBT.

Few assessment and research designs have applied structural models to individual cases (Hayes et al., 2019), although this approach is becoming increasingly common. In posttraumatic stress and resilience literature, machine learning models are helping researchers and clinicians understand individual differences in etiological and maintenance factors. These models help explain individualized symptom and diagnostic profiles, which are important to consider given heterogeneity in posttraumatic stress presentations (Schultebraucks & Galatzer-Levy, 2019). Nomothetic and individualized models of symptoms have also been examined in patients with co-occurring emotion dysregulation and trauma symptoms (Jennissen et al., 2016), among others. Examples of how to apply structural models to individual patient presentations are imperative for understanding how biological, psychological, and social processes interact to predict and explain complex human behavior, which ultimately guides the selection of evidence-based procedures for intervention consistent with individualized structural models (Hofmann et al., 2020; see also Figure 1 for an adapted structural equation model based on Jennissen et al., 2016).

The current case study functions as a tutorial for how clinicians might integrate biological, psychological, and social processes into idiographic structural models that guide the selection of treatment procedures using evidence-based change processes. It is an extension of the rapidly burgeoning literature emphasizing etiological and maintenance processes of psychopathology

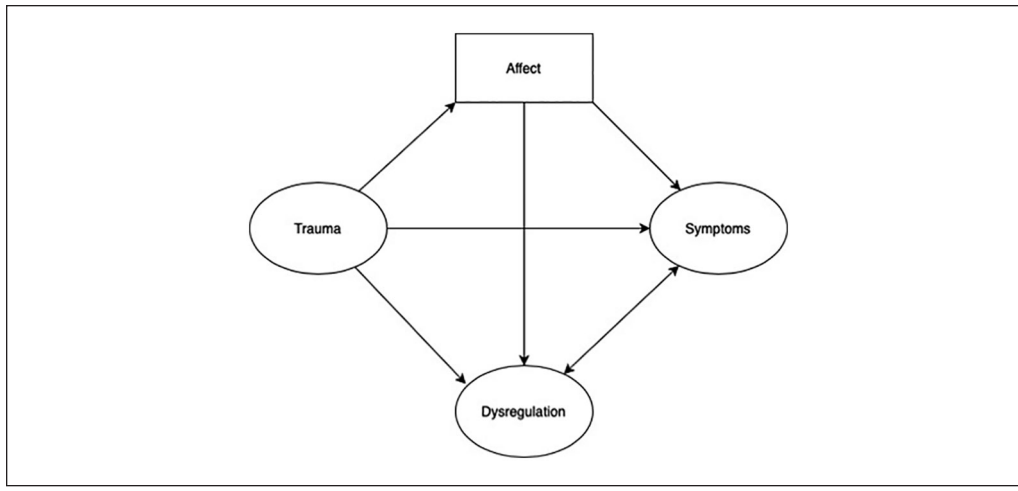

Figure 1. Adapted structural equation model from Jennissen et al. (2016) to provide examples of manifest, latent, exogenous, and endogenous variables. This model serves as an example for how psychopathology can be conceptualized with observable and non-observable variables.

and deemphasizing diagnoses and protocols, which may ultimately be more amenable to adaptation for more people in more diverse environments than the traditional diagnosis to treatment model. Transdiagnostic, evidence-based procedures were selected based on the patient's individualized structural model (described further below), consistent with case studies illustrating the flexible administration of evidence-based care (Trahan et al., 2016). Treatment progress was monitored using evidence-based self-report measures, and skills taught emphasized inhibitory learning to improve functional outcomes as opposed to symptom reduction as the primary mechanism of therapeutic change.

Case Introduction

"Michael" is a college-aged White male referred by an instructor to a mental health clinic located in the Southeastern region of the United States for an initial intake and evaluation.

Presenting Complaints

Michael presented to the training clinic with complaints of social anxiety since grade school. He avoided crowds, initiating or maintaining conversations, participating in small groups, attending parties, and eating in front of others. His ubiquitous avoidance of these activities prevented Michael from meeting new friends and interacting in social settings, both of which he identified as personal values and desires. Michael isolated himself because of this social anxiety, which consequently led to fewer opportunities for social skill development in comparison to his peers (further exacerbating his anxiety). He also characterized three, two-week episodes of depression in the past, the most recent of which occurred one month prior to Michael seeking treatment. These depressive episodes consisted of decreased appetite, difficulty sleeping, feeling tired and without energy, and difficulty functioning at work and school because of depression symptoms.

In addition to anxiety and depression problems, Michael described a history of eating binges followed by purging, which sometimes occurred routinely for months at a time. He also readily identified that his body weight and shape greatly influenced how he felt about himself. Although

he did not report eating difficulties at the time of the initial evaluation, the degree to which weight and shape influenced his self-opinion was salient (as was the negative impact of self-image on his symptoms of social anxiety). Michael also indicated that he sometimes drank to cope with emotional problems, although this did not appear to be functionally impairing at intake. Finally, while it was not revealed until the midway point of treatment, Michael also identified as bisexual. Given that he lived in a predominantly homophobic environment, sexual orientation contributed to psychological distress and his sexual identity comprised a central component in the overall conceptualization of his case.

History

Michael was the oldest of three siblings, all of whom lived with his mother and father in the Southeast United States. He lived much of the year in a distal location to attend college but saw his family frequently on weekends. He indicated that his family moved very frequently when he was a child, which he explicitly identified as etiological in terms of his longstanding social anxiety symptoms and resulting functional impairment. Michael reported no current prescriptions for any medications and no presence of any major medical conditions. He indicated an amorphous family history of psychological problems, including what he thought included at least one formal diagnosis of Bipolar Disorder, general emotion dysregulation, and unipolar depression. Michael also reported having three close friends whom he considered to be supportive and trustworthy, all of whom he saw regularly when he was located in his college town. He also reported great enjoyment of reading and studying but conveyed few other interests (social or otherwise).

Assessment

Michael completed a semi-structured diagnostic interview (i.e., Mini International Neuropsychiatric Interview; Sheehan et al., 1998) and less structured clinical interview to assess biological factors, psychological factors, social factors, and presenting complaints. He also completed various self-report measures to assess the severity of symptoms related to presenting problems, specifically the Depression Anxiety Stress Scale—21 (Lovibond & Lovibond, 1995), the Outcome Questionnaire—45 (Lambert et al., 2004), and the Social Phobia Inventory (Connor et al., 2000). There were lines of converging evidence in support of diagnoses of Social Anxiety Disorder and Major Depressive Disorder, Recurrent, In Partial Remission. As mentioned previously, Michael did not endorse the contemporaneous presence of eating pathology at the initial intake but did outline a history of such. These symptoms became resurgent under increased social and internal stress due to issues related to his sexual identity, however, and played an increasingly prevalent role throughout treatment (both in terms of treatment techniques and evolving conceptualization). This led to a diagnosis of Unspecified Feeding or Eating Disorder being added midway through treatment (see case conceptualization below for further detail). Finally, while Michael endorsed occasionally using alcohol to cope with emotional problems, he did not meet diagnostic criteria for Alcohol Use Disorder. As is detailed in the conceptualization, the focus of this case study was on the underlying etiology and maintenance determinants of psychopathology as opposed to diagnostic markers.

Case Conceptualization

A structural model incorporating biological, psychological, and social components helped conceptualize Michael's psychological difficulties and presenting complaints. To begin with a multidimensional risk factor, Michael's family history of psychological problems suggested the potential for a heritability factor for psychopathology (i.e., neuroticism). Neuroticism, or the

propensity to experience negative emotions accompanied by the belief that the world is a dangerous and threatening place, was therefore hypothesized as a temperamental factor interacting with Michael's uncontrollable, often harsh, environment to influence the expression of specific psychological difficulties. Neuroticism was modeled as a latent variable, given that biological temperaments could not be measured directly (at least not with any specificity and/or in this setting). Neuroticism has traditionally been conceptualized as a stable trait; however, recent conceptualizations have implicated both biological and general psychological vulnerabilities (i.e., a sense of uncontrollability) as central to the explanation of neuroticism. Neuroticism, then, interacts with specific psychological factors to influence a specific disorder or cluster of symptoms (Barlow et al., 2014). In this particular case, considering Michael's unpredictable environment, upbringing, and family history of psychological problems, neuroticism was modeled as an exogenous predictor that explained the experience of negative emotions, such as social anxiety, depression, and eating problems.

After adding neuroticism as a latent or unobservable variable, psychological factors were also considered within the context of Michael's structural model, which interacted with neuroticism to influence Michael's profile of symptoms. Classical and operant conditioning helped explain Michael's symptom presentation and were modeled as manifest variables in his structural model, given that they were directly observable events, emotions, or behaviors. He reported a specific instance in grade school where he experienced embarrassment in a social situation, which was paired with previously neutral stimuli (e.g., crowds, speeches). The social anxiety response he experienced eventually generalized across different contexts and settings through higher order conditioning and associative learning processes to previously neutral stimuli. For example, at the time he arrived at treatment, Michael avoided all situations with large groups of people, such as social gatherings, parties, group projects, or classes. He also refused to engage in other social situations that may facilitate negative evaluation, such as eating in front of others or providing his opinion on matters important to him. Direct contingency learning in general also contributed to the formulation of a schema, which evolved and was continuously reinforced as a result of contextual influences and avoidance behaviors. Operant conditioning, represented by manifest variables of avoidance and a temporary reduction in symptoms, maintained the avoidance cycle and different symptoms (i.e., depression, anxiety, and eating problems identified later in the course of treatment). Depression, anxiety, and eating problems were modeled as latent variables, given that the underlying psychopathology was not directly observable. This perpetual avoidance prevented new learning from occurring and decreased Michael's ability to function in his environment.

In Michael's case, one specific avoidance behavior was isolation. Over time, isolating behaviors cultivated Michael's development of a schema that his behaviors had no impact on his environment and did not serve as effective solutions to problems, thereby facilitating learned helplessness and the development of depression symptoms (Seligman, 1972). This self-report was consistent throughout treatment, as Michael frequently mentioned that he isolated himself due to anxiety, which prevented him from accessing values-consistent reinforcers.

Emotion regulation difficulties were thought to moderate the relationship between negative cognitions/schemas and physiological sensations and avoidance/escape behaviors. Emotion regulation, much like the temperamental factor of neuroticism, is central to essentially all psychological disorders and is implicated as a procedure of change in psychotherapy (Gratz & Tull, 2010). Difficulties related to emotion regulation have also been shown to be specifically relevant to eating disorders (Brockmeyer et al., 2014) and anxiety and depression (Aldao et al., 2010), thus making consideration of this construct important to all dimensions of Michael's difficulties. As examples of deficits with specific emotion regulation strategies, Michael had difficulty tolerating and accepting emotions. He frequently avoided the experience of emotions (however salient, and independent of whether or not they were positive or negative) in an attempt to suppress their effects and future occurrence through potentially deleterious behaviors (e.g., alcohol

use; bingeing; purging; escape in social settings). In turn, this avoidance facilitated more future avoidance and limited opportunities to learn to accept emotional vacillation and continue to function despite potential interference or difficulty on this basis. Given that the consequences of emotion regulation were directly observable they were modeled as manifest variables impacting the relationship between thoughts and feelings and avoidance.

In addition to conceptualizing biological and psychological processes using manifest and latent variables as described above, there were also social factors contributing to psychological distress. Primarily, Michael's identification as bisexual in the course of treatment was seen as very salient to his overall conceptualization. He described his parents as extremely disapproving of those who identify as LGBTQ+. In addition to immediate and overt interpretations of how negatively this could affect someone first coming to understand their own sexuality and identity, research has also pointed out that individuals who are the targets of homophobic discrimination frequently experience elevated levels of psychological distress as a direct result (Sarno et al., 2020). This was explicitly the case for Michael given his own description, and this unsupportive, actively prejudicial environment was identified as an important social factor contributing to his social anxiety, depression, and eating problems (also unfortunately common among the LGBTQ+ community, both in terms of prejudice/discrimination and sequelae; Baams et al., 2015; Feldman & Meyer, 2007). Michael's already pervasive fear of social judgment was that much more amplified when it came to being judged negatively just for being himself, which contributed to him globally being unable to be comfortable in his own skin. Sexual orientation and the associated social context were therefore modeled as manifest variables that impacted social anxiety, depression, and eating problems, in conjunction with neuroticism and the outcomes of classical and operant conditioning processes. These various biological, psychological, and social factors together provided a theoretical framework to explain the individualized etiology and maintenance processes of Michael's psychological problems. For an in-depth review of Michael's conceptualization using a structural model, see Figure 2. His structural model aided the selection of transdiagnostic intervention strategies that have been demonstrated to be effective across different contexts and populations (as described further below).

Course of Treatment and Assessment of Progress

After the initial intake evaluation during which the semi-structured clinical interview and self-report measures were completed, Michael attended 20 treatment sessions. The initial five sessions consisted of psychoeducation based on a functional analysis and mindfulness from the Unified Protocol (Barlow et al., 2017). Both psychoeducation and mindfulness are evidence-based procedures that have been shown to be crucial elements of a transdiagnostic intervention approach (Sauer-Zavala et al., 2017). Homework for the initial five sessions consisted of emotion (i.e., thoughts, physiological sensations, behaviors) tracking and mindfulness exercises designed to increase emotional awareness. These initial interventions were largely consistent with Michael's structural model, where the primary maintenance factor and intervention target for his psychological problem was avoidance. In his model and as explained above, avoidance in multiple forms (i.e., escape, avoidance, alcohol use, purging) contributed to anxiety, depression, and eating problems. Therefore, we hypothesized that targeting avoidance would facilitate the highest level of functional improvement and concurrent symptom reduction. Anxiety, depression, and eating problems were modeled as latent variables that covaried, given the common factors across these symptoms. For example, anxiety and mood disorders share certain properties, such as avoidance, negative affect, and a lack of emotional awareness (Ehrenreich et al., 2009). Psychoeducation and mindfulness were implemented to increase Michael's emotional awareness and knowledge relating to how avoidance behaviors impact different psychological symptoms in the long-term prior to

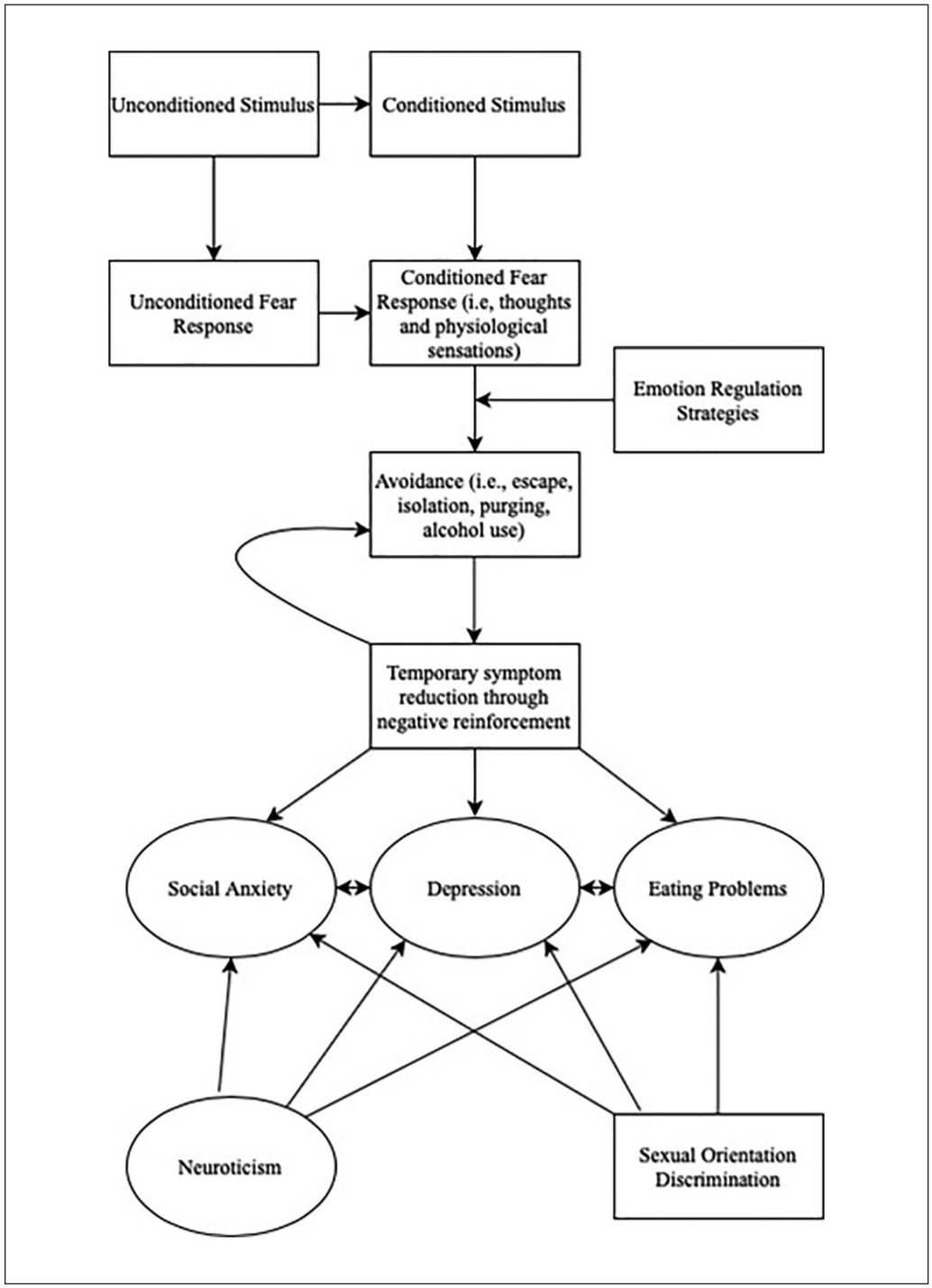

Figure 2. Structural model for Michael's case. Latent variables are represented by circles. Manifest or observed variables are represented by squares. Single-arrow lines represent the variable receiving the arrow is the outcome. Double-sided arrows indicate a reciprocal relationship.

Table 1. Exposure exercises from an inhibitory learning perspective. Adapted from Davies and Craske (2018).

Before exposure	After exposure
Behavioral Goal:	Yes or no, did what you were most worried about occur?
What are you most worried will happen?	
On a scale of 0 to 100, how likely is it that it will happen?	How do you know?
On a scale of 0 to 100, how bad would it be if this did happen?	What did you learn?

introducing him to exposure exercises. We reasoned that providing Michael with an understanding of how aversive thoughts and physiological feelings impact behaviors through psychoeducation and engagement in mindfulness activities would also increase buy-in when designing difficult exposure exercises.

Sessions 6 and 7 consisted of the construction of an exposure hierarchy, which included a number of situations that Michael predicted would elicit various ranges of social anxiety symptoms, and that could be targeted with in-session and in vivo exposures. In examining Michael's conceptual model, it was imperative to select interventions that would facilitate the greatest amount of functional change. As mentioned, avoidance appeared to be the predominant precipitating factor for the various forms of psychological distress that Michael experienced, and therefore exposure was hypothesized as the transdiagnostic procedure that would lead to the most improvement or disruption to the maladaptive structural model (i.e., reductions in behavioral avoidance would simultaneously impact social anxiety, depression, eating problems, and overall psychological well-being). Michael was educated about the goal of exposure exercises, which was not symptom reduction but rather identifying and "testing out" anticipated negative outcomes through behavioral experiments to enhance the likelihood that inhibitory learning would occur (Davies & Craske, 2018; see also Table 1). We also chose to utilize an inhibitory learning model to emphasize (1) variability in behavioral responses to aversive emotions and situations to improve psychological well-being, (2) selection of behaviors that are focused on long-term outcomes (e.g., goals and values) as opposed to short-term consequences, and 3) retention of more adaptive behaviors (Hayes & Hofmann, 2018).

After outlining and refining the exposure hierarchy, the therapist assigned a low-level exposure (i.e., three to four on a 0–10 scale) in session 8. Michael was encouraged to use learned mindfulness skills to regulate emotions and tolerate the exposure exercises. The initial exposure exercises involved socializing in small groups of people (i.e., three to five) to allow Michael to develop a sense of self-efficacy, an understanding of the purpose of completing exposure, and a perception of personal success in the completion of an exposure exercise (Davies & Craske, 2018). He also gave formal speeches in session to the therapist as an analogue to the same activity he would encounter in his classes. Higher-level exposures were designed to be more anxiety-provoking after Michael built a sense of mastery with lower-level exposures, including attending parties and public events, eating in front of others, public speaking, and engaging in situations that could potentially cause a negative evaluation (i.e., asking comical questions to an unknown person in public or to one or more confederates in session). After each exposure, in-session debriefing occurred using an inhibitory learning model based on Table 1. Higher-level exposures were completed during sessions 9 and 10. Michael reported learning that he was able to tolerate difficult emotions while still engaging with his environment fully and accessing positive reinforcers, such as social interaction and new friends, in line with evolutionary principles of variability, selection, and retention. The therapist recognized that emphasizing acceptance of emotional symptoms as opposed to symptom reduction resonated with Michael, which allowed for the assignment of more difficult exposure exercises across contexts. In addition to functional gains, social anxiety symptoms also decreased throughout the course of treatment along with

depression (i.e., which was conceptualized as a downstream consequence of social anxiety because of the function of Michael's avoidance behaviors).

As Michael started engaging in exposure exercises, he also began acting in accord with his stated values to approach new social interactions with people he did not previously know. In the course of doing so he identified some instances where he interacted romantically with other males. During session 11, Michael informed the therapist that he identified as bisexual, which coincided with the resurgence of purging behaviors (stresses and drivers of that process outlined in the conceptualization, above). Possible issues related to sexual orientation were identified as a potential social risk factor for psychopathology in the initial conceptualization, given that eating disorders are more prevalent among males who identify as gay or bisexual (Feldman & Meyer, 2007).

Immediately following Michael's coming out and report of purging behavior, the therapist began Motivational Enhancement Training and problem solving, separate intervention procedures for PB-CBT, in line with these evolving contextual changes to help Michael discover sources of social support he could foster and access specifically for psychological distress related to coming out. The coming out process almost ubiquitously results in psychological distress, in addition to the fear of lacking adequate coping resources (Charbonnier & Graziani, 2016). Further, social support is one reinforcer imperative for successful coping and resilience during the coming out process (Ali, 2017). Taken in conjunction with the assumption that the patient is the master of their own experience, as well as the utility of activities related to Motivational Enhancement Training and problem solving for identifying pros and cons for accessing different sources of social support (i.e., using a decisional balance to develop sources of social support that could be accessed and subsequent problem solving techniques for taking concrete steps to access these supports), the clinician implemented these procedures. The therapist also provided resources (e.g., support groups) in the immediate area that Michael could utilize outside of session. At this time, a diagnosis of Unspecified Feeding or Eating Disorder was added after further assessment and clarification. Given that a lack of emotion regulation skills was a risk factor for avoidance and psychopathology, as well as binge eating (Gianini et al., 2013), the therapist provided reiterated psychoeducation on basic emotion regulation skills to help Michael resist the desire to purge.

As is commonly the case, Michael's initial purging behaviors became increasingly frequent and problematic. Given that purging is associated with detrimental medical complications (Forney et al., 2016), these behaviors became the primary targets of intervention, which was shifted to employ Cognitive Behavior Therapy for Eating Disorders (Fairburn, 2008). In keeping with transdiagnostic intervention procedures based on Michael's structural model, session 14 constituted psychoeducation on the role of purging within the context of Michael's functional analysis (see Figure 2). Psychoeducation on regular eating and food monitoring was also provided. Sessions 15 to 20 accordingly consisted of assessing weight, emotion regulation skills, and continued exposures to increase emotional awareness and address social anxiety (concordant, but not completely overlapping, with goals inherent in reducing bingeing and/or purging episodes).

Throughout treatment, Michael made clinical improvements in social anxiety (see Figure 3) and entirely curtailed purging, in addition to increasing his range of functional behaviors (e.g., being able to tolerate difficult emotions and still engage with his environment). He was also able to apply the skills taught to him throughout treatment to functionally similar avoidance behaviors, often in completely independent fashion. For example, Michael reported increases in his ability to use mindfulness skills to manage difficult emotions in diverse situations that were not addressed in therapy until after the fact. He learned that he could tolerate difficult emotions while still engaging fully in social situations, practiced and refined that ability in-session, and then applied it more generally to reformulation of the maladaptive schema that was perpetuating his

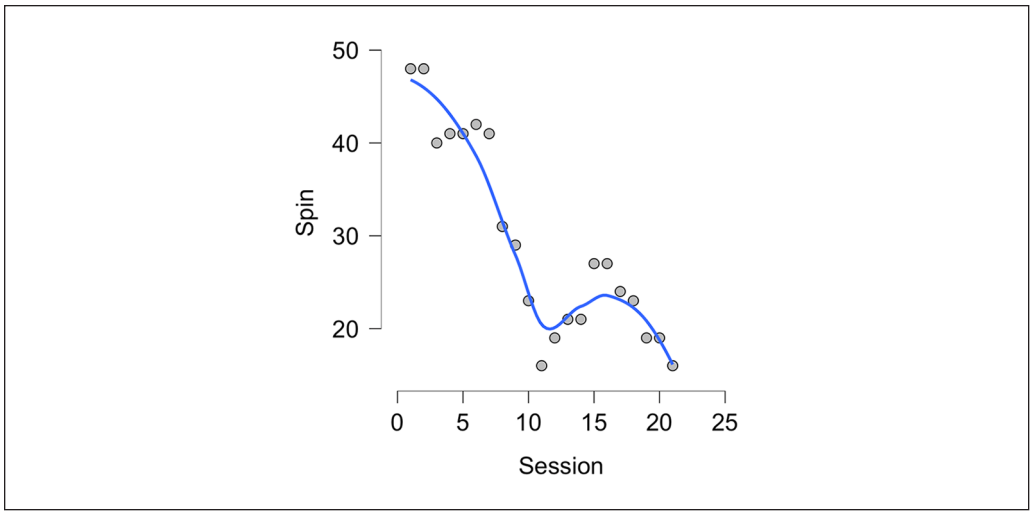

Figure 3. Social Phobia Inventory (SPIN) scores. A score of 19 distinguishes those with clinical levels of social anxiety compared to healthy controls.

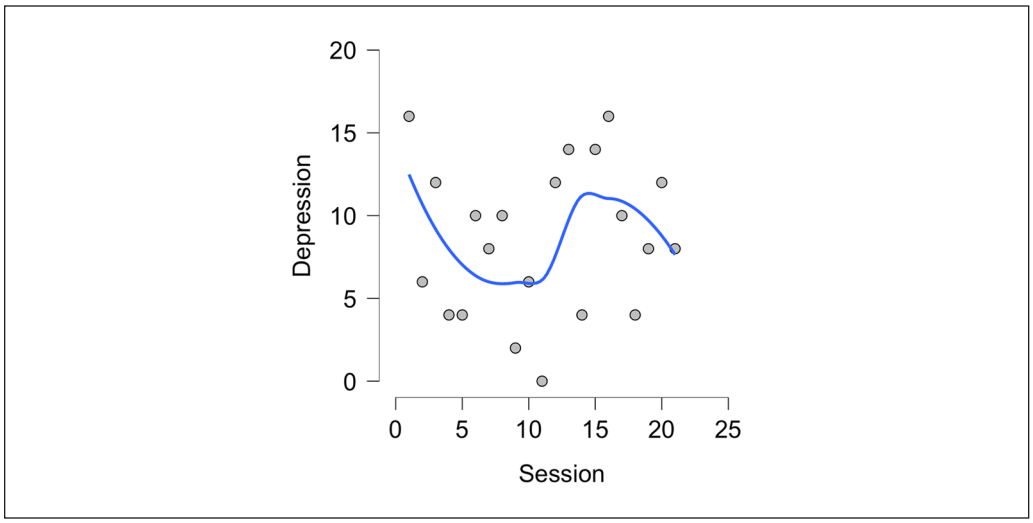

Figure 4. Depression scores from the Depression, Anxiety, and Stress Scale–21.

avoidance (consistent with an inhibitory model of therapeutic change). Regarding his sexuality, he went from being afraid to even identify these aspects of himself to problem solving and talking openly about his sexuality to his close friends. Eventually (and perhaps one of the most positive outcomes of the process, and certainly the most rewarding to the therapist) Michael stated directly that he had became more comfortable in his own skin and in learning to successfully navigate the prejudicial, bigoted environments in which he often found himself. In keeping with Michael's structural model, exposure was hypothesized as the procedure that would facilitate the most therapeutic change, and these changes were apparent with objective data and verbal reports in session. He also made improvements from "moderate" to "normal" levels of depression (see Figure 4), "moderate" to "normal" levels of stress (see Figure 5), and "mild" to "normal" levels

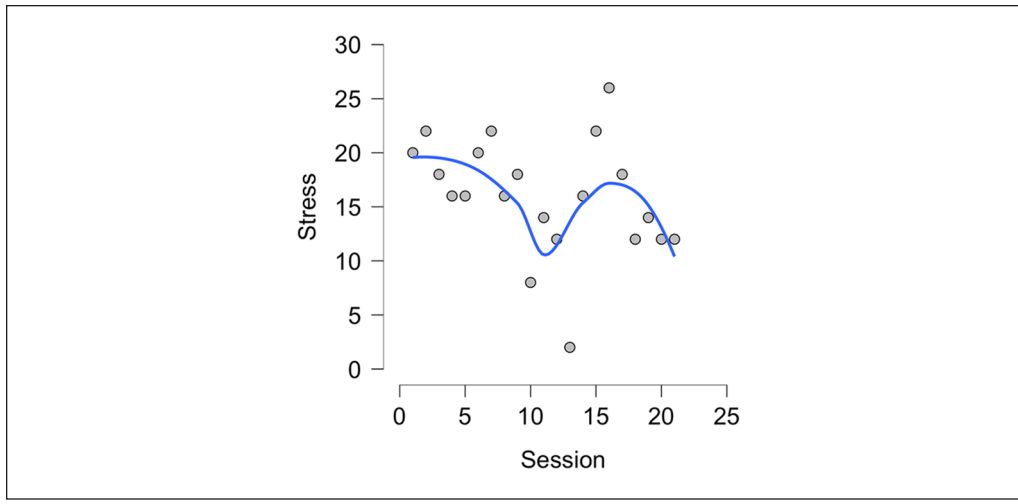

Figure 5. Stress scores from the Depression Anxiety, and Stress Scale–21.

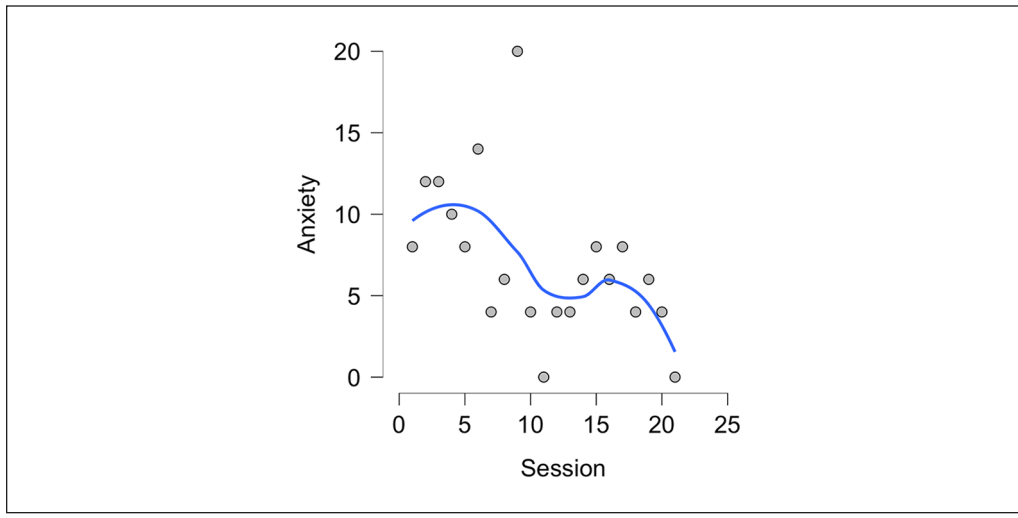

Figure 6. Anxiety scores from the Depression Anxiety, and Stress Scale–21.

of anxiety (see Figure 6). OQ scores also decreased significantly throughout the course of treatment (see Figure 7).

An overarching focus of the current case study was applying transdiagnostic, evidence-based treatment techniques consistent with an individualized structural model. Biological, psychological, and social factors helped explain the etiology and maintenance factors for Michael's problems. The therapist selected appropriate evidence-based techniques based on the processes hypothesized to lead to the most change within the model. Psychoeducation and mindfulness were the focus of initial sessions, while exposure techniques consistent with an inhibitory model dominated the latter half of treatment given Michael's model. Emotion regulation strategies were incorporated as needed, in addition to transdiagnostic interventions tailored to eating problems. In terms of Michael's sexual orientation, he was encouraged to connect to sources of social support outside of session with problem solving techniques and Motivational Enhancement Training.

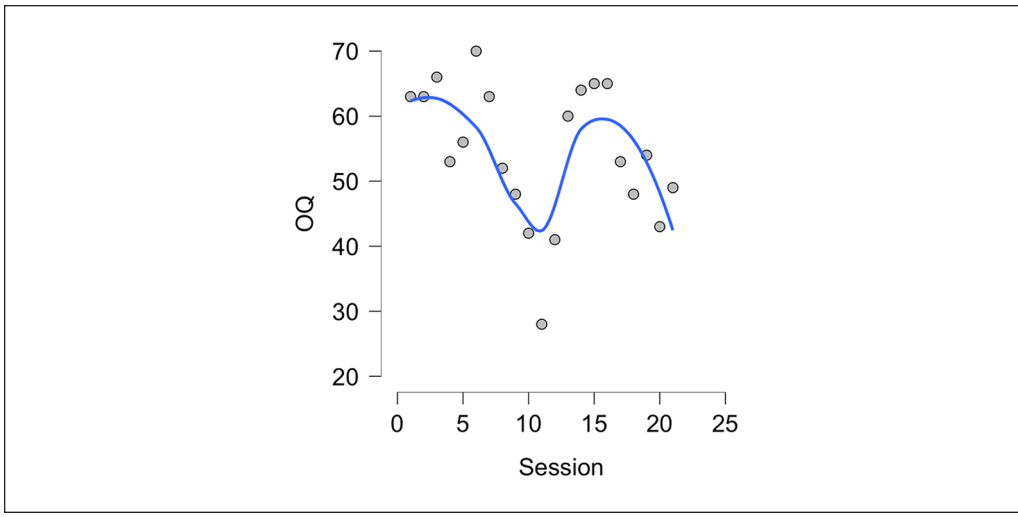

Figure 7. Outcome Questionnaire scores.

In session, he was taught to apply the same skills for managing difficult emotions to manage the distress he felt when encountering homophobic, discriminatory behavior. Throughout treatment different evidence-based procedures were applied consistent with the dynamically evolving context, which offers an example of adaptations possible from a PB-CBT perspective.

Complicating Factors

Perhaps the most salient complicating factor was the homophobic attitudes of his family members and immediate circle of broadening social relationships (i.e., many of his friends and new acquaintances, with the exception of two people whom he viewed as much more understanding). These attitudes, and the resultant fear of social judgment Michael experienced, prevented him from accessing certain social supports that could have served as protective factors for psychological functioning. This remained difficult due to the realistic concern associated with disclosure of his sexuality (given that the intolerant attitudes described are widely espoused in Michael's environmental context). He was not comfortable disclosing his sexual orientation to his immediate friend group for fear of how they would respond, so elucidating specific forms of social support took additional session time. However, he was able to broaden his social support network through problem solving techniques and Motivational Enhancement Training.

Access and Barriers to Care

Michael's time in treatment was terminated during the beginning of the COVID-19 pandemic. Although the clinic in which he was seen was equipped for telehealth services, Michael did not wish to continue in this modality (which he attributed primarily to concerns about being overheard or other privacy violations during his stay with his parents while in quarantine). He also noted that his family members were more generally unaware that he was receiving therapy, which he predicted would be another source of negative judgment that he did not wish to encounter. This prevented the therapist from conducting any follow-up assessment to determine whether long-term gains were maintained, although he exhibited strong improvements in identified target areas by the time sessions curtailed. Despite verbal reports of improvements in both well-being and psychological symptoms prior to the COVID-19 pandemic, however, the lack of follow-up

data is a prominent limitation that prevented the clinician from assessing the long-term maintenance of gains. As a separate limitation, the lack of a self-report measure on functional outcomes forced the clinician to rely on verbal reports for gains related to psychological well-being and quality of life (e.g., increased usage of mindfulness skills, heightened ability to tolerate difficult emotions in the service of values, access to new sources of social support not previously utilized due to anxiety and depression problems). Finally, although the current paper utilized a structural equation modeling-like framework to help distinguish latent/non-observable variables (e.g., neuroticism) from those that were manifest/observable (e.g., avoidance), contemporary PB-CBT typically emphasizes network models as the basis for idiographic case conceptualization.

Follow-Up

While it was not possible to provide follow-up given the COVID-19 pandemic as mentioned above, Michael and the therapist had previously discussed treatment termination and were in the process of spacing out sessions prior to quarantine. He discussed with the therapist continuing to apply the skills that he had learned while at his hometown for the summer and using these skills to regulate his emotions in a difficult environment. Michael particularly enjoyed using mindfulness skills to foster a non-judgmental stance towards his emotions, and he reportedly planned on continuing to enter social situations that were anxiety-provoking while using these mindfulness skills in the process. This pattern of behavior was apparent throughout sessions prior to COVID-19, as Michael was able to generalize the skills taught in session to manage depression, anxiety, and eating problems.

Treatment Implications of the Case

The current case study illustrates how individualized structural models can be applied to explain etiological and maintenance factors of a patient's psychopathology using biological, psychological (i.e., drawing largely from behavioral theories of classical and operant conditioning), and social factors. This model facilitates an understanding of the bidirectional and unidirectional relationships between these different factors. In addition, the case study illustrates how structural models can guide the application of transdiagnostic evidence-based procedures for various forms of psychopathology to lead to the highest level of functional change. Given the rise in process-based, transdiagnostic care as opposed to matching diagnoses to manuals, illustrating how one can conceptualize and treat using a process-based model is imperative. The current approach is consistent with PB-CBT in clinical psychology, which may provide the impetus for future consideration of these methods and/or formal research on tailoring treatment to the level of the individual.

Recommendations to Clinicians and Students

Traditional evidence-based services emphasize protocols for specific diagnoses, but this approach potentially contributes to problems and confusion in terms of treatment selection (particularly with complex, comorbid presentations). Recent advancements in Cognitive Behavioral Therapy, such as PB-CBT, allow for flexibility in conceptualization and adapting transdiagnostic, evidence-based procedures based on idiographic structural models. The structural model in the current case study emphasizes the biological, psychological, and social factors that were predominant in explaining the etiology of Michael's different complaints. This was conducted in visual form, making it ideal for efficient, effective communication about key aspects of the case in terms of overall conceptualization. Further, the structural model illustrates how these different variables covary and influence one another, which allowed for the selection of transdiagnostic intervention targets that would lead

to the most functional and symptom gains in terms of the model. Transdiagnostic procedures were applied in line with the dynamic relationship between Michael's environment and presenting problems (e.g., psychoeducation, mindfulness, exposure, problem solving, emotion regulation skills, and motivational interviewing). Importantly, each of these interventions targeted a specific component of Michael's structural model to facilitate therapeutic change from an inhibitory learning perspective. Taken together, the integration of evidence-based etiological theories with transdiagnostic interventions and mechanisms of change can be applied to each individual using a PB-CBT model. The current case study also functions as a tutorial for identifying manifest and latent variables, adhering to a structural equation modeling-esque form of case presentation (which itself may be a target for future research and/or clinical implementation).

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