

Emotion Regulation in Clinical Populations: Mechanisms, Challenges, and Therapeutic Interventions

Klinik Popülasyonlarda Duygu Düzenleme: Mekanizmalar, Zorluklar ve Terapötik Müdahaleler

Eda YILMAZER* 

Beykoz University, Faculty of Social Sciences, Department of Psychology, İstanbul, Türkiye

Abstract

Emotion regulation is a fundamental aspect of psychological well-being, involving processes through which individuals manage and respond to their emotional experiences. This review explores the mechanisms of emotion regulation, the challenges faced by clinical populations, and therapeutic interventions designed to enhance regulation skills. Theoretical models, such as Gross's Process Model and Emotion Regulation Theory, provide insights into cognitive and situational factors influencing regulation. Neurobiological research highlights the roles of brain regions like the prefrontal cortex and amygdala, and neurotransmitters such as serotonin, dopamine, and norepinephrine. Assessment methods range from self-report questionnaires to behavioral tasks and physiological measures, with innovative approaches like Ecological Momentary Assessment offering real-world insights. Adaptive strategies, including cognitive reappraisal, are linked to improved emotional outcomes, while maladaptive strategies, such as suppression, exacerbate distress. Emotion dysregulation manifests uniquely across disorders, including anxiety, depression, Post Traumatic Stress Disorder, Bipolar Personality Disorder, and substance use disorders, necessitating tailored treatments. Effective therapies such as Dialectical Behavior Therapy, Acceptance and Commitment Therapy, Cognitive Behavioral Therapy, and mindfulness-based interventions are discussed. These interventions have demonstrated efficacy in enhancing emotional regulation across various clinical populations, equipping individuals with skills necessary to manage their emotions more effectively. Despite progress, challenges remain in the accurate assessment and cultural adaptation of treatments. Future research should focus on long-term outcomes and integrating technology to enhance interventions, ultimately aiming to improve emotion regulation and mental health outcomes. This comprehensive approach is essential for addressing the complexity of emotion dysregulation and improving psychological well-being.

Keywords: Emotion Regulation, Psychological Disorders, Therapeutic Interventions, Neurobiological Mechanisms.

Öz

Duygu düzenleme, bireylerin duygusal deneyimlerini yönetme ve bunlara yanıt verme süreçlerini içeren psikolojik iyi oluşun temel bir bileşenidir. Bu derleme, duygu düzenlemenin mekanizmalarını, klinik popülasyonların karşılaştığı zorlukları ve düzenleme becerilerini geliştirmek için tasarlanan terapötik müdahaleleri incelemektedir. Gross'un Süreç Modeli ve Duygu Düzenleme Teorisi gibi teorik modeller, duygu düzenlemeyi etkileyen bilişsel ve durumsal faktörler hakkında içgörüler sunmaktadır. Nörobiyolojik araştırmalar, prefrontal korteks ve amigdala gibi beyin bölgelerinin ve serotonin, dopamin ve norepinefrin gibi nörotransmitterlerin rollerini vurgulamaktadır. Değerlendirme yöntemleri, öz-bildirim anketlerinden davranışsal görevler ve fizyolojik ölçümlere kadar uzanmakta olup, Ekolojik Anlık Değerlendirme gibi yenilikçi yaklaşımlar gerçek dünya içgörülerini sunabilmektedir. Bilişsel yeniden değerlendirme gibi uyumlu stratejiler, duygusal sonuçları iyileştirirken baskılama gibi uyumsuz stratejiler stresi artırmaktadır. Duygu düzenleme güçlüğü, anksiyete, depresyon, travma sonrası stres bozukluğu, bipolar kişilik bozukluğu ve madde kullanımı bozuklukları gibi çeşitli rahatsızlıklarda benzersiz şekilde ortaya çıkabilmekte ve kişiye özel tedaviler gerektirebilmektedir. Diyalektik Davranış Terapisi, Kabul ve Kararlılık Terapisi, Bilişsel Davranışçı Terapi ve farkındalık temelli müdahaleler etkili terapiler olarak değerlendirilebilir. Bu müdahaleler, çeşitli klinik popülasyonlarda duygu düzenlemeyi geliştirmede etkinlik göstermiş, bireylerin duygularını daha etkili yönetmeleri için gerekli becerilerle donatabilmektedir. İlerleme kaydedilmesine rağmen, duygu düzenlemenin doğru değerlendirilmesi ve tedavilerin kültürel uyarlanması konularında zorluklar devam etmektedir. Gelecek araştırmaların, uzun vadeli sonuçları ve müdahaleleri geliştirmek için teknolojinin entegrasyonuna odaklanabileceği tavsiye edilebilir, nihayetinde duygu düzenlemeyi ve ruh sağlığı sonuçlarını iyileştirmek asıl amaçtır. Bu kapsamlı yaklaşım, duygusal düzensizliklerin karmaşıklığını ele almak ve psikolojik iyi oluşu artırmak için etkili bir strateji olarak değerlendirilebilir.

Anahtar Kelimeler: Duygu Düzenleme, Psikolojik Rahatsızlıklar, Terapötik Müdahaleler, Nörobiyolojik Mekanizmalar.

* Corresponding Author / Sorumlu Yazar: edavilmazer@beykoz.edu.tr

Article Info / Makale Bilgileri:

Received / Gönderim: 06.06.2024 Accepted / Kabul: 13.05.2025

To cite this article / Atf için:

Yılmaz, E. (2025). Emotion regulation in clinical populations: Mechanisms, challenges, and therapeutic interventions. *Curr Res Soc Sci*, 11(1), 1-38.

To link to this article / Bağlantı için:

<http://dx.doi.org/10.30613/curesosc.1496942>

Emotion Regulation in Clinical Populations: Mechanisms, Challenges, and Therapeutic Interventions

Emotion regulation is a fundamental aspect of psychological well-being (Greenier et al., 2021), encompassing the processes by which individuals influence their emotions—how they experience and express them (Fomina et al., 2020). It plays a critical role in daily functioning and is integral to mental health. Emotion regulation allows individuals to manage and adapt their emotional responses to meet the demands of their environment (Ferreira et al., 2020), thus facilitating goal-directed behavior and enhancing social interactions. However, in clinical populations, the capacity for effective emotion regulation is often impaired, leading to significant psychological distress and dysfunction (Lincoln et al., 2022).

This review seeks to explore the mechanisms underlying emotion regulation, focusing on the neurobiological and cognitive processes involved. It will examine the specific challenges faced by individuals with psychological disorders, such as anxiety, depression, Post-Traumatic Stress Disorder (PTSD), Bipolar Personality Disorder (BPD), and substance use disorders, where emotional dysregulation is a prominent feature. Additionally, the review will evaluate various therapeutic interventions designed to enhance emotional regulation skills, including Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), Cognitive Behavioral Therapy (CBT), and mindfulness-based approaches.

The need for this review arises from these theoretical and methodological gaps. Theoretical reviews serve several critical functions: they synthesize existing research to identify trends in the field, clarify conceptual ambiguities, introduce unfamiliar yet essential theoretical constructs, and comprehensively examine well-established concepts to highlight unresolved issues. Despite the growing body of research on emotion regulation, there remains a lack of a cohesive framework that integrates cognitive, neurobiological, and therapeutic perspectives. Furthermore, while various interventions—such as Dialectical Behavior Therapy, Acceptance and Commitment Therapy, and mindfulness-based approaches—have demonstrated efficacy in improving emotion regulation, challenges persist in assessing their long-term impact, cross-cultural applicability, and real-world implementation.

The present study aims to address these issues by providing a comprehensive theoretical review of emotion regulation mechanisms, challenges faced by clinical populations, and the effectiveness of current interventions. Specifically, this review will (1) examine the predominant theoretical models of emotion regulation, (2) evaluate the neurobiological underpinnings of regulation processes, (3) assess the measurement tools used in research and clinical practice, and (4) analyze the efficacy and limitations of therapeutic interventions. By synthesizing current knowledge and identifying areas requiring further exploration, this review will offer a structured perspective to guide future research and improve clinical interventions. Ultimately, this work seeks to enhance our understanding of emotion regulation, address existing gaps in literature, and contribute to the development of more effective assessment and treatment strategies.

By providing a comprehensive overview of the current understanding of emotion regulation in clinical populations, this article aims to highlight the importance of effective emotion regulation for mental health and the potential benefits of targeted therapeutic interventions. Understanding these aspects is crucial for clinicians and researchers alike, as it informs both the development of new treatment strategies and the refinement of existing ones, ultimately aiming to improve outcomes for individuals

struggling with emotion dysregulation. In this context, process model, emotion regulation model and neurobiologic models of emotion regulation will be examined.

Theoretical Perspectives on Emotion Regulation

In this section, various theoretical perspectives and approaches to emotion regulation will be explored.

Process Model

Emotion regulation has been extensively studied through various theoretical lenses, providing a robust framework for understanding its complexity (Park et al., 2023). These theoretical perspectives offer critical insights into the mechanisms and processes underlying how individuals manage and respond to their emotions. One of the most influential models in this domain is James Gross's Process Model of Emotion Regulation (Olderbak et al., 2023). This model outlines a sequence of steps involved in regulating emotions, emphasizing that regulation can occur at multiple points in the emotional response trajectory.

The first step in Gross's model is the selection of situations, where individuals choose which situations to enter or avoid based on the anticipated emotional outcomes (Gross, 2024). This proactive step allows individuals to manage their emotional experiences by seeking out environments that are likely to produce desired emotions and avoiding those that may lead to negative emotions. For example, someone might choose to attend a social event where they expect to feel joy and connection, while avoiding a potentially stressful confrontation at work.

Once in a situation, individuals can modify the situation to alter its emotional impact, the second step in the model. Situation modification involves making changes to the environment or the context to influence the emotional experience (Benita, 2020). This could involve altering aspects of the physical environment, such as adjusting lighting or seating arrangements, or changing social dynamics, such as redirecting a conversation to a more pleasant topic. By actively modifying situations, individuals can create conditions that are more conducive to positive emotional experiences.

The third step is deploying attention within the chosen or modified situation. Attention deployment refers to how individuals direct their focus within a given context to regulate their emotions (DiGirolamo et al., 2023). This can involve techniques such as distraction, where attention is diverted away from negative stimuli, or concentration, where focus is intensified on positive aspects of the situation. For instance, someone might focus on the supportive aspects of a challenging task to mitigate feelings of anxiety.

The fourth step involves changing one's cognitive appraisal of the situation. Cognitive appraisal is the process of interpreting and making sense of a situation in a way that influences its emotional impact (Chang, 2020). This step is crucial because how an individual thinks about a situation can significantly alter their emotional response. Cognitive reappraisal, a specific strategy within this step, involves reinterpreting a situation to change its emotional significance. For example, viewing a setback as a learning opportunity rather than a failure can reduce feelings of disappointment and foster resilience.

Finally, the fifth step in Gross's model is modulating the emotional response itself. This step includes various strategies to influence the intensity, duration, or expression of emotions after they have been generated. Techniques in this stage might involve using relaxation exercises to calm down after a stressful event, expressing emotions in socially acceptable ways, or engaging in activities that help to dissipate lingering negative emotions (Smith et al., 2022). By modulating their emotional responses, individuals can better align their emotional expressions with their goals and social contexts.

This process-oriented approach highlights the dynamic and multifaceted nature of emotional regulation. It underscores that regulation is not a single, static event but rather a series of ongoing adjustments that can occur at multiple points before, during, and after an emotional experience. Understanding this sequence provides a comprehensive framework for studying emotional regulation and developing interventions to enhance it. By recognizing that emotional regulation involves multiple stages, researchers and clinicians can better identify where individuals may struggle and tailor interventions to address specific points in the regulatory process (Hiebel et al., 2021).

In clinical populations, research has explored the application and efficacy of this model such as; **Neurofeedback Training**: A study investigated the use of simultaneous real-time functional MRI (fMRI) and electroencephalography (EEG) neurofeedback to enhance emotion regulation in patients with major depressive disorder. Participants learned to upregulate specific brain activities associated with positive emotions, leading to mood improvements. Emotion self-regulation training in major depressive disorder using simultaneous real-time fMRI and EEG neurofeedback (Zotev et. al. 2020). Another research has investigated the application of the process model of emotion regulation within clinical populations, focusing on interventions like Mindfulness-Oriented Recovery Enhancement (MORE) and neurofeedback training. MORE integrates mindfulness training, cognitive-behavioral therapy, and positive psychology to address addiction, chronic pain, and psychiatric symptoms. A meta-analysis of randomized controlled trials (RCTs) involving 816 participants demonstrated that MORE effectively reduces addictive behaviors, craving, opioid dosage, pain, and psychiatric symptoms (Parisi et al. 2022). These studies underscore the potential of interventions targeting specific stages of the emotion regulation process model to improve mental health outcomes in clinical settings.

Emotion Regulation Theory

Another significant theoretical framework in the study of emotional regulation is the Emotion Regulation Theory, which places a strong emphasis on the role of cognitive processes in managing emotions. This theory posits that the way individuals perceive and interpret emotional stimuli plays a crucial role in shaping their emotional responses (Wilms et al., 2020). According to this perspective, our thoughts about a situation can significantly influence the intensity and nature of our emotional reactions.

Central to the Emotion Regulation Theory are cognitive strategies such as reappraisal, which involves changing one's interpretation of a situation to alter its emotional impact. Reappraisal is considered an adaptive strategy because it allows individuals to modify their emotional responses by reframing the meaning of an event (Bodrogi et al., 2022). For example, if someone receives critical feedback at work, they might initially feel upset and defensive. However, by reappraising the feedback as constructive criticism intended to help them improve, they can reduce their emotional distress and respond more positively. This cognitive shift can transform a potentially negative experience into a more manageable and even beneficial one.

Reappraisal has been shown to have several beneficial effects on emotional regulation and overall psychological well-being. Research indicates that individuals who frequently use reappraisal experience lower levels of emotional distress, such as anxiety and depression, compared to those who use less adaptive strategies like suppression or rumination. By altering their interpretations of emotional stimuli, individuals can decrease the intensity of negative emotions and increase positive emotions, leading to enhanced psychological well-being (Vally & Ahmed, 2020).

The Emotion Regulation Theory also highlights the importance of flexibility in cognitive processes. Effective emotional regulation requires the ability to adaptively shift cognitive strategies based on the context and demands of a situation. For instance, while reappraisal might be effective in some situations, other strategies such as problem-solving or acceptance might be more appropriate in different contexts (Pruessner et al., 2020). This flexibility allows individuals to employ the most suitable cognitive strategy to manage their emotions effectively.

Furthermore, the theory underscores the interplay between cognitive processes and emotional experiences. It suggests that individuals who are more adept at identifying and understanding their emotions are better equipped to use cognitive strategies like reappraisal (Thomas et al., 2020). This emotional awareness provides a foundation for recognizing when and how to apply different regulation strategies. Conversely, those with less emotional awareness may struggle to implement effective cognitive strategies, leading to poorer emotion regulation.

The adaptive use of cognitive strategies such as reappraisal also has long-term benefits for mental health (Levin & Rawana, 2022). Regular practice of reappraisal can lead to more resilient emotional patterns, making individuals less susceptible to emotional disturbances. This resilience is particularly important in coping with chronic stressors and adversities, where effective emotion regulation can mitigate the impact of prolonged stress on mental health.

Overall, the Emotion Regulation Theory provides a comprehensive framework for understanding the crucial role of cognitive processes in managing emotions (Sheppes, 2020). It emphasizes the power of perception and interpretation in shaping emotional experiences and highlights the adaptive potential of cognitive strategies like reappraisal (Rompilla et al., 2022). This theory not only enhances our understanding of emotional regulation but also informs the development of effective therapeutic approaches to improve emotional health and well-being.

In clinical settings, these theoretical perspectives are invaluable for understanding the challenges faced by individuals with psychological disorders. For instance, the Process Model can explain why individuals with anxiety disorders may struggle to avoid or modify situations that trigger their anxiety, leading to persistent emotional distress (Hayes & Hofmann, 2021). Similarly, Emotion Regulation Theory can clarify why individuals with depression may find it difficult to reappraise negative situations, resulting in prolonged periods of sadness and hopelessness.

These theories also inform the development of therapeutic interventions aimed at improving emotional regulation. For example, interventions that teach cognitive reappraisal can help individuals with various disorders develop more adaptive ways of thinking about and responding to emotional stimuli (Volkaert et al., 2020). Similarly, therapies that focus on enhancing situational modification or attention deployment skills can provide individuals with practical tools for managing their emotions more effectively (Colombo et al., 2021).

Overall, these theoretical frameworks provide a comprehensive understanding of emotional regulation, highlighting the interplay between cognitive processes, situational factors, and emotional responses (Liu et al., 2021). This understanding is crucial for both diagnosing emotion regulation difficulties and designing effective interventions to address them. By grounding therapeutic approaches in these well-established theories, clinicians can better tailor their strategies to meet the specific needs of their clients, ultimately improving therapeutic outcomes and enhancing overall psychological well-being.

Integrating neurobiological mechanisms into the development of emotion regulation interventions is essential for enhancing their effectiveness. Neuroimaging studies have identified specific brain regions

associated with various emotion regulation strategies. For instance, both cognitive reappraisal and acceptance strategies engage the left inferior frontal gyrus and insula, while also showing distinct patterns of activity in other regions, reflecting

By comprehending these neural processes, clinicians can design interventions that target specific brain mechanisms, thereby enhancing the efficacy of therapeutic approaches. This neurobiological insight informs the development of tailored strategies that align with individual neural profiles, promoting more effective emotion regulation and overall psychological well-being.

Neurobiological Mechanisms

Understanding the neurobiological underpinnings of emotion regulation is essential for comprehending how emotional processes are managed and modulated within the brain. Several brain regions and neurotransmitter systems are involved in the regulation of emotions, each playing a distinct yet interconnected role in this complex process (Dong et al., 2022).

Understanding the neurobiological underpinnings of emotion regulation is essential for comprehending how emotional processes are managed and modulated within the brain. Several mechanisms, including specific brain regions such as the prefrontal cortex and the amygdala, as well as neurotransmitter systems like serotonin, dopamine, and norepinephrine, play distinct yet interconnected roles in this complex process.

Prefrontal Cortex

The prefrontal cortex (PFC) is a critical region for the cognitive control of emotions, playing a pivotal role in the processes that allow individuals to regulate their emotional responses effectively (Friedman & Robbins, 2022). This brain region is involved in higher-order executive functions such as planning, decision-making, and moderating social behavior, all of which are essential for effective emotional regulation. The PFC helps individuals to manage their emotions in a way that is adaptive and appropriate to their social and environmental context.

Within the PFC, the dorsolateral prefrontal cortex (dlPFC) is particularly important for cognitive reappraisal (Steward et al., 2021). Cognitive reappraisal is a strategy that involves changing one's interpretation of a situation to alter its emotional impact. For example, by reinterpreting a stressful event as a challenge rather than a threat, individuals can reduce their emotional distress (Wang et al., 2023). The dlPFC facilitates this process by engaging in the cognitive tasks necessary for reappraisal, such as analyzing the situation, generating alternative perspectives, and suppressing initial emotional responses (Zhao et al., 2021). This ability to reframe situations cognitively is crucial for maintaining emotional balance and preventing negative emotions from becoming overwhelming.

The ventromedial prefrontal cortex (vmPFC) and the orbitofrontal cortex (OFC) are also key players in the neural network that supports emotional regulation (Nejati et al., 2021). The vmPFC is involved in evaluating emotional stimuli and integrating this information to guide behavior. It helps in assessing the emotional value of different stimuli and making decisions that are congruent with one's goals and social norms. For instance, the vmPFC helps individuals determine whether a particular emotional response is appropriate in each social context and whether it aligns with long-term objectives (Alexander et al., 2023). This region is also associated with the regulation of fear and the extinction of conditioned fear responses, making it essential for adaptive emotional regulation.

The OFC, on the other hand, is implicated in the processing of rewards and punishments, which influences decision-making based on emotional information. It plays a role in evaluating the potential outcomes of different actions and using this information to guide future behavior (Ishikawa et al., 2020). The OFC helps individuals to anticipate the emotional consequences of their actions and make choices that maximize positive outcomes and minimize negative ones. For example, when deciding how to respond to a potentially upsetting situation, the OFC helps weigh the possible emotional repercussions and select a response that is likely to result in the least distress.

Together, these regions of the PFC work in concert to support the cognitive processes underlying emotional regulation. They enable individuals to interpret emotional stimuli accurately, generate appropriate emotional responses, and adjust these responses as needed to fit the context (Menon & D'Esposito, 2022). This neural network's functionality is crucial for maintaining psychological health and well-being, as it allows for the flexible and adaptive management of emotions in daily life.

Moreover, dysfunction in these areas of the PFC is often associated with various emotion regulation difficulties and psychiatric disorders (Weis et al., 2022). For instance, impaired functioning of the dlPFC can lead to challenges in cognitive reappraisal, resulting in increased susceptibility to anxiety and depression (De la Peña-Arteaga et al., 2021). Similarly, abnormalities in the vmPFC and OFC are linked to conditions such as obsessive-compulsive disorder (OCD) (Acevedo et al., 2021) and BPD (Šimić et al., 2021), where individuals struggle with evaluating emotional stimuli and making adaptive decisions based on emotional information.

Understanding the roles of different PFC regions in emotion regulation not only provides insights into the neural mechanisms underlying these processes but also informs the development of targeted interventions. Therapeutic approaches such as CBT often focus on enhancing cognitive reappraisal and other executive functions supported by the PFC. By strengthening these neural pathways, such interventions can improve emotion regulation and overall mental health.

The Amygdala

The amygdala, a small almond-shaped structure located deep within the brain, is central to the detection and initial response to emotional stimuli, especially those perceived as threatening (Inman et al., 2020). It plays a pivotal role in the rapid, automatic processing of emotions, serving as an early warning system that alerts the brain to potential dangers (Bertini & Lâdavas, 2021). This swift response is crucial for survival, as it allows for immediate reactions to threats, such as the fight-or-flight response. The amygdala is particularly associated with the processing of fear and anxiety, rapidly evaluating sensory information and triggering appropriate emotional and physiological responses.

The interaction between the PFC and the amygdala is crucial for effective emotion regulation (Berboth & Morawetz, 2021). While the amygdala is responsible for the quick and automatic detection of emotional stimuli, the PFC provides a higher-order, cognitive layer of control over these emotional responses. The PFC can exert top-down control over the amygdala, helping to modulate and dampen emotional reactions. This interaction facilitates more adaptive behavior by allowing individuals to assess situations more thoroughly and respond in a manner that is congruent with their long-term goals and social norms.

The PFC's regulatory influence on the amygdala involves several mechanisms. For instance, when an individual is faced with a threatening situation, the amygdala may trigger an immediate fear response (Murray & Fellows, 2022). However, the PFC can reassess the situation and determine whether the threat is real or exaggerated. If the PFC concludes that the threat is not as severe as initially perceived,

it can send inhibitory signals to the amygdala, reducing the intensity of the emotional response (Alexandra et al., 2022). This process is essential for preventing overreactions to non-threatening stimuli and for managing stress and anxiety in a controlled manner.

Moreover, the PFC aids in the implementation of cognitive strategies such as reappraisal, which can alter the emotional impact of a situation. For example, reinterpreting a stressful event in a more positive or neutral light involves the PFC's engagement in higher-order thinking and problem-solving (Wessa et al., 2022). This cognitive reappraisal helps to calm the amygdala's response, promoting a more balanced emotional state. The ability of the PFC to modulate the amygdala's activity is thus fundamental to adaptive emotion regulation and effective coping strategies.

Disruptions in the PFC-amygdala interaction can lead to difficulties in emotion regulation and are implicated in various psychiatric conditions. For instance, individuals with anxiety disorders often exhibit hyperactivity in the amygdala along with hypoactivity in the PFC (Kim & Kim, 2021). This imbalance results in heightened fear and anxiety responses that are difficult to control. Similarly, in conditions such as depression, the reduced regulatory capacity of the PFC over the amygdala can contribute to persistent negative emotional states and impaired stress management.

Understanding the interplay between the PFC and the amygdala is critical for developing therapeutic interventions aimed at improving emotional regulation. Cognitive-behavioral therapies, for example, often focus on enhancing the PFC's ability to regulate the amygdala through cognitive restructuring and mindfulness practices (Goldin et al., 2021). These therapies help individuals develop skills to reinterpret negative experiences and reduce the intensity of their emotional responses. Additionally, neurofeedback and other techniques that directly target brain function may help strengthen the PFC's regulatory capacity, providing more effective control over amygdala-driven emotional reactions (Kirlic et al., 2021).

Neurotransmitters

Neurotransmitters such as serotonin, dopamine, and norepinephrine play significant roles in the complex processes of emotional regulation (Azizi, 2022). These chemical messengers facilitate communication between neurons and are crucial for various aspects of mood and emotional response.

Serotonin, for example, is deeply involved in mood regulation and has been extensively linked to the modulation of emotional responses (Roberts et al., 2020). It helps stabilize mood, feelings of well-being, and happiness. Dysregulation of the serotonergic system is associated with several mood disorders, including depression and anxiety (Otsuka et al., 2022). For instance, lower levels of serotonin are often found in individuals suffering from depression, which is why many antidepressants, such as selective serotonin reuptake inhibitors (SSRIs), work by increasing serotonin levels in the brain. By enhancing serotonin availability, these medications help to alleviate symptoms of depression and anxiety, promoting better emotional balance and stability.

Dopamine is another critical neurotransmitter, essential for reward processing and motivation. It influences how individuals experience pleasure and approach goals, which are fundamental components of emotional regulation (Sander & Nummenmaa, 2021). Dopamine pathways in the brain, particularly those connecting the ventral tegmental area to the nucleus accumbens (known as the mesolimbic pathway), play a key role in the reward system. This system helps regulate behaviors by reinforcing activities that are pleasurable or rewarding, thus motivating individuals to engage in goal-directed behavior. Dysfunctions in the dopaminergic system can lead to issues such as anhedonia (the inability

to feel pleasure) and a lack of motivation, which are common symptoms in conditions like depression and schizophrenia.

Norepinephrine, also known as noradrenaline, is involved in the body's stress response and plays a crucial role in regulating arousal and alertness. It helps the body respond to stress by increasing heart rate, releasing glucose from energy stores, and increasing blood flow to skeletal muscles. This neurotransmitter is vital for managing emotions effectively, as it prepares the body and mind to respond to stressors (Ross & Van Bockstaele, 2021). High levels of norepinephrine are associated with heightened arousal and alertness, which can be beneficial in short-term stress situations but problematic if chronic, contributing to anxiety and hypervigilance. Conversely, low levels of norepinephrine can result in a lack of energy and alertness, contributing to feelings of lethargy and depression.

The interplay between these neurotransmitters is complex and highlights the intricate balance required for optimal emotional regulation. For example, serotonin and dopamine systems interact in ways that can influence mood and behavior (Muller & Cunningham, 2020). While serotonin can help modulate dopamine's effects, ensuring that reward-seeking behavior does not become excessive, dopamine's role in reward processing can influence how serotonin affects mood regulation (Liu et al., 2020). Similarly, norepinephrine's role in arousal and alertness can interact with serotonin and dopamine to impact mood and motivation, illustrating the multifaceted nature of neurotransmitter interactions in emotional regulation.

Understanding the roles of these neurotransmitters in emotional regulation has significant implications for treating mood disorders. Pharmacological treatments often aim to restore the balance of these neurotransmitters to improve emotional regulation and overall mental health (Küpeli Akkol et al., 2021). For example, SSRIs increase serotonin levels to treat depression, while medications that affect dopamine levels are used in the treatment of conditions like Parkinson's disease and schizophrenia (de la Mora et al., 2020). Additionally, norepinephrine reuptake inhibitors (NRIs) can be used to address issues related to attention deficit hyperactivity disorder (ADHD) and depression by enhancing alertness and mood (Hu et al., 2021).

Neuroimaging studies have provided valuable insights into how these brain regions and neurotransmitter systems interact during emotional regulation tasks (Murnane et al., 2023). Functional magnetic resonance imaging (fMRI) and positron emission tomography (PET) scans have revealed patterns of brain activity associated with different emotional regulation strategies (Grill et al., 2021). For instance, individuals who effectively use cognitive reappraisal tend to show increased activation in the PFC and decreased activation in the amygdala (Hassa et al., 2021). Conversely, those who rely on maladaptive strategies like suppression may exhibit different patterns of brain activation, highlighting the neural basis of these regulatory processes (Laumann & Snyder, 2021).

In clinical populations, abnormalities in these neurobiological mechanisms are often observed. For instance, individuals with anxiety disorders may show hyperactivation of the amygdala in response to threatening stimuli, coupled with hypoactivation of the PFC, indicating reduced top-down control. Similarly, those with depression may exhibit altered serotonergic function and impaired connectivity between the PFC and other brain regions involved in emotional regulation (Daffre et al., 2020).

Understanding these neurobiological mechanisms is crucial for developing targeted interventions that can enhance emotional regulation. Techniques such as neurofeedback, which trains individuals to modulate their brain activity, and pharmacological treatments aimed at balancing neurotransmitter levels, offer promising avenues for improving emotional regulation in clinical populations. By

continuing to explore the neurobiological basis of emotional regulation, researchers and clinicians can develop more effective strategies for helping individuals manage their emotions and improve their psychological well-being.

Understanding these neurobiological mechanisms is crucial for developing targeted interventions that can enhance emotional regulation. By continuing to explore the neurobiological basis of emotional regulation, researchers and clinicians can develop more effective strategies for helping individuals manage their emotions and improve their psychological well-being. Building upon this foundation, the subsequent section delves into the assessment and measurement of emotional regulation, highlighting the importance of accurate evaluation in developing effective interventions.

Assessment and Measurement of Emotional Regulation

Evaluating emotion regulation in clinical populations requires a multifaceted approach, incorporating various tools and methods to capture the complexity of emotional experiences and regulation strategies. Accurate assessment is crucial for diagnosing emotion dysregulation, guiding treatment planning, and evaluating the effectiveness of interventions (Reichenberg & Seligman, 2016).

Specifically, this section will focus on self-report questionnaires, behavioral tasks, physiological measures, and ecological assessments as key tools for measuring emotional regulation.

Self-Report

Self-report questionnaires are among the most commonly used tools for assessing emotion regulation, providing valuable insights into how individuals perceive and manage their emotions (Phillips & Power, 2007). These instruments rely on individuals' subjective accounts of their emotional experiences and the strategies they use to regulate their emotions, offering a practical and accessible method for gathering data on emotion regulation processes.

This section will focus on the Emotion Regulation Questionnaire (ERQ) and the Difficulties in Emotion Regulation Scale (DERS), two widely used self-report measures for assessing emotional regulation.

The Emotion Regulation Questionnaire (ERQ) is one widely used self-report measure that assesses the frequency of two specific emotion regulation strategies: cognitive reappraisal and expressive suppression (Sörman et al., 2022). Cognitive reappraisal involves changing the way one thinks about a situation to alter its emotional impact, while expressive suppression involves inhibiting the outward expression of emotions. The ERQ helps researchers and clinicians understand how often individuals employ these strategies and how they relate to emotional outcomes and psychological well-being.

Another popular self-report tool is the Difficulties in Emotion Regulation Scale (DERS). The DERS evaluates multiple dimensions of emotional regulation difficulties, providing a comprehensive assessment of various aspects of emotion regulation (Dan-Glauser & Scherer, 2012). It includes items that measure non-acceptance of emotional responses, which assesses the extent to which individuals experience negative secondary emotions (such as shame or guilt) in response to their primary emotional reactions. The DERS also evaluates difficulties engaging in goal-directed behavior, assessing how well individuals can maintain focus and pursue goals when experiencing negative emotions (Hallion et al., 2018). Additionally, it measures impulse control difficulties, which looks at individuals' ability to control their behaviors when experiencing strong emotions, and lack of emotional awareness, which assesses how well individuals recognize and understand their own emotions. Other dimensions include limited access to emotion regulation strategies, evaluating whether individuals feel they have effective

ways to regulate their emotions when upset, and lack of emotional clarity, measuring how clearly individuals understand the emotions they are experiencing.

While self-report questionnaires like the ERQ and DERS provide valuable insights into individuals' perceptions of their emotional regulation, they are subject to several limitations and biases. One significant limitation is social desirability bias, where individuals may respond in ways they believe are more socially acceptable or favorable rather than providing accurate accounts of their true experiences. For instance, someone might underreport their use of expressive suppression because it is often viewed negatively. Another limitation is self-awareness. The accuracy of self-report data depends on individuals' ability to accurately reflect on and report their emotional experiences and regulation strategies (Goldenberg et al., 2006). Some individuals may lack the introspective capacity to fully understand their emotional processes, leading to incomplete or inaccurate responses. For example, individuals with alexithymia (a condition characterized by difficulties in identifying and describing emotions) may struggle to accurately complete self-report questionnaires on emotional regulation.

Despite these limitations, self-report questionnaires remain a widely used and valuable tool in both research and clinical settings. They provide a straightforward and cost-effective method for assessing emotional regulation across large groups of people, making them ideal for epidemiological studies and initial screenings in clinical practice. Furthermore, self-report measures can be complemented with other assessment methods, such as behavioral tasks and physiological measures, to provide a more comprehensive understanding of emotional regulation.

In clinical practice, self-report questionnaires can help identify areas where individuals may be struggling with emotional regulation and guide the development of personalized intervention plans (Bettis et al., 2022). For example, a high score on the DERS subscale for impulse control difficulties might indicate a need for interventions focused on enhancing self-control and distress tolerance skills. Similarly, a low score on the emotional awareness subscale could suggest the benefit of mindfulness-based interventions aimed at increasing emotional awareness and clarity.

Behavioral Tasks

Behavioral tasks offer a more objective measure of emotion regulation by directly observing how individuals respond to controlled emotional stimuli in a structured environment (Aldao, 2013). These tasks are designed to elicit specific emotional responses and then assess the effectiveness of various regulation strategies in managing those emotions. By capturing real-time data on participants' behaviors and physiological reactions, behavioral tasks provide a richer and more nuanced understanding of emotional regulation processes.

Within this context, the Emotion Regulation Task and the Trier Social Stress Test will be examined.

One commonly used behavioral task is the Emotion Regulation Task where participants are presented with emotionally evocative images or scenarios designed to provoke specific emotional responses, such as sadness, anger, or fear (Ziv et al., 2013). Participants are then instructed to employ specific emotion regulation strategies, such as cognitive reappraisal (reinterpreting the meaning of the emotional stimulus to reduce its impact) or expressive suppression (inhibiting the outward expression of the emotional response). Researchers record and analyze participants' behavioral responses, such as facial expressions, eye movements, and reaction times, to determine the effectiveness of the regulation strategies being used (Harms et al., 2010). For instance, a participant may be shown a distressing image and asked to reframe it in a more positive light. Their ability to change their facial expression from

distressed to neutral or positive, and the time it takes to do so, provides valuable data on their emotion regulation capacity.

Another valuable approach involves the use of experimental paradigms that manipulate emotion regulation demands, such as the Trier Social Stress Test (TSST). The TSST is designed to induce stress in a controlled laboratory setting. Participants are typically asked to perform a public speaking task and complete a series of challenging mental arithmetic problems in front of an evaluative audience. This setup reliably induces stress, allowing researchers to observe how participants regulate their emotions under pressure (Frisch et al., 2015). During the TSST, researchers measure both physiological responses (such as heart rate, cortisol levels, and skin conductance) and behavioral responses (such as verbal fluency, posture, and facial expressions). By examining these responses, researchers can assess the participants' ability to manage stress and maintain emotion regulation in a high-pressure situation.

These behavioral tasks provide valuable real-time data on how individuals regulate their emotions, offering insights that complement and extend beyond self-report measures. While self-report questionnaires rely on individuals' retrospective accounts of their emotional experiences and emotion regulation strategies, behavioral tasks capture immediate responses to emotional stimuli, reducing the potential for recall bias and social desirability effects. For example, a person may report using cognitive reappraisal effectively in a self-report measure, but their performance in a behavioral task may reveal difficulties in applying this strategy in real-time. Moreover, behavioral tasks can be used to identify specific patterns of emotion dysregulation associated with different psychological disorders. For instance, individuals with anxiety disorders may exhibit heightened and prolonged physiological arousal in response to stress-inducing tasks like the TSST, indicating difficulties in down-regulating their emotional responses (Long et al., 2020). Similarly, individuals with depression might show a slower recovery to baseline emotional states after exposure to negative stimuli in the Emotion Regulation Task, reflecting persistent negative affect and impaired emotion regulation.

Although behavioral task measurements are commonly used in psychological and cognitive research to assess various aspects of human behavior, cognition, and performance, they come with several limitations. One of the main drawbacks is the considerable amount of time needed for data collection. Additionally, the accuracy and validity of these measurements often depend on the researcher's expertise and ability to properly administer the tasks. Some behavioral tasks also require subjective interpretation by the researcher, which can introduce bias into the results.

In clinical practice, behavioral tasks can also be used to assess the effectiveness of therapeutic interventions aimed at improving emotional regulation (David et al., 2022). By administering these tasks before and after treatment, clinicians can objectively evaluate changes in clients' emotion regulation abilities. Improvements in task performance, such as quicker and more effective use of regulation strategies and reduced physiological arousal, can provide evidence of therapeutic progress. Additionally, these tasks can help identify specific regulation deficits that need to be targeted in therapy, allowing for more personalized and effective intervention plans.

Physiological Measures

Physiological measures capture the bodily correlates of emotion regulation, providing a more nuanced understanding of the underlying processes involved in how individuals manage their emotions (Pace-Schott et al., 2019). These measures offer objective data that can complement self-report and behavioral assessments, leading to a more comprehensive picture of emotional regulation. Common physiological measures include heart rate variability (HRV) (Pham et al., 2021), skin conductance (Figner & Murphy,

2011), and electroencephalography (EEG) (Charles & Nixon, 2019), each of which shed light on different aspects of the body's response to emotional stimuli.

HRV is one of the most widely used physiological indicators of emotion regulation. HRV reflects the variability in the time intervals between consecutive heartbeats, which is influenced by the autonomic nervous system. The autonomic nervous system has two branches: the sympathetic nervous system, which prepares the body for fight or flight responses, and the parasympathetic nervous system, which promotes rest and digestion (Wehrwein et al., 2016). A higher HRV indicates a greater ability of the autonomic nervous system to adapt to changing circumstances, suggesting greater flexibility in emotion regulation. Conversely, lower HRV is associated with reduced autonomic flexibility and is often linked to emotion dysregulation. For example, individuals with anxiety or depression frequently exhibit lower HRV, reflecting their difficulty in adapting to stress and regulating their emotions effectively.

Skin conductance, also known as galvanic skin response (GSR), measures the electrical conductance of the skin, which varies with the level of sweat gland activity (Sharma et al., 2016). Since sweat gland activity increases with emotional arousal, skin conductance provides a direct measure of physiological arousal in response to emotional stimuli. Higher skin conductance levels are typically observed during states of high emotional arousal, such as stress or excitement, indicating increased sympathetic nervous system activity. By tracking changes in skin conductance, researchers can gain insights into how individuals physiologically respond to and recover from emotional challenges.

EEG measures brain wave activity by detecting electrical signals on the scalp. EEG provides valuable information about the neural processes underlying emotion regulation. For instance, increased frontal alpha asymmetry is associated with approach-oriented emotions and positive affect, while increased right frontal activity is linked to withdrawal-oriented emotions and negative affect (Harmon-Jones et al., 2010). This asymmetry reflects the differential activation of the brain's frontal regions, which play a critical role in emotion processing and regulation. By examining patterns of brain wave activity, researchers can infer how different emotional states are represented and regulated in the brain.

Each of these physiological measures offers unique insights into the mechanisms of emotion regulation. HRV captures the dynamic interplay between the sympathetic and parasympathetic branches of the autonomic nervous system, highlighting the body's capacity for adaptive emotional responses (Cornes, 2023). Skin conductance provides a direct measure of emotional arousal, reflecting the intensity of the body's immediate response to emotional stimuli. EEG reveals the neural correlates of emotion regulation, showing how different brain regions contribute to the regulation of emotions.

Together, these physiological measures enhance our understanding of emotion regulation by providing objective data that can be used to validate and complement subjective self-report and behavioral observations. For example, an individual may report feeling calm, but physiological measures such as HRV and skin conductance might reveal underlying autonomic arousal, suggesting that the individual is experiencing unrecognized stress (Wearne et al., 2019). Similarly, EEG data can help identify neural patterns associated with successful emotional regulation, which can inform the development of targeted interventions.

Physiological task measurements also come with their own set of challenges. One significant limitation is the high cost of the required equipment, which can make these methods less accessible, particularly for researchers with limited budgets. Additionally, interpreting the results of physiological measurements often demands specialized training. Without this expertise, it can be difficult to

accurately analyze the data and draw meaningful conclusions, which can make the process more complex and prone to error.

In clinical settings, physiological measures can be used to assess the effectiveness of therapeutic interventions aimed at improving emotion regulation. For instance, a therapy that successfully enhances HRV and reduces skin conductance levels would indicate improved autonomic regulation and reduced physiological arousal in response to stress. These objective measures can provide valuable feedback to both clinicians and clients, helping to track progress and tailor interventions to individual needs.

Ecological Assessment

Ecological Momentary Assessment (EMA) is an innovative approach that captures emotion regulation in real-world settings (Shiffman et al., 2008). EMA involves repeatedly sampling individuals' emotional states and regulation strategies in their natural environments using smartphones or other digital devices. This method reduces recall bias and provides a more ecologically valid picture of emotion regulation as it occurs in daily life. EMA can track fluctuations in emotional states and regulation efforts in response to everyday stressors and events, offering rich data on the temporal dynamics of emotion regulation (Ebner-Priemer & Trull, 2009). Other studies have investigated the use of EMA in understanding the relationship between emotional states and behaviors, such as substance use, physical activity, or eating habits, in naturalistic settings (Stone et al., 2007). These studies have highlighted EMA's ability to track momentary changes and provide an in-depth understanding of how individuals regulate their emotions throughout the day. While EMA offers many advantages, such as its high ecological validity and real-time data collection, its use also comes with challenges. One significant limitation is the potential burden placed on participants. The repeated sampling of emotional states and regulation strategies throughout the day can be intrusive, and participants may become fatigued or less compliant over time. Additionally, the effectiveness of EMA is highly dependent on the study design. Poorly timed prompts, ambiguous questions, or excessive frequency of assessments can lead to participant dropout or inaccuracies in the collected data.

While each of these assessment methods has its strengths, they also have limitations. Therefore, combining multiple assessment methods can provide a comprehensive understanding of emotion regulation, leveraging the strengths of each approach while mitigating their limitations (Roshdy et al., 2024). For instance, integrating self-report measures with behavioral tasks and physiological recordings can offer a holistic view of how individuals regulate their emotions across different contexts and time points. Such a multi-method approach is particularly valuable in clinical settings, where a detailed understanding of emotion regulation is essential for accurate diagnosis and effective treatment planning.

Advancements in assessment techniques continue to enhance our ability to measure emotion regulation more accurately and comprehensively. The development of more sophisticated and user-friendly digital tools, along with improvements in data analytics, promises to further refine our understanding of emotion regulation and its impact on mental health. By continually improving assessment methods, researchers and clinicians can better support individuals in managing their emotions and achieving better psychological outcomes.

Upon reviewing the theoretical frameworks, underlying mechanisms, and measurement techniques associated with emotion regulation, attention now shifts toward clinical populations. This transition to clinical applications is pivotal for bridging the gap between theoretical knowledge and practical implementation, facilitating the translation of insights from emotion regulation research into effective strategies for enhancing mental health within clinical contexts. A comprehensive understanding of these

dynamics is essential for the development of individualized interventions that address the distinct needs of individuals experiencing emotional difficulties.

Emotion Regulation Strategies in Clinical Populations

Emotion regulation involves a range of strategies that individuals use to manage and modify their emotional experiences. These strategies can be broadly categorized into cognitive and behavioral approaches, each with its own implications for psychological health. In clinical populations, the use of these strategies varies significantly, often contributing to the persistence of emotion dysregulation and associated mental health issues (Hughes et al., 2020) including cognitive strategies, mindfulness, and acceptance-based approaches and suppression.

Cognitive Strategies

Cognitive strategies for emotion regulation include techniques such as cognitive reappraisal, which involves changing the way one thinks about a situation to alter its emotional impact (Rodriguez et al., 2020). Reappraisal is generally considered an adaptive strategy because it allows individuals to reinterpret potentially distressing situations in a more positive or neutral light, thereby reducing their emotional intensity (Roos & Bennett, 2023). For example, someone might view a challenging work project not as a source of stress, but as an opportunity for growth and development. This shift in perspective can significantly decrease feelings of anxiety and stress associated with the project.

Research has consistently shown that cognitive reappraisal is associated with better psychological outcomes, including lower levels of anxiety and depression, and greater overall well-being (Riepenhausen et al., 2022). Studies have demonstrated that individuals who frequently use reappraisal experience less emotional distress and exhibit more resilience in the face of adversity. This strategy is effective because it helps individuals maintain a sense of control over their emotional experiences, which is crucial for psychological health.

Cognitive reappraisal engages the prefrontal cortex, a brain region involved in higher-order executive functions such as planning, decision-making, and regulating social behavior (Salehinejad et al., 2021). The prefrontal cortex helps to modulate the activity of the amygdala, the brain's emotional center responsible for detecting and responding to threats (Dixon & Dweck, 2022). By reinterpreting a situation, the prefrontal cortex can downregulate the amygdala's response, thereby reducing the emotional intensity of the experience. For instance, during a potentially threatening situation, an individual might use reappraisal to convince themselves that the threat is not as severe as it appears, which in turn dampens the fear response generated by the amygdala.

Furthermore, cognitive reappraisal has been linked to numerous long-term benefits. It fosters greater emotional stability and helps build psychological resilience (Stover et al., 2024). By regularly practicing reappraisal, individuals can develop a habit of looking at life events through a more balanced and less distressing lens. This habitual positive reinterpretation of events can lead to lasting improvements in emotional health and well-being.

In clinical settings, cognitive reappraisal is a key component of many therapeutic approaches, including CBT (Goldin et al., 2013). Therapists often work with clients to identify and challenge negative thought patterns and to replace them with more adaptive interpretations. This process not only alleviates immediate emotional distress but also equips clients with tools to handle future emotional challenges more effectively.

Mindfulness and Acceptance-based Approaches

Mindfulness and acceptance-based approaches have gained prominence as effective strategies for improving emotional regulation (Simione & Saldarini, 2023). These approaches focus on enhancing individuals' awareness and acceptance of their present-moment experiences, including thoughts, emotions, and bodily sensations, without judgment or the urge to alter them.

Mindfulness involves maintaining a non-judgmental awareness of the present moment, including one's thoughts, feelings, and bodily sensations (İnce & Demir, 2023). This practice encourages individuals to observe their internal experiences as they unfold, fostering a deeper understanding and connection with their emotional states. By staying present and attentive, individuals can recognize and acknowledge their emotions without becoming overwhelmed by them. For instance, during a moment of anxiety, a mindful approach would involve noticing the sensations of tension in the body and the racing thoughts, but rather than trying to suppress these feelings, simply observing them and allowing them to be.

Acceptance-based strategies complement mindfulness by encouraging individuals to experience their emotions fully without trying to change or avoid them, fostering a sense of openness and acceptance (Polizzi et al., 2020). These strategies are based on the understanding that attempting to resist or control emotions often leads to increased distress and emotional dysregulation. Instead, acceptance involves embracing emotions as they are, even if they are unpleasant, which can paradoxically reduce their intensity and impact. For example, someone feeling sad might practice acceptance by acknowledging their sadness, understanding that it is a natural emotional response, and allowing themselves to feel it without judgment or resistance.

These approaches are particularly beneficial for individuals with clinical disorders, as they help reduce the tendency to engage in maladaptive regulation strategies such as rumination and avoidance (Aldao et al., 2010). Rumination involves repetitively focusing on distressing thoughts and feelings, which can exacerbate emotional distress and contribute to conditions like depression and anxiety. Avoidance, on the other hand, involves efforts to escape from or ignore unpleasant emotions, which can prevent effective coping and lead to further emotional difficulties. Mindfulness and acceptance help individuals break these patterns by fostering a healthier relationship with their emotions (Strosahl & Robinson, 2017).

Mindfulness practices activate brain regions associated with self-regulation and emotional awareness, such as the anterior cingulate cortex (ACC) and insula, promoting greater emotional stability (Grecucci et al., 2015). The ACC is involved in monitoring and regulating attention, detecting conflicts, and managing emotional responses, making it a crucial player in emotional regulation. The insula is associated with interoceptive awareness, or the ability to sense internal bodily states, which is important for recognizing and understanding emotional experiences. By engaging these brain regions, mindfulness practices enhance individuals' capacity to regulate their emotions effectively.

Research has shown that regular mindfulness practice can lead to structural and functional changes in the brain, supporting better emotional regulation (Wheeler et al., 2017). For example, studies have found increased gray matter density in the ACC and insula among individuals who regularly practice mindfulness, suggesting enhanced neural connectivity and efficiency in these areas. These changes are associated with improved emotional stability, reduced reactivity to stress, and greater overall well-being.

In clinical practice, mindfulness and acceptance-based approaches are integrated into various therapeutic modalities, including Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-

Based Cognitive Therapy (MBCT). MBSR involves structured mindfulness practices, such as meditation and body scans, aimed at reducing stress and improving emotional regulation. MBCT combines mindfulness practices with cognitive therapy techniques to prevent relapse in individuals with recurrent depression. Both approaches have been shown to be effective in enhancing emotional regulation, reducing symptoms of anxiety and depression, and improving overall mental health (Salmon et al., 2011).

Suppression

In contrast, suppression is a behavioral strategy that involves inhibiting the outward expression of emotions (Sikka et al., 2022). This means that while an individual might feel strong emotions internally, they deliberately prevent these feelings from being visible to others. For example, someone might hide their anger during a conflict by maintaining a neutral facial expression and calm tone of voice, even though they are feeling highly agitated inside.

While suppression can be effective in certain short-term contexts, such as maintaining composure during a professional meeting or avoiding conflict in a volatile situation, it is generally regarded as maladaptive when used as a primary emotional regulation strategy (Cavicchioli et al., 2021). The chronic use of suppression tends to have several negative consequences. Physiologically, it is associated with increased arousal, including heightened heart rate and blood pressure, as the body continues to experience the suppressed emotion without the relief that typically comes from expressing it. This sustained arousal can strain the cardiovascular system and contribute to long-term health issues.

Psychologically, suppression can lead to elevated levels of anxiety, depression, and stress (Tyra et al., 2023). Because suppression involves pushing emotions away rather than dealing with them directly, it does not resolve the underlying emotional experience. Over time, this can lead to a build-up of unexpressed emotions, which may eventually manifest in more intense and uncontrolled ways. For instance, someone who consistently suppresses feelings of sadness might find that these feelings intensify and lead to bouts of depression, or someone who suppresses anger might experience sudden, explosive outbursts when they can no longer contain their feelings.

Research also suggests that suppression can have detrimental effects on social interactions and relationships (Butler et al., 2003). By not expressing emotions, individuals can appear distant or disengaged, which can hinder effective communication and connection with others. This can lead to misunderstandings and conflicts, as well as feelings of isolation and loneliness.

Furthermore, suppression can create a feedback loop where the effort to suppress emotions increases the intensity of those emotions (Gross & Levenson, 1993). The more an individual tries to avoid thinking about or feeling a particular emotion, the more attention they may inadvertently give it, making it harder to suppress. This paradoxical effect can exacerbate the very emotions the individual is trying to manage.

In clinical settings, addressing the reliance on suppression involves helping individuals develop more adaptive emotional regulation strategies. Therapies such as CBT and DBT emphasize the importance of recognizing, accepting, and expressing emotions in healthy ways (Fruzzetti et al., 2009). Clients are taught to identify their emotions, understand the context and triggers, and find constructive ways to express and cope with their feelings. This approach helps to reduce the physiological and psychological burdens associated with chronic suppression.

Emotion Dysregulation in Specific Psychological Disorders

If these strategies are not effectively applied, individuals may struggle more with emotion regulation, which can worsen the course of different psychological disorders.

Emotion dysregulation is a pervasive issue across a range of psychological disorders, each characterized by unique challenges and manifestations (Sharma & McClellan, 2021). Understanding how emotion dysregulation presents in these disorders is crucial for developing targeted interventions and improving patient outcomes. Emotion regulation plays a critical role in the onset and maintenance of various psychological disorders. Conditions such as anxiety, depression, post-traumatic stress disorder (PTSD), borderline personality disorder, and substance use disorders, among others, are often influenced by the individual's ability to effectively manage and regulate their emotions.

Anxiety and Depression

In anxiety and depressive disorders, emotion dysregulation often manifests as heightened emotional responses and difficulty returning to a baseline state after experiencing emotional arousal (Deckert et al., 2020). This means that individuals with these disorders frequently remain in a state of heightened emotional intensity long after the initial trigger has passed, making it challenging to regain emotional stability. For those with anxiety disorders, such as generalized anxiety disorder (GAD) and social anxiety disorder, this dysregulation is characterized by pervasive and intense fear and worry that are often disproportionate to any actual threat (Horenstein & Heimberg, 2020). These individuals are prone to maladaptive cognitive processes like catastrophizing, where they may interpret relatively minor events as disastrous, and hypervigilance, which involves an exaggerated state of alertness and constant scanning for potential threats. For instance, a person with social anxiety might view a small social blunder as catastrophic, triggering excessive anxiety and leading to avoidance behaviors to prevent future occurrences of such distress. In the context of depressive disorders, emotional dysregulation presents itself through persistent feelings of sadness, hopelessness, and a marked inability to experience pleasure, a condition known as anhedonia. These individuals often engage in ruminative thinking, a maladaptive cognitive process where they continually focus on their negative thoughts and feelings. This pattern of rumination not only exacerbates the symptoms of depression but also prolongs depressive episodes, making recovery more difficult (Blanke et al., 2022). Ruminative thinking traps individuals in a cycle of negativity, where their constant focus on distressing emotions and thoughts reinforces and deepens their depressive state.

Post-Traumatic Stress Disorder

PTSD presents another distinct profile of emotion dysregulation, characterized by a severe and persistent disturbance in the ability to manage emotional responses (Muñoz-Rivas et al., 2021). PTSD is marked by intense and overwhelming emotional reactions to trauma-related cues, which can include intrusive flashbacks, distressing nightmares, and severe anxiety that can be debilitating. Individuals with PTSD often find it extremely challenging to modulate their emotional responses, resulting in pronounced states of hyperarousal or emotional numbing (Giotakos, 2020). Hyperarousal in PTSD is manifested through symptoms such as chronic irritability, an exaggerated startle response to unexpected stimuli, and significant difficulty in concentrating on tasks. These individuals may feel constantly on edge, with their nervous system remaining in a heightened state of alertness as if they are perpetually prepared for danger. This constant state of hypervigilance can severely disrupt daily functioning and lead to an ongoing sense of being overwhelmed. Conversely, emotional numbing in PTSD involves a diminished capacity to experience positive emotions and an overall sense of emotional detachment from

others (Litz et al., 2002). Individuals may find it hard to connect with loved ones or feel joy, often reporting a sense of emptiness or alienation. This numbing effect serves as a defense mechanism to protect against the overwhelming pain of traumatic memories but also contributes to feelings of isolation and disconnection. These symptoms collectively reflect a disrupted balance in the brain's emotional regulation mechanisms. The brain of a person with PTSD remains stuck in a state of heightened alertness and hyperarousal, making it difficult to effectively down-regulate in response to trauma reminders. This imbalance prevents the brain from returning to a baseline state of calm after exposure to trauma-related stimuli, perpetuating a cycle of distress and emotional instability (Nicholson et al., 2023). Consequently, the constant state of heightened alertness and inability to modulate emotions effectively underscores the profound impact PTSD has on an individual's emotional and psychological well-being.

Borderline Personality Disorder

BPD is perhaps the most well-known for its association with severe emotion dysregulation, characterized by rapid and intense fluctuations in mood and emotional states (Mirkovic et al., 2021). Individuals with BPD often experience dramatic and sudden changes in their emotions, typically triggered by interpersonal stressors. These stressors could be real or perceived slights or rejections, which are often amplified in the minds of those with BPD, leading to disproportionately strong emotional reactions. These emotional swings can result in impulsive and sometimes dangerous behaviors, such as self-harm, substance abuse, and erratic patterns in relationships (Bell, 2004). For instance, in response to feelings of abandonment or rejection, a person with BPD might engage in self-injurious behaviors to cope with their overwhelming emotions or to express their distress. Substance abuse may be used as a form of self-medication to numb painful feelings or to escape from emotional turmoil. Additionally, their relationships tend to be intense and unstable, characterized by a pattern of idealizing others, followed by rapid devaluation. This pattern, known as "splitting," reflects the difficulty individuals with BPD have in maintaining a balanced view of themselves and others (Fertuck et al., 2018). The instability in mood and behavior seen in BPD is closely linked to significant challenges in regulating emotional intensity and duration. Patients with BPD may experience extreme emotional responses to seemingly minor events, especially those involving perceived rejection or abandonment. These responses can trigger episodes of intense anger, anxiety, or depression, which may last for hours or even days (Kreisman & Straus, 2021). Such episodes are often disproportionate to the actual events that trigger them, highlighting the difficulty BPD patients have in modulating their emotional responses. The chronic nature of these emotional fluctuations significantly impacts the daily functioning and overall quality of life of individuals with BPD. Their emotional instability often leads to frequent crises and conflicts, both in their personal and professional lives. The intensity and volatility of their emotions can make it difficult for them to maintain steady employment, form lasting relationships, and achieve a stable sense of self. As a result, individuals with BPD often feel misunderstood and isolated, further exacerbating their emotional distress and perpetuating a cycle of instability and emotional turmoil. The profound impact of these emotional difficulties underscores the importance of effective therapeutic interventions to help individuals with BPD develop more adaptive strategies for managing their emotions and improving their overall functioning and quality of life.

Substance Use Disorders

In substance use disorders, emotion dysregulation plays a central role in both the development and maintenance of the disorder, acting as both a trigger and a perpetuating factor (Darharaj et al., 2023). Many individuals turn to substances such as alcohol, drugs, or prescription medications to manage or escape from overwhelming and distressing emotions. This self-medication hypothesis suggests that

individuals use substances to alleviate feelings of anxiety, depression, anger, or other negative emotional states that they find difficult to cope with otherwise. However, the use of substances often leads to a vicious cycle of dependency and further emotional dysregulation. Initially, substances may provide temporary relief from emotional pain, offering a fleeting sense of calm or euphoria. This temporary alleviation can reinforce the behavior, making individuals more likely to continue using substances to manage their emotions. Over time, this can lead to the development of tolerance, where increasingly larger amounts of the substance are needed to achieve the same effect, and eventually, dependence, where the body requires the substance to function normally (Garland et al., 2020). The consequences of substance use extend beyond the immediate effects of the substances themselves. Withdrawal symptoms, which can include severe anxiety, depression, irritability, and physical discomfort, often occur when the effects of the substance wear off (Fertuck et al., 2018). These withdrawal symptoms can significantly exacerbate emotional instability, creating a powerful drive to use the substance again to alleviate the discomfort. This cycle of relief followed by withdrawal and craving perpetuates the disorder, making it incredibly difficult for individuals to break free from substance use without appropriate intervention. Moreover, the lifestyle and consequences associated with substance use, such as legal issues, financial problems, strained relationships, and health complications, can further contribute to emotional distress (Orford et al., 2013). The stress and negative affect associated with these issues frequently act as emotional triggers that precipitate relapse. For instance, a person who is trying to abstain from substance use might encounter a stressful situation, such as a conflict at work or a personal loss, which triggers intense negative emotions. Without effective emotional regulation strategies, the individual may revert to substance use as a coping mechanism. This intricate interplay between emotion dysregulation and substance use underscores the importance of interventions that address underlying emotion regulation deficits. Effective treatment approaches often incorporate strategies to enhance emotion regulation skills, helping individuals develop healthier ways to manage their emotions without resorting to substances. CBT is commonly used to help individuals identify and challenge maladaptive thought patterns and develop more adaptive coping strategies (Greimel & Kröner-Herwig, 2011). Mindfulness-based interventions can also be beneficial, as they teach individuals to observe and accept their emotions without judgment, reducing the impulse to escape from negative feelings through substance use (Chiesa & Serretti, 2014). Additionally, treatments may include building resilience and stress management techniques, improving interpersonal skills, and addressing any co-occurring mental health conditions that contribute to emotion dysregulation. By focusing on these underlying issues, interventions can help individuals achieve long-term recovery and improve their overall emotional and psychological well-being. This holistic approach is essential for breaking the cycle of dependency and supporting sustained sobriety and emotional health.

Addressing emotion dysregulation in these disorders involves understanding the specific patterns and mechanisms that contribute to each condition. For example, in anxiety and depression, cognitive-behavioral strategies that focus on modifying maladaptive thought patterns can be particularly effective (Leahy et al., 2022). In PTSD, trauma-focused therapies that incorporate techniques for managing hyperarousal and reprocessing traumatic memories are essential (Lee et al., 2022). For BPD, DBT offers a comprehensive approach that includes skills training in emotional regulation, distress tolerance, and interpersonal effectiveness (Schaich et al., 2021). In substance use disorders, interventions that combine behavioral therapies with strategies for managing emotional triggers and building healthier coping mechanisms are critical. By tailoring therapeutic approaches to the specific emotion dysregulation profiles of different disorders, clinicians can more effectively support individuals in managing their emotions and improving their overall mental health. This nuanced understanding of emotion dysregulation across psychological disorders underscores the importance of personalized treatment plans that address the unique challenges faced by each patient.

Therapeutic Interventions Targeting Emotional Regulation

Enhancing emotion regulation skills is a central goal in many therapeutic interventions, particularly for individuals with psychological disorders characterized by emotional dysregulation. Various therapeutic approaches have been developed to target emotional regulation, each drawing on different theoretical frameworks and techniques to help individuals manage their emotions more effectively (Berking et al., 2008). These interventions include Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), Cognitive Behavioral Therapy (CBT), Mindfulness-Based Interventions, and pharmacological treatments, each offering unique strategies for enhancing emotional regulation.

Dialectical Behavior Therapy

DBT is one of the most well-established and effective interventions specifically designed to address emotion dysregulation. Originally developed by Marsha Linehan in the late 1980s for treating individuals with BPD (Linehan & Wilks, 2015), DBT has since been adapted for use with a variety of other mental health conditions characterized by severe emotional instability (Chapman, 2006).

DBT is unique in its combination of cognitive-behavioral techniques and mindfulness practices. It is structured around four key areas, each targeting a specific aspect of emotional and behavioral functioning: mindfulness, distress tolerance, emotion regulation, and interpersonal effectiveness. Mindfulness is a core component of DBT, involving teaching clients to focus on the present moment and become more aware of their thoughts, feelings, and sensations without judgment (Baer & Krietemeyer, 2006). Mindfulness practices help individuals observe their experiences as they occur, promoting a greater sense of control and reducing impulsive reactions. By staying present, clients can more effectively manage their emotions and behaviors. Distress tolerance which is crucial for managing high-stress moments when the impulse to engage in harmful behaviors is strongest equips clients with skills to tolerate and survive crises without resorting to self-destructive behaviors (Van Dijk et al., 2023). Techniques such as self-soothing, distraction, and radical acceptance help individuals endure intense emotions and situations. The emotion regulation module teaches clients skills for identifying and labeling their emotions accurately, understanding the function of their emotions, and reducing their vulnerability to negative emotional states. Clients learn strategies to manage their emotional intensity, such as opposite action, where they engage in behaviors contrary to what their emotions urge them to do (e.g., approaching a feared situation rather than avoiding it).

Another technique, accumulating positive emotions, involves building a life worth living by participating in activities that bring joy and satisfaction, thus enhancing overall emotional well-being. Interpersonal effectiveness focuses on helping clients develop skills to navigate relationships more effectively. It includes techniques for assertiveness, maintaining self-respect, and building healthy relationships (Dimidjian & Linehan, 2008). Clients learn how to communicate their needs and set boundaries while maintaining positive connections with others, which is essential for reducing interpersonal conflicts and fostering supportive relationships.

Research has consistently shown that DBT significantly reduces symptoms of emotion dysregulation and improves overall functioning in individuals with BPD and other disorders. Studies have demonstrated that DBT can lead to reductions in self-harm behaviors, suicidal ideation, and hospitalizations, as well as improvements in mood, social functioning, and quality of life. The effectiveness of DBT is attributed to its comprehensive and multifaceted approach, which addresses the complex interplay of emotional, cognitive, and behavioral factors that contribute to emotion dysregulation. Furthermore, the adaptability of DBT has allowed it to be successfully applied to a range

of other conditions, including eating disorders, substance use disorders, PTSD, and mood disorders (Ritschel et al., 2015). This flexibility makes DBT a valuable therapeutic option for many individuals struggling with severe emotional and behavioral challenges. By providing clients with practical and evidence-based skills, DBT empowers them to manage their emotions more effectively, improve their relationships, and enhance their overall quality of life.

Acceptance and Commitment Therapy

ACT is another therapeutic approach that emphasizes emotion regulation through acceptance and mindfulness strategies, making it particularly effective in managing a variety of psychological conditions (Hayes et al., 1999). ACT encourages individuals to embrace their emotional experiences without judgment, which fosters a non-reactive and open stance towards their thoughts and feelings (Webb, 2023). By promoting acceptance, ACT helps clients to stop avoiding or struggling against their emotions and instead to observe them as they are. This approach is coupled with a commitment to engage in actions that are aligned with one's personal values, thus facilitating meaningful and purpose-driven living. The core objective of ACT is to develop psychological flexibility, which is the ability to stay present and fully engaged in life activities despite experiencing difficult emotions (Kashdan & Rottenberg, 2010). Psychological flexibility allows individuals to adapt to changing circumstances and to handle stress more effectively, without becoming overwhelmed by their internal experiences. This is achieved through a set of six interconnected processes: acceptance, cognitive defusion, being present, self-as-context, values, and committed action. ACT techniques include cognitive defusion, which involves helping individuals to see their thoughts as just thoughts, rather than as absolute truths that dictate their behavior (Harris, 2019). This technique reduces the power of negative thoughts by encouraging a more detached and observational stance. For instance, rather than thinking "I am a failure," a person might learn to think "I am having the thought that I am a failure," which diminishes the thought's emotional impact.

Acceptance exercises are another key component of ACT, teaching individuals to fully experience their emotions without trying to change or avoid them. These exercises often involve mindfulness practices, such as focusing on the breath or engaging in body scans, to cultivate a sense of awareness and presence. By learning to sit with their emotions, individuals can reduce the struggle against their internal experiences and increase their capacity to cope with distress. Values clarification is a process in ACT where clients identify what is most important to them in life, such as relationships, career, or personal growth (Kirschenbaum, 2013). This clarity about values provides a direction for behavior, helping individuals to make choices that are consistent with their values, even in the face of emotional challenges. Committed action involves setting specific goals and taking actionable steps towards these values, reinforcing a sense of purpose and fulfillment.

Studies indicate that ACT is effective in reducing symptoms of anxiety, depression, and other forms of emotional distress by promoting greater emotion regulation and psychological flexibility. Research has shown that individuals undergoing ACT experience significant improvements in their ability to manage stress, reduce avoidance behaviors, and increase overall psychological well-being (Flaxman et al., 2013). For example, in cases of anxiety, ACT helps individuals confront and accept their fears, rather than avoiding them, which leads to a decrease in anxiety symptoms over time. Similarly, for depression, ACT's emphasis on values and committed action can help individuals to re-engage with life and find motivation and meaning, counteracting feelings of hopelessness and inactivity. Overall, ACT's integrative approach, which combines acceptance, mindfulness, and commitment to values-based living, offers a robust framework for enhancing emotion regulation and psychological resilience (Hope-Bell, 2022). By fostering a more accepting and proactive stance towards emotional experiences, ACT

helps individuals navigate life's challenges with greater ease and purpose, ultimately leading to improved mental health and quality of life.

Cognitive Behavioral Therapy

CBT is a widely used and empirically supported intervention that addresses emotion regulation by targeting and modifying maladaptive thought patterns and behaviors (Boswell, 2013). CBT operates on the principle that our thoughts, feelings, and behaviors are interconnected, and that by changing unhelpful thoughts and behaviors, we can improve our emotion regulation skills and overall mental health (Roth et al., 2002). One of the key components of CBT is cognitive restructuring, which involves helping clients identify and challenge distorted cognitions that contribute to emotion dysregulation. Distorted cognitions, such as catastrophizing (exaggerating the negative consequences of an event) or overgeneralization (drawing broad, negative conclusions based on a single incident), can lead to intense and often inappropriate emotional responses. For instance, a person who catastrophizes might believe that failing a single exam means they are doomed to fail in life, leading to feelings of despair and anxiety. In CBT, therapists work with clients to recognize these irrational thoughts, evaluate their validity, and replace them with more realistic and balanced perspectives (Shea, 2014). This process helps clients alter their emotional responses and develop healthier coping mechanisms.

Behavioral techniques are another critical aspect of CBT. These techniques are designed to change unhelpful behaviors that contribute to emotion dysregulation. For example, exposure therapy is commonly used to treat anxiety disorders. In exposure therapy, clients gradually and systematically confront their fears in a controlled and safe environment. This process helps individuals face and manage their emotional reactions to feared situations, reducing their anxiety over time. By repeatedly exposing themselves to the source of their fear without experiencing the anticipated negative outcomes, clients learn that their anxiety decreases and becomes more manageable (Craske et al., 2006). This behavioral change helps to break the cycle of avoidance and fear that perpetuates anxiety disorders. CBT is also effective in treating depression by addressing the negative thought patterns and behaviors that sustain depressive symptoms. Depressed individuals often engage in negative self-talk and maintain a pessimistic outlook on their lives and future. CBT helps these individuals identify these patterns, challenge their validity, and replace them with more positive and realistic thoughts. Additionally, behavioral activation, a CBT technique for depression, encourages clients to engage in activities that they once found pleasurable or meaningful. This re-engagement with positive activities can help lift the mood and counteract the inactivity and withdrawal common in depression.

The effectiveness of CBT in improving emotional regulation has been demonstrated across a range of psychological disorders, including anxiety, depression, and PTSD (Moltrecht et al., 2021). For example, in the treatment of PTSD, CBT helps clients process traumatic memories and reduce the distress associated with them. Techniques such as cognitive restructuring help clients challenge and change the dysfunctional beliefs that stem from the trauma, while exposure therapy helps them gradually face and reduce the trauma-related anxiety. Overall, CBT provides a structured and evidence-based approach to enhancing emotion regulation. By addressing the cognitive and behavioral components of emotional responses, CBT equips individuals with practical skills to manage their emotions more effectively (Wright et al., 2017). Clients learn to identify and alter maladaptive thought patterns, confront and change unhelpful behaviors, and develop healthier coping strategies. These skills contribute to long-term improvements in emotion regulation and overall mental health, making CBT a valuable and versatile therapeutic intervention for a wide range of emotional and psychological issues.

Mindfulness-Based Interventions

Mindfulness-Based Interventions, including Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT) have gained significant prominence for their effectiveness in enhancing emotional regulation (Teper et al., 2013). These interventions are designed to cultivate mindfulness, which involves paying deliberate attention to the present moment with an attitude of openness, curiosity, and acceptance. By doing so, mindfulness helps individuals develop a greater awareness of their thoughts, feelings, and bodily sensations, without becoming overwhelmed or excessively reactive to them.

MBSR, developed by Jon Kabat-Zinn, incorporates mindfulness practices such as focused breathing, body scans, and mindful movement (Santorelli et al., 2017). Focused breathing exercises involve paying close attention to the breath as it moves in and out of the body, which helps anchor the mind and reduce distractions from external stressors. Body scans involve systematically paying attention to different parts of the body, noticing any sensations without judgment. This practice promotes a sense of bodily awareness and relaxation. Mindful movement, such as gentle yoga or walking meditation, integrates physical movement with mindfulness, encouraging a connection between the mind and body. Through these practices, MBSR participants learn to observe their thoughts and emotions as transient experiences, rather than as fixed or overwhelming realities.

MBCT, developed by Zindel Segal, Mark Williams, and John Teasdale, combines the principles of mindfulness with cognitive therapy techniques (Segal et al., 2018). It specifically targets individuals with recurrent depression, aiming to prevent relapse by teaching them how to respond more adaptively to stress and negative emotions. MBCT involves similar mindfulness practices as MBSR, but it also includes cognitive therapy elements such as identifying negative thought patterns and learning to relate to them differently. For example, individuals are taught to recognize the early signs of depressive relapse and to apply mindfulness techniques to observe these thoughts and feelings without judgment, thereby breaking the cycle of rumination that often leads to relapse. Mindfulness practices help individuals develop a heightened sense of awareness and acceptance of their present experiences (Garland et al., 2015). By observing their thoughts and emotions without immediate reaction, individuals can create a space between their experiences and their responses. This space allows for a more balanced and measured approach to emotions, fostering greater emotional stability and reducing the likelihood of being overwhelmed by negative feelings. For instance, during moments of stress or anxiety, mindfulness practices enable individuals to acknowledge their emotions without getting caught up in them, leading to more effective coping and reduced emotional reactivity.

Research has shown that both MBSR and MBCT are effective in enhancing emotional regulation and overall mental well-being (Googhari et al., 2022). MBSR has been found to reduce symptoms of anxiety, stress, and depression, improve sleep quality, and enhance overall quality of life. Participants in MBSR programs often report feeling more resilient and better able to manage daily stressors (Zhang et al., 2019). MBCT, on the other hand, has been particularly effective in preventing relapse in individuals with recurrent depression. Studies have demonstrated that MBCT significantly reduces the risk of depressive relapse by helping individuals develop a mindful awareness of their thoughts and emotions, enabling them to respond more adaptively to stress and emotional challenges.

In addition to these established therapies, other interventions are being developed and refined to target specific aspects of emotion regulation. For example, Emotion-Focused Therapy (EFT) emphasizes the importance of understanding and processing emotions to facilitate healing and personal growth. EFT techniques include accessing and expressing core emotions, exploring unmet emotional needs, and

transforming maladaptive emotional responses into healthier ones. Research on EFT has shown positive outcomes in improving emotion regulation and reducing symptoms of depression and anxiety.

Pharmacological Treatments

Pharmacological treatments can also play a crucial role in enhancing emotion regulation, particularly when they are combined with psychotherapy (Otto et al., 2010). Medications are often prescribed to address the neurobiological aspects of emotion dysregulation, helping to stabilize mood and improve overall emotional functioning. By modulating the brain's chemical environment, these treatments can provide a more stable foundation for individuals to benefit from psychotherapeutic interventions.

One of the most commonly used classes of medications in the treatment of emotion dysregulation are SSRIs. SSRIs, such as fluoxetine (Prozac), sertraline (Zoloft), and citalopram (Celexa), work by increasing the levels of serotonin in the brain (Ogata et al., 2019). Serotonin is a neurotransmitter that plays a key role in mood regulation, anxiety, and overall emotional balance. By preventing the reuptake of serotonin into neurons, SSRIs enhance its availability in the synaptic cleft, thereby improving communication between neurons and stabilizing mood. This can help reduce symptoms of depression, anxiety, and other mood disorders, allowing individuals to better manage their emotions and engage more effectively in psychotherapy.

Mood stabilizers are another important class of medications used to enhance emotion regulation, particularly in individuals with bipolar disorder and other conditions characterized by mood swings (Altamura et al., 2011). Medications such as lithium, valproate (Depakote), and lamotrigine (Lamictal) help to balance the extremes of mood by influencing various neurotransmitter systems and neural pathways. Lithium, for example, affects the flow of sodium through nerve and muscle cells, which impacts mood regulation and stabilizes mood fluctuations (Vosahlikova & Svoboda, 2016). Valproate and lamotrigine work by affecting the levels of certain neurotransmitters and modulating neural excitability, which can help prevent the extreme highs (mania) and lows (depression) associated with bipolar disorder.

In addition to SSRIs and mood stabilizers, other classes of medications may also be used to address specific aspects of emotion dysregulation. For instance, atypical antipsychotics such as aripiprazole (Abilify) and quetiapine (Seroquel) can be effective in managing mood swings and emotional instability in conditions like bipolar disorder and schizoaffective disorder (Noel & Jackson, 2020). These medications work by affecting dopamine and serotonin receptors in the brain, helping to regulate mood and reduce symptoms such as agitation and emotional volatility.

When combined with psychotherapy, pharmacological treatments can enhance the overall effectiveness of treatment for emotion dysregulation (Lenzi et al., 2018). Medications can help alleviate the intense emotional symptoms that might otherwise interfere with an individual's ability to participate fully in therapy. For example, an individual experiencing severe depression may find it challenging to engage in CBT due to low energy, poor concentration, and pervasive negative thinking (Roepke & Seligman, 2016). By alleviating these symptoms through the use of antidepressants, the individual may become more receptive to the cognitive and behavioral strategies taught in CBT.

Similarly, in conditions like PTSD, medications can help manage symptoms such as hyperarousal, anxiety, and intrusive thoughts, providing a calmer mental state that allows for more effective engagement in trauma-focused therapies like prolonged exposure therapy or eye movement desensitization and reprocessing (EMDR) (Valiente-Gómez, 2017). In the context of BPD, mood

stabilizers and antipsychotic medications can help reduce emotional intensity and impulsivity, making it easier for individuals to benefit from therapies like DBT.

Overall, the integration of pharmacological treatments with psychotherapy offers a comprehensive approach to enhancing emotion regulation. Medications address the neurobiological mechanisms underlying emotion dysregulation, providing a more stable foundation for therapeutic work. By alleviating severe emotional symptoms, pharmacological treatments enable individuals to engage more fully and effectively in psychotherapy, ultimately leading to improved emotional regulation and better mental health outcomes (Emmelkamp et al., 2014). This combined approach underscores the importance of personalized treatment plans that consider both biological and psychological factors in the management of emotional dysregulation.

Overall, these therapeutic interventions demonstrate the importance of a comprehensive approach to emotion regulation that integrates cognitive, behavioral, and mindfulness-based strategies. By tailoring interventions to the specific needs and challenges of individuals, clinicians can more effectively support clients in developing the skills necessary for managing their emotions and improving their mental health. The ongoing refinement of these therapies, informed by advances in research and clinical practice, promises to enhance our ability to address emotion dysregulation and promote psychological well-being across diverse populations.

Emotion dysregulation is a common issue in many psychological disorders, including anxiety, depression, PTSD, borderline personality disorder, and substance use disorders. People with these conditions often struggle to manage their emotions, which can make their symptoms worse and impact their daily lives. Understanding how emotion dysregulation plays a role in these disorders is important for creating better treatments that can help people feel better and improve their mental health.

To address emotion dysregulation, several therapeutic approaches have been developed, each with its own unique methods. These include Dialectical Behavior Therapy (DBT), Acceptance and Commitment Therapy (ACT), Cognitive Behavioral Therapy (CBT), Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), and even medications. These treatments use different techniques, like mindfulness, cognitive restructuring, and behavioral changes, to help people better manage their emotions and improve their overall well-being.

Challenges and Future Directions

Addressing emotion dysregulation in clinical populations presents several challenges, both in terms of understanding the underlying mechanisms and in developing effective interventions. Despite significant progress, there remain numerous areas where further research and innovation are needed to improve outcomes for individuals struggling with emotion regulation.

One major challenge in addressing emotion dysregulation is the complexity and variability of its manifestations across different psychological disorders. Emotion dysregulation presents itself in unique ways depending on the specific disorder, making it essential to tailor interventions to meet the needs of each condition. This variability complicates the development of universal interventions and necessitates a deeper understanding of the disorder-specific mechanisms that drive emotion dysregulation.

Given the diverse manifestations of emotion dysregulation across these disorders, developing interventions that are flexible and adaptable to individual needs remains a critical goal. For example, cognitive reappraisal, a strategy where individuals change their interpretation of a situation to alter its

emotional impact, might be highly effective for individuals with depression. This technique can help them challenge and change their negative thought patterns, thereby improving their mood and reducing depressive symptoms. However, for individuals with PTSD, grounding techniques that help manage hyperarousal may be more beneficial. Grounding techniques involve using sensory experiences to anchor individuals in the present moment, helping them to feel more connected to the here and now and reducing the intensity of their traumatic responses.

Another challenge lies in the accurate assessment and measurement of emotion regulation. Current assessment tools, while valuable, have limitations such as reliance on self-report, which can be biased by individuals' perceptions and willingness to disclose their emotional experiences. Behavioral tasks and physiological measures provide more objective data but can be resource-intensive and may not fully capture the complexity of real-world emotion regulation. Innovative approaches like EMA offer promise but also present practical challenges, such as ensuring participant compliance and managing large volumes of data. Advances in assessment technology and methodology are needed to develop more comprehensive and accurate tools for evaluating emotion regulation.

The integration of technology in therapeutic interventions presents both opportunities and challenges. Digital health interventions, including mobile apps and online therapy platforms, offer scalable solutions for delivering emotion regulation strategies to a broad audience. These tools can provide real-time support and feedback, enhancing accessibility and convenience. However, the effectiveness of digital interventions varies, and ensuring that these tools are evidence-based and tailored to individual needs is crucial. Moreover, digital interventions must address issues of user engagement and adherence, which can impact their overall effectiveness.

Research on the neurobiological mechanisms of emotion regulation continues to advance, yet translating these findings into clinical practice remains a challenge. While neuroimaging studies have identified key brain regions and pathways involved in emotion regulation, applying this knowledge to develop targeted interventions requires further exploration. Techniques such as neurofeedback, which trains individuals to modulate their brain activity, hold promise but require more robust evidence and practical implementation strategies. Bridging the gap between neurobiological research and clinical application is essential for developing more precise and effective treatments.

Cultural and social factors also play a significant role in emotion regulation, influencing how emotions are experienced, expressed, and managed. Cross-cultural research has highlighted variations in emotion regulation strategies and outcomes, indicating that cultural context must be considered in both assessment and intervention. Developing culturally sensitive approaches that respect and integrate diverse emotion regulation practices is crucial for ensuring the effectiveness of therapeutic interventions across different populations.

In addition to cultural factors, individual differences such as gender, family practices, social support, socioeconomic status (SES), and education should also be considered, as these factors can significantly influence emotion regulation and its outcomes. Evaluating these individual factors is essential for tailoring interventions to meet the specific needs of diverse individuals.

Future research should also focus on the long-term outcomes of emotion regulation interventions. While many studies demonstrate short-term benefits, understanding the sustainability of these effects over time is critical. Longitudinal studies that track individuals' emotion regulation and psychological well-being over extended periods can provide valuable insights into the enduring impact of various interventions. Additionally, exploring the mechanisms that contribute to the maintenance of improved

emotion regulation skills can inform the development of booster sessions or follow-up interventions to support long-term success.

Emerging trends in personalized medicine and precision psychiatry offer exciting opportunities for advancing emotion regulation interventions. By leveraging genetic, neurobiological, and psychological data, personalized approaches can be developed to tailor interventions to the unique profiles of individuals. This approach can enhance the specificity and effectiveness of treatments, improving outcomes for those with emotion dysregulation.

Conclusion

Emotion regulation is a multifaceted construct that plays a critical role in psychological well-being and mental health. It encompasses the processes by which individuals manage their emotional experiences and responses to meet the demands of their environment. Effective emotion regulation allows individuals to cope with stress, maintain healthy relationships, and achieve personal and professional goals. Conversely, difficulties in emotion regulation are associated with a range of psychological disorders, contributing to significant distress and impairment.

This review has highlighted the various dimensions of emotion regulation, from its theoretical underpinnings to the neurobiological mechanisms involved, the diverse strategies used by individuals, and the manifestation of emotion dysregulation in specific psychological disorders. It has also examined the tools and methods used to assess emotion regulation and evaluated the therapeutic interventions designed to enhance emotion regulation skills in clinical populations.

ore the long-term outcomes of emotion regulation interventions, understanding the sustainability of these effects over time. Longitudinal studies that track individuals' emotion regulation and psychological well-being over extended periods can provide valuable insights into the enduring impact of various interventions. Additionally, exploring the mechanisms that contribute to the maintenance of improved emotion regulation skills can inform the development of booster sessions or follow-up interventions to support long-term success.

Emerging trends in personalized medicine and precision psychiatry offer exciting opportunities for advancing emotion regulation interventions. By leveraging genetic, neurobiological, and psychological data, personalized approaches can be developed to tailor interventions to the unique profiles of individuals. This approach can enhance the specificity and effectiveness of treatments, improving outcomes for those with emotion dysregulation.

Looking ahead, future research should focus on (1) developing more sophisticated, real-time assessment tools—such as Ecological Momentary Assessment and digital interventions—to capture the fluidity of emotion regulation, (2) refining theoretical models to better account for individual and cultural variability, and (3) enhancing intervention strategies like biofeedback mechanisms. Additionally, interdisciplinary collaboration across psychology, neuroscience will be essential in advancing both theoretical understanding and practical applications.

By synthesizing existing knowledge and identifying critical gaps, this review contributes to the advancement of emotion regulation research. Rather than merely summarizing prior work, it provides a roadmap for future inquiry, emphasizing the need for integrative, personalized, and scalable solutions. Ultimately, deepening our understanding of emotion regulation will not only refine theoretical

frameworks but also lead to more effective interventions, improving mental health outcomes on a broader scale.

In summary, while significant strides have been made in understanding and addressing emotion dysregulation, numerous challenges remain. Ongoing research, innovation, and collaboration across disciplines are essential for developing more effective, personalized, and culturally sensitive interventions. By addressing these challenges and exploring future directions, the field can continue to advance, ultimately improving the lives of individuals struggling with emotion regulation difficulties. This ongoing effort to refine our understanding and treatment of emotion dysregulation will contribute to better mental health outcomes and an improved quality of life for those affected by psychological disorders.

Compliance with Ethical Standards

Competing Interests: The author declare that she has no competing interests.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Ethics Approval and Consent to Participate: Not applicable.

Consent for Publication: The authors are willing to permit the Journal to publish the article.

Acknowledgments: Not applicable

References

- Acevedo, N., Bosanac, P., Pikoos, T., Rossell, S., & Castle, D. (2021). Therapeutic neurostimulation in obsessive-compulsive and related disorders: a systematic review. *Brain sciences*, 11(7), 948. <https://doi.org/10.3390/brainsci11070948>
- Aldao, A. (2013). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science*, 8(2), 155-172. <https://doi.org/10.1177/1745691612459518>
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, 30(2), 217-237. <https://doi.org/10.1016/j.cpr.2009.11.004>
- Alexander, L., Wood, C. M., & Roberts, A. C. (2023). The ventromedial prefrontal cortex and emotion regulation: lost in translation?. *The Journal of Physiology*, 601(1), 37-50. <https://doi.org/10.1113/JP282627>
- Alexandra Kredlow, M., Fenster, R. J., Laurent, E. S., Ressler, K. J., & Phelps, E. A. (2022). Prefrontal cortex, amygdala, and threat processing: implications for PTSD. *Neuropsychopharmacology*, 47(1), 247-259. <https://doi.org/10.1038/s41386-021-01155-7>
- Altamura, A. C., Lietti, L., Dobrea, C., Benatti, B., Arici, C., & Dell’Osso, B. (2011). Mood stabilizers for patients with bipolar disorder: the state of the art. *Expert Review of Neurotherapeutics*, 11(1), 85-99. <https://doi.org/10.1586/ern.10.181>
- Azizi, S. A. (2022). Monoamines: dopamine, norepinephrine, and serotonin, beyond modulation, “switches” that alter the state of target networks. *The Neuroscientist*, 28(2), 121-143. <https://doi.org/10.1177/1073858420974336>
- Baer, R. A., & Krietemeyer, J. (2006). *Overview of mindfulness-and acceptance-based treatment approaches*. In R. A. Baer (Ed.), *Mindfulness-based treatment approaches: Clinician’s guide to evidence base and applications* (pp. 3–27). Elsevier Academic Press.
- Beck, J. S. (2020). *Cognitive behavior therapy: Basics and beyond*. Guilford Publications.

- Bell, L. (2004). *Managing intense emotions and overcoming self-destructive habits: A self-help manual*. Routledge.
- Benita, M. (2020). Freedom to feel: A self-determination theory account of emotion regulation. *Social And Personality Psychology Compass*, 14(11), e12563. <https://doi.org/10.1111/spc3.12563>
- Berboth, S., & Morawetz, C. (2021). Amygdala-prefrontal connectivity during emotion regulation: A meta-analysis of psychophysiological interactions. *Neuropsychologia*, 153, 107767. <https://doi.org/10.1016/j.neuropsychologia.2021.107767>
- Berking, M., Wupperman, P., Reichardt, A., Pejic, T., Dippel, A., & Znoj, H. (2008). Emotion-regulation skills as a treatment target in psychotherapy. *Behaviour Research and Therapy*, 46(11), 1230-1237. <https://doi.org/10.1016/j.brat.2008.08.005>
- Bertini, C., & Ládavas, E. (2021). Fear-related signals are prioritised in visual, somatosensory and spatial systems. *Neuropsychologia*, 150, 107698. <https://doi.org/10.1016/j.neuropsychologia.2020.107698>
- Bettis, A. H., Burke, T. A., Nesi, J., & Liu, R. T. (2022). Digital technologies for emotion-regulation assessment and intervention: a conceptual review. *Clinical Psychological Science*, 10(1), 3-26. <https://doi.org/10.1177/21677026211011982>
- Blanke, E. S., Neubauer, A. B., Houben, M., Erbas, Y., & Brose, A. (2022). Why do my thoughts feel so bad? Getting at the reciprocal effects of rumination and negative affect using dynamic structural equation modeling. *Emotion*, 22(8), 1773. <https://doi.org/10.1037/emo0000946>
- Bodrogi, B., Bereczkei, T., & Deak, A. (2022). Be aware, make it clear, and take the lead: Emotion regulation difficulties and emotional intelligence as moderators of cognitive reappraisal. *Current Psychology*, 41(10), 6795-6807. <https://doi.org/10.1007/s12144-020-01182-5>
- Boswell, J. F. (2013). Intervention strategies and clinical process in transdiagnostic cognitive-behavioral therapy. *Psychotherapy*, 50(3), 381. <https://doi.org/10.1037/a0032157>
- Brown, V. M., Price, R., & Dombrovski, A. Y. (2023). Anxiety as a disorder of uncertainty: Implications for understanding maladaptive anxiety, anxious avoidance, and exposure therapy. *Cognitive, Affective, & Behavioral Neuroscience*, 23(3), 844-868. <https://doi.org/10.3758/s13415-023-01080-w>
- Butler, E. A., Egloff, B., Wilhelm, F. H., Smith, N. C., Erickson, E. A., & Gross, J. J. (2003). The social consequences of expressive suppression. *Emotion*, 3(1), 48. <https://doi.org/10.1037/1528-3542.3.1.48>
- Cavicchioli, M., Scalabrini, A., Northoff, G., Mucci, C., Ogliari, A., & Maffei, C. (2021). Dissociation and emotion regulation strategies: A meta-analytic review. *Journal of Psychiatric Research*, 143, 370-387. <https://doi.org/10.1016/j.jpsychires.2021.09.011>
- Chang, M. L. (2020, June). *Emotion display rules, emotion regulation, and teacher burnout*. In *Frontiers in Education* (Vol. 5, p. 90). Frontiers Media SA. <https://doi.org/10.3389/educ.2020.00090>
- Chapman, A. L. (2006). Dialectical behavior therapy: Current indications and unique elements. *Psychiatry (Edmont)*, 3(9), 62.
- Charles, R. L., & Nixon, J. (2019). Measuring mental workload using physiological measures: A systematic review. *Applied Ergonomics*, 74, 221-232. <https://doi.org/10.1016/j.apergo.2018.08.028>
- Chiesa, A., & Serretti, A. (2014). Are mindfulness-based interventions effective for substance use disorders? A systematic review of the evidence. *Substance Use & Misuse*, 49(5), 492-512. <https://doi.org/10.3109/10826084.2013.770027>
- Clarke, P. B., Lewis, T. F., Myers, J. E., Henson, R. A., & Hill, B. (2020). Wellness, emotion regulation, and relapse during substance use disorder treatment. *Journal of Counseling & Development*, 98(1), 17-28. <https://doi.org/10.1002/jcad.12296>
- Colombo, D., Díaz-García, A., Fernandez-Álvarez, J., & Botella, C. (2021). Virtual reality for the enhancement of emotion regulation. *Clinical Psychology & Psychotherapy*, 28(3), 519-537. <https://doi.org/10.1002/cpp.2618>
- Cornes, J. (2023). *Dynamic changes in heart rate variability under threat: Exploring the effects of emotion regulation on the parasympathetic nervous system* (Doctoral dissertation). Open Access Te Herenga Waka-Victoria University of Wellington.
- Craske, M. G., Antony, M. M., & Barlow, D. H. (2006). *Mastering your fears and phobias*. Oxford University Press.

- Daffre, C., Oliver, K. I., & Pace-Schott, E. F. (2020). *Neurocircuitry of anxiety disorders*. In: Bui, E., Charney, M., Baker, A. (Eds.) *Clinical Handbook of Anxiety Disorders*. Current Clinical Psychiatry. Humana, Cham. https://doi.org/10.1007/978-3-030-30687-8_2
- Dan-Glauser, E. S., & Scherer, K. R. (2012). The difficulties in emotion regulation scale (DERS). *Swiss Journal of Psychology*, 72(1). <https://doi.org/10.1024/1421-0185/a000093>
- Darharaj, M., Hekmati, I., Mohammad Ghezel Ayagh, F., Ahmadi, A., Eskin, M., & Abdollahpour Ranjbar, H. (2023). Emotional dysregulation and craving in patients with substance use disorder: The mediating role of psychological distress. *International Journal of Mental Health and Addiction*, 1-16. <https://doi.org/10.1007/s11469-023-01031-z>
- David, O. A., Magurean, S., & Tomoiagă, C. (2022). do improvements in therapeutic game-based skills transfer to real life improvements in children's emotion-regulation abilities and mental health? A pilot study that offers preliminary validity of the RETHink in-game performance scoring. *Frontiers in Psychiatry*, 13, 828481. <https://doi.org/10.3389/fpsyt.2022.828481>
- de Klerk-Sluis, J. M., Huijbers, M. J., Löcke, S., Spijker, J., Spinhoven, P., Speckens, A. E., & Ruhe, H. G. (2022). Factors associated with relapse and recurrence of major depressive disorder in patients starting mindfulness-based cognitive therapy. *Depression and anxiety*, 39(2), 113-122. <https://doi.org/10.1002/da.23220>
- de la Mora, M. P., Hernandez-Mondragon, C., Crespo-Ramirez, M., Rejon-Orantes, J., Borroto-Escuela, D. O., & Fuxe, K. (2020). Conventional and novel pharmacological approaches to treat dopamine-related disorders: Focus on Parkinson's disease and schizophrenia. *Neuroscience*, 439, 301-318. <https://doi.org/10.1016/j.neuroscience.2019.07.026>
- De la Peña-Arteaga, V., Berruga-Sánchez, M., Steward, T., Martínez-Zalacaín, I., Goldberg, X., Wainsztein, A., ... & Soriano-Mas, C. (2021). An fMRI study of cognitive reappraisal in major depressive disorder and borderline personality disorder. *European Psychiatry*, 64(1), e56. <https://doi.org/10.1016/j.neuroscience.2019.07.026>
- Deckert, M., Schmoeger, M., Auff, E., & Willinger, U. (2020). Subjective emotional arousal: An explorative study on the role of gender, age, intensity, emotion regulation difficulties, depression and anxiety symptoms, and meta-emotion. *Psychological Research*, 84, 1857-1876. <https://doi.org/10.1007/s00426-019-01197-z>
- DiGirolamo, M. A., Kibrislioglu Uysal, N., McCall, E. C., & Isaacowitz, D. M. (2023). Attention-focused emotion regulation in everyday life in adulthood and old age. *Emotion*, 23(3), 633. <https://doi.org/10.1037/emo0001158>
- Dimidjian, S., & Linehan, M. M. (2008). 40 mindfulness practice. *Cognitive Behavior Therapy*, 327.
- Dixon, M. L., & Dweck, C. S. (2022). The amygdala and the prefrontal cortex: The co-construction of intelligent decision-making. *Psychological Review*, 129(6), 1414. <https://doi.org/10.1037/rev0000339>
- Dong, J., Xiao, T., Xu, Q., Liang, F., Gu, S., Wang, F., & Huang, J. H. (2022). Anxious personality traits: Perspectives from basic emotions and neurotransmitters. *Brain Sciences*, 12(9), 1141. <https://doi.org/10.3390/brainsci12091141>
- Eadeh, H. M., Breaux, R., & Nikolas, M. A. (2021). A meta-analytic review of emotion regulation focused psychosocial interventions for adolescents. *Clinical Child and Family Psychology Review*, 24(4), 684-706. <https://doi.org/10.1007/s10567-021-00362-4>
- Ebner-Priemer, U. W., & Trull, T. J. (2009). Ecological momentary assessment of mood disorders and mood dysregulation. *Psychological Assessment*, 21(4), 463. <https://doi.org/10.1037/a0017075>
- Emmelkamp, P. M., David, D., Beckers, T., Muris, P., Cuijpers, P., Lutz, W., ... & Vervliet, B. (2014). Advancing psychotherapy and evidence-based psychological interventions. *International Journal of Methods in Psychiatric Research*, 23(S1), 58-91. <https://doi.org/10.1002/mpr.1411>
- Ferreira, M., Martinsone, B., & Talić, S. (2020). Promoting sustainable social emotional learning at school through relationship-centered learning environment, teaching methods and formative assessment. *Journal of Teacher Education for Sustainability*, 22(1), 21-36. <https://doi.org/10.2478/jtes-2020-0003>
- Fertuck, E. A., Fischer, S., & Beeney, J. (2018). Social cognition and borderline personality disorder: Splitting and trust impairment findings. *Psychiatric Clinics*, 41(4), 613-632. <https://doi.org/10.1016/j.psc.2018.07.003>
- Figner, B., & Murphy, R. O. (2011). *Using skin conductance in judgment and decision making research*. A handbook of process tracing methods for decision research, (pp. 163-184).

- Fitzpatrick, S., Varma, S., & Kuo, J. R. (2022). Is borderline personality disorder really an emotion dysregulation disorder and, if so, how? A comprehensive experimental paradigm. *Psychological Medicine*, 52(12), 2319-2331. <https://doi.org/10.1017/S0033291720004225>
- Flaxman, P. E., Bond, F. W., & Livheim, F. (2013). *The mindful and effective employee: An acceptance and commitment therapy training manual for improving well-being and performance*. New Harbinger Publications.
- Fomina, T., Burmistrova-Savenkova, A., & Morosanova, V. (2020). Self-regulation and psychological well-being in early adolescence: A two-wave longitudinal study. *Behavioral Sciences*, 10(3), 67. <https://doi.org/10.3390/bs10030067>
- Friedman, N. P., & Robbins, T. W. (2022). The role of prefrontal cortex in cognitive control and executive function. *Neuropsychopharmacology*, 47(1), 72-89. <https://doi.org/10.1038/s41386-021-01132-0>
- Frisch, J. U., Häusser, J. A., & Mojzisch, A. (2015). The Trier Social Stress Test as a paradigm to study how people respond to threat in social interactions. *Frontiers in Psychology*, 6, 124782. <https://doi.org/10.3389/fpsyg.2015.00014>
- Fruzzetti, A. E., Crook, W., Erikson, K. M., Lee, J. E., & Worrall, J. M. (2009). 28 EMOTION REGULATION. *General principles and empirically supported techniques of cognitive behavior therapy*, 272.
- Garke, M. Å., Isacson, N. H., Sörman, K., Bjureberg, J., Hellner, C., Gratz, K. L., ... & Jayaram-Lindström, N. (2021). Emotion dysregulation across levels of substance use. *Psychiatry Research*, 296, 113662. <https://doi.org/10.1016/j.psychres.2020.113662>
- Garland, E. L., Bell, S., Atchley, R., & Froeliger, B. (2020). Emotion dysregulation in addiction. In *The Oxford handbook of emotion dysregulation* (pp. 313-326). Oxford University Press, New York.
- Garland, E. L., Farb, N. A., R. Goldin, P., & Fredrickson, B. L. (2015). Mindfulness broadens awareness and builds eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological inquiry*, 26(4), 293-314. <https://doi.org/10.1080/1047840X.2015.1064294>
- Giotakos, O. (2020). Neurobiology of emotional trauma. *Psychiatriki*, 31(2), 162-171.
- Goldenberg, I., Matheson, K., & Mantler, J. (2006). The assessment of emotional intelligence: A comparison of performance-based and self-report methodologies. *Journal of personality assessment*, 86(1), 33-45. https://doi.org/10.1207/s15327752jpa8601_05
- Goldin, P. R., Thurston, M., Allende, S., Moodie, C., Dixon, M. L., Heimberg, R. G., & Gross, J. J. (2021). Evaluation of cognitive behavioral therapy vs mindfulness meditation in brain changes during reappraisal and acceptance among patients with social anxiety disorder: a randomized clinical trial. *JAMA psychiatry*, 78(10), 1134-1142. <https://doi.org/10.1001/jamapsychiatry.2021.1862>
- Goldin, P. R., Ziv, M., Jazaieri, H., Hahn, K., Heimberg, R., & Gross, J. J. (2013). Impact of cognitive behavioral therapy for social anxiety disorder on the neural dynamics of cognitive reappraisal of negative self-beliefs: randomized clinical trial. *JAMA psychiatry*, 70(10), 1048-1056. <https://doi.org/10.1001/jamapsychiatry.2013.234>
- Googhari, Z. S., Hafezi, F., Asgari, P., & Heidari, A. (2022). The effectiveness of mindfulness-based cognitive therapy and acceptance and commitment therapy on medical science students' subjective well-being, psychological distress, and emotion regulation. *Journal of Shahrekord University of Medical Sciences*, 24(1), 35-41. <https://doi.org/10.34172/jsums.2022.07>
- Grecucci, A., Pappaianni, E., Siugzdaitė, R., Theuninck, A., & Job, R. (2015). Mindful emotion regulation: Exploring the neurocognitive mechanisms behind mindfulness. *BioMed Research International*, 2015. <https://doi.org/10.1155/2015/670724>
- Greenier, V., Derakhshan, A., & Fathi, J. (2021). Emotion regulation and psychological well-being in teacher work engagement: a case of British and Iranian English language teachers. *System*, 97, 102446. <https://doi.org/10.1016/j.system.2020.102446>
- Greimel, K. V., & Kröner-Herwig, B. (2011). Cognitive behavioral treatment (CBT). *Textbook of Tinnitus*, 557-561. https://doi.org/10.1007/978-1-60761-145-5_71
- Grill, F., Johansson, J., Axelsson, J., Brynolfsson, P., Nyberg, L., & Rieckmann, A. (2021). Dissecting motor and cognitive component processes of a finger-tapping task with hybrid dopamine positron emission tomography and functional magnetic resonance imaging. *Frontiers in Human Neuroscience*, 15, 733091. <https://doi.org/10.3389/fnhum.2021.733091>

- Gross, J. J. (2024). Conceptual foundations of emotion regulation. In J. J. Gross & B. Q. Ford (Eds.), *Handbook of emotion regulation* (3rd ed., pp. 3–12). The Guilford Press.
- Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology*, 64(6), 970. <https://doi.org/10.1037/0022-3514.64.6.970>
- Hagger, M. S., Rebar, A. L., Mullan, B., Lipp, O. V., & Chatzisarantis, N. L. (2015). The subjective experience of habit captured by self-report indexes may lead to inaccuracies in the measurement of habitual action. *Health Psychology Review*, 9(3), 296-302. <https://doi.org/10.1080/17437199.2014.959728>
- Hallion, L. S., Steinman, S. A., Tolin, D. F., & Diefenbach, G. J. (2018). Psychometric properties of the Difficulties in Emotion Regulation Scale (DERS) and its short forms in adults with emotional disorders. *Frontiers in Psychology*, 9, 539. <https://doi.org/10.3389/fpsyg.2018.00539>
- Harmon-Jones, E., Gable, P. A., & Peterson, C. K. (2010). The role of asymmetric frontal cortical activity in emotion-related phenomena: A review and update. *Biological Psychology*, 84(3), 451-462. <https://doi.org/10.1016/j.biopsycho.2009.08.010>
- Harms, M. B., Martin, A., & Wallace, G. L. (2010). Facial emotion recognition in autism spectrum disorders: a review of behavioral and neuroimaging studies. *Neuropsychology Review*, 20, 290-322. <https://doi.org/10.1007/s11065-010-9138-6>
- Harris, R. (2019). *ACT made simple: An easy-to-read primer on acceptance and commitment therapy*. New Harbinger Publications.
- Hassa, T., Spiteri, S., Schmidt, R., Merkel, C., & Schoenfeld, M. A. (2021). Increased amygdala activity associated with cognitive reappraisal strategy in functional neurologic disorder. *Frontiers in Psychiatry*, 12, 613156. <https://doi.org/10.3389/fpsyg.2021.613156>
- Hayes, S. C., & Hofmann, S. G. (2021). “Third-wave” cognitive and behavioral therapies and the emergence of a process-based approach to intervention in psychiatry. *World Psychiatry*, 20(3), 363-375. <https://doi.org/10.1002/wps.20884>
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy* (Vol. 6). Guilford press.
- Hiebel, N., Rabe, M., Maus, K., Peusquens, F., Radbruch, L., & Geiser, F. (2021). Resilience in adult health science revisited—a narrative review synthesis of process-oriented approaches. *Frontiers in Psychology*, 12, 659395. <https://doi.org/10.3389/fpsyg.2021.659395>
- Hope-Bell, J. (2022). *Investigating Acceptance and Commitment Therapy (ACT), and the Role of Mindfulness, in the Context of Stress Management* (Doctoral dissertation, University of the West of England).
- Horenstein, A., & Heimberg, R. G. (2020). Anxiety disorders and healthcare utilization: A systematic review. *Clinical Psychology Review*, 81, 101894. <https://doi.org/10.1016/j.cpr.2020.101894>
- Hu, X., Pan, L., & Li, W. (2021). Meta-analysis on the efficacy of the norepinephrine reuptake inhibitors reboxetine and atomoxetine for the treatment of schizophrenia and attention deficit hyperactivity disorder. *IRB*, 554. <https://doi.org/10.17219/acem/155802>
- Hughes, D. J., Kratsiotis, I. K., Niven, K., & Holman, D. (2020). Personality traits and emotion regulation: A targeted review and recommendations. *Emotion*, 20(1), 63. <https://doi.org/10.1037/emo0000644>
- İNCE, D. K., & DEMİR, S. (2023). Mindfulness-based cognitive therapy: A review. *Journal of Gazi University Health Sciences Institute*, 5(2), 77-82. <https://doi.org/10.59124/guhes.1276584>
- Inman, C. S., Bijanki, K. R., Bass, D. I., Gross, R. E., Hamann, S., & Willie, J. T. (2020). Human amygdala stimulation effects on emotion physiology and emotional experience. *Neuropsychologia*, 145, 106722. <https://doi.org/10.1016/j.neuropsychologia.2018.03.019>
- Ishikawa, J., Sakurai, Y., Ishikawa, A., & Mitsushima, D. (2020). Contribution of the prefrontal cortex and basolateral amygdala to behavioral decision-making under reward/punishment conflict. *Psychopharmacology*, 237, 639-654. <https://doi.org/10.1007/s00213-019-05398-7>
- Kashdan, T. B., & Rottenberg, J. (2010). Psychological flexibility as a fundamental aspect of health. *Clinical Psychology Review*, 30(7), 865-878. <https://doi.org/10.1016/j.cpr.2010.03.001>
- Kim, N., & Kim, M. J. (2021). Altered task-evoked corticolimbic responsivity in generalized anxiety disorder. *International Journal of Molecular Sciences*, 22(7), 3630. <https://doi.org/10.3390/ijms22073630>

- Kirlic, N., Cohen, Z., & Stewart, J. L. (2021). Neurocircuitry of mindfulness-based interventions for substance use prevention and recovery. *Current Addiction Reports*, 1-10. <https://doi.org/10.1007/s40429-021-00396-2>
- Kirschenbaum, H. (2013). *Values clarification in counseling and psychotherapy: Practical strategies for individual and group settings*. Oxford University Press.
- Kreisman, J. J., & Straus, H. (2021). *I hate you--Don't leave me:: Understanding the borderline personality*. Penguin.
- Küpeli Akkol, E., Tatlı Çankaya, I., Şeker Karatoprak, G., Carpar, E., Sobarzo-Sánchez, E., & Capasso, R. (2021). Natural compounds as medical strategies in the prevention and treatment of psychiatric disorders seen in neurological diseases. *Frontiers in Pharmacology*, 12, 669638. <https://doi.org/10.3389/fphar.2021.669638>
- Laumann, T. O., & Snyder, A. Z. (2021). Brain activity is not only for thinking. *Current Opinion in Behavioral Sciences*, 40, 130-136. <https://doi.org/10.1016/j.cobeha.2021.04.002>
- Leahy, R. L., Clark, D. A., & Dozois, D. J. (2022). *Cognitive-behavioral theories. Gabbard's textbook of psychotherapeutic treatments*. American Psychiatric Pub., 151.
- Lee, E., Faber, J., & Bowles, K. (2022). A review of trauma specific treatments (tsts) for post-traumatic stress disorder (PTSD). *Clinical Social Work Journal*, 50(2), 147-159. <https://doi.org/10.1007/s10615-021-00816-w>
- Lenzi, F., Cortese, S., Harris, J., & Masi, G. (2018). Pharmacotherapy of emotional dysregulation in adults with ADHD: a systematic review and meta-analysis. *Neuroscience & Biobehavioral Reviews*, 84, 359-367. <https://doi.org/10.1016/j.neubiorev.2017.08.010>
- Levin, R. L., & Rawana, J. S. (2022). Exploring two models of emotion regulation: how strategy use, abilities, and flexibility relate to well-being and mental illness. *Anxiety, Stress, & Coping*, 35(6), 623-636. <https://doi.org/10.1080/10615806.2021.2018419>
- Lincoln, T. M., Schulze, L., & Renneberg, B. (2022). The role of emotion regulation in the characterization, development and treatment of psychopathology. *Nature Reviews Psychology*, 1(5), 272-286. <https://doi.org/10.1038/s44159-022-00040-4>
- Linehan, M. M., & Wilks, C. R. (2015). The course and evolution of dialectical behavior therapy. *American journal of psychotherapy*, 69(2), 97-110. <https://doi.org/10.1176/appi.psychotherapy.2015.69.2.97>
- Litz, B. T., Litz, B. T., & Gray, M. J. (2002). Emotional numbing in posttraumatic stress disorder: Current and future research directions. *Australian & New Zealand Journal of Psychiatry*, 36(2), 198-204. <https://doi.org/10.1046/j.1440-1614.2002.01002.x>
- Liu, Y., Pan, H., Yang, R., Wang, X., Rao, J., Zhang, X., & Pan, C. (2021). The relationship between test anxiety and emotion regulation: the mediating effect of psychological resilience. *Annals of General Psychiatry*, 20, 1-9. <https://doi.org/10.1186/s12991-021-00360-4>
- Liu, Z., Lin, R., & Luo, M. (2020). Reward contributions to serotonergic functions. *Annual Review of Neuroscience*, 43, 141-162. <https://doi.org/10.1146/annurev-neuro-093019-112252>
- Long, M., Verbeke, W., Ein-Dor, T., & Vrtička, P. (2020). A functional neuro-anatomical model of human attachment (NAMA): Insights from first-and second-person social neuroscience. *Cortex*, 126, 281-321. <https://doi.org/10.1016/j.cortex.2020.01.010>
- Menon, V., & D'Esposito, M. (2022). The role of PFC networks in cognitive control and executive function. *Neuropsychopharmacology*, 47(1), 90-103. <https://doi.org/10.1038/s41386-021-01152-w>
- Mirkovic, B., Delvenne, V., Robin, M., Pham-Scottez, A., Corcos, M., & Speranza, M. (2021). Borderline personality disorder and adolescent suicide attempt: The mediating role of emotional dysregulation. *BMC Psychiatry*, 21, 1-10. <https://doi.org/10.1186/s12888-021-03377-x>
- Moltrecht, B., Deighton, J., Patalay, P., & Edbrooke-Childs, J. (2021). Effectiveness of current psychological interventions to improve emotion regulation in youth: a meta-analysis. *European Child & Adolescent Psychiatry*, 30(6), 829-848. <https://doi.org/10.1007/s00787-020-01498-4>
- Muller, C. P., & Cunningham, K. A. (2020). *Handbook of the behavioral neurobiology of serotonin*. Academic Press.
- Muñoz-Rivas, M., Bellot, A., Montorio, I., Ronzón-Tirado, R., & Redondo, N. (2021). Profiles of emotion regulation and post-traumatic stress severity among female victims of intimate partner violence. *International Journal of Environmental Research and Public Health*, 18(13), 6865. <https://doi.org/10.3390/ijerph18136865>

- Murnane, K. S., Edinoff, A. N., Cornett, E. M., & Kaye, A. D. (2023). Updated perspectives on the neurobiology of substance use disorders using neuroimaging. *Substance Abuse and Rehabilitation*, 99-111. <https://doi.org/10.2147/SAR.S362861>
- Murray, E. A., & Fellows, L. K. (2022). Prefrontal cortex interactions with the amygdala in primates. *Neuropsychopharmacology*, 47(1), 163-179. <https://doi.org/10.1038/s41386-021-01128-w>
- Nejati, V., Majdi, R., Salehinejad, M. A., & Nitsche, M. A. (2021). The role of dorsolateral and ventromedial prefrontal cortex in the processing of emotional dimensions. *Scientific reports*, 11(1), 1971. <https://doi.org/10.1038/s41598-021-81454-7>
- Nicholson, A. A., Densmore, M., Frewen, P. A., Neufeld, R. W., Th  berge, J., Jetly, R., ... & Ros, T. (2023). Homeostatic normalization of alpha brain rhythms within the default-mode network and reduced symptoms in post-traumatic stress disorder following a randomized controlled trial of electroencephalogram neurofeedback. *Brain Communications*, 5(2), fcad068. <https://doi.org/10.1093/braincomms/fcad068>
- Noel, J. M., & Jackson, C. W. (2020). ASHP therapeutic position statement on the use of antipsychotic medications in the treatment of adults with schizophrenia and schizoaffective disorder. *American Journal of Health-System Pharmacy*, 77(24), 2114-2132. <https://doi.org/10.1093/ajhp/zxaa303>
- Ogata, N., de Souza Dantas, L. M., & Crowell-Davis, S. L. (2019). Selective serotonin reuptake inhibitors. *Veterinary psychopharmacology*, 103-128.
- Olderbak, S., Uusberg, A., MacCann, C., Pollak, K. M., & Gross, J. J. (2023). The process model of emotion regulation questionnaire: assessing individual differences in strategy stage and orientation. *Assessment*, 30(7), 2090-2114. <https://doi.org/10.1177/10731911221134601>
- Orford, J., Velleman, R., Natera, G., Templeton, L., & Copello, A. (2013). Addiction in the family is a major but neglected contributor to the global burden of adult ill-health. *Social Science & Medicine*, 78, 70-77. <https://doi.org/10.1016/j.socscimed.2012.11.036>
- Otsuka, T., Le, H. T., Thein, Z. L., Ihara, H., Sato, F., Nakao, T., & Kohsaka, A. (2022). Deficiency of the circadian clock gene *Rev-erba* induces mood disorder-like behaviours and dysregulation of the serotonergic system in mice. *Physiology & Behavior*, 256, 113960. <https://doi.org/10.1016/j.physbeh.2022.113960>
- Otto, M. W., McHugh, R. K., & Kantak, K. M. (2010). Combined pharmacotherapy and cognitive-behavioral therapy for anxiety disorders: Medication effects, glucocorticoids, and attenuated treatment outcomes. *Clinical Psychology: Science and Practice*, 17(2), 91. <https://doi.org/10.1111/j.1468-2850.2010.01198.x>
- Pace-Schott, E. F., Amole, M. C., Aue, T., Balconi, M., Bylsma, L. M., Critchley, H., ... & VanElzakker, M. B. (2019). Physiological feelings. *Neuroscience & Biobehavioral Reviews*, 103, 267-304. <https://doi.org/10.1016/j.neubiorev.2019.05.002>
- Park, C. L., Kubzansky, L. D., Chafouleas, S. M., Davidson, R. J., Keltner, D., Parsafar, P., ... & Wang, K. H. (2023). Emotional well-being: What it is and why it matters. *Affective Science*, 4(1), 10-20. <https://doi.org/10.1007/s42761-022-00163-0>
- Parisi, A., Roberts, R. L., Hanley, A. W., & Garland, E. L. (2022). Mindfulness-oriented recovery enhancement for addictive behavior, psychiatric distress, and chronic pain: A multilevel meta-analysis of randomized controlled trials. *Mindfulness*, 13(10), 2396-2412. <https://doi.org/10.1007/s12671-022-01964-x>
- Paulus, F. W., Ohmann, S., M  hler, E., Plener, P., & Popow, C. (2021). Emotional dysregulation in children and adolescents with psychiatric disorders. A narrative review. *Frontiers in psychiatry*, 12, 628252. <https://doi.org/10.3389/fpsyt.2021.628252>
- Pham, T., Lau, Z. J., Chen, S. A., & Makowski, D. (2021). Heart rate variability in psychology: A review of HRV indices and an analysis tutorial. *Sensors*, 21(12), 3998. <https://doi.org/10.3390/s21123998>
- Phillips, K. F. V., & Power, M. J. (2007). A new self-report measure of emotion regulation in adolescents: The Regulation of Emotions Questionnaire. *Clinical Psychology & Psychotherapy: An International Journal of Theory & Practice*, 14(2), 145-156. <https://doi.org/10.1002/cpp.523>
- Polizzi, C., Lynn, S. J., & Perry, A. (2020). Stress and coping in the time of COVID-19: Pathways to resilience and recovery. *Clinical Neuropsychiatry*, 17(2), 59. <https://doi.org/10.36131/CN20200204>
- Pruessner, L., Barnow, S., Holt, D. V., Joormann, J., & Schulze, K. (2020). A cognitive control framework for understanding emotion regulation flexibility. *Emotion*, 20(1), 21. <https://doi.org/10.1037/emo0000658>

- Reichenberg, L. W., & Seligman, L. (2016). *Selecting effective treatments: A comprehensive, systematic guide to treating mental disorders*. John Wiley & Sons.
- Ressler, K. J., Berretta, S., Bolshakov, V. Y., Rosso, I. M., Meloni, E. G., Rauch, S. L., & Carlezon Jr, W. A. (2022). Post-traumatic stress disorder: clinical and translational neuroscience from cells to circuits. *Nature Reviews Neurology*, 18(5), 273-288. <https://doi.org/10.1038/s41582-022-00635-8>
- Riepenhausen, A., Wackerhagen, C., Reppmann, Z. C., Deter, H. C., Kalisch, R., Veer, I. M., & Walter, H. (2022). Positive cognitive reappraisal in stress resilience, mental health, and well-being: A comprehensive systematic review. *Emotion Review*, 14(4), 310-331. <https://doi.org/10.1177/17540739221114642>
- Ritschel, L. A., Lim, N. E., & Stewart, L. M. (2015). Transdiagnostic applications of DBT for adolescents and adults. *American Journal of Psychotherapy*, 69(2), 111-128. <https://doi.org/10.1176/appi.psychotherapy.2015.69.2.111>
- Roberts, C., Sahakian, B. J., & Robbins, T. W. (2020). Psychological mechanisms and functions of 5-HT and SSRIs in potential therapeutic change: Lessons from the serotonergic modulation of action selection, learning, affect, and social cognition. *Neuroscience & Biobehavioral Reviews*, 119, 138-167. <https://doi.org/10.1016/j.neubiorev.2020.09.001>
- Rodriguez, L. M., Lee, K. D., Onufrak, J., Dell, J. B., Quist, M., Drake, H. P., & Bryan, J. (2020). Effects of a brief interpersonal conflict cognitive reappraisal intervention on improvements in access to emotion regulation strategies and depressive symptoms in college students. *Psychology & Health*, 35(10), 1207-1227. <https://doi.org/10.1080/08870446.2019.1711090>
- Roepke, A. M., & Seligman, M. E. (2016). Depression and prospection. *British Journal of Clinical Psychology*, 55(1), 23-48. <https://doi.org/10.1111/bjc.12087>
- Rompilla Jr, D. B., Hittner, E. F., Stephens, J. E., Mauss, I., & Haase, C. M. (2022). Emotion regulation in the face of loss: How detachment, positive reappraisal, and acceptance shape experiences, physiology, and perceptions in late life. *Emotion*, 22(7), 1417. <https://doi.org/10.1037/emo0000932>
- Roos, L. G., & Bennett, J. M. (2023). Reappraisal and health: How habitual reappraisal and reappraisal ability interact to protect against life stress in young adults. *Emotion*, 23(5), 1360. <https://doi.org/10.1037/emo0001154>
- Roshdy, A., Karar, A., Kork, S. A., Beyrouthy, T., & Nait-ali, A. (2024). Advancements in EEG emotion recognition: Leveraging multi-modal database integration. *Applied Sciences*, 14(6), 2487. <https://doi.org/10.3390/app14062487>
- Ross, J. A., & Van Bockstaele, E. J. (2021). The locus coeruleus-norepinephrine system in stress and arousal: unraveling historical, current, and future perspectives. *Frontiers in Psychiatry*, 11, 601519. <https://doi.org/10.3389/fpsyt.2020.601519>
- Roth, D. A., Eng, W., & Heimberg, R. G. (2002). Cognitive behavior therapy. *Encyclopedia of Psychotherapy*, 1, 451-458.
- Salehinejad, M. A., Ghanavati, E., Rashid, M. H. A., & Nitsche, M. A. (2021). Hot and cold executive functions in the brain: A prefrontal-cingular network. *Brain and Neuroscience Advances*, 5, 23982128211007769. <https://doi.org/10.1177/23982128211007769>
- Salmon, P. G., Sephton, S. E., & Dreeben, S. J. (2011). Mindfulness-based stress reduction. *Acceptance and mindfulness in cognitive behavior therapy: Understanding and applying the new therapies*, 132-163. <https://doi.org/10.1002/9781118001851.ch6>
- Sander, D., & Nummenmaa, L. (2021). Reward and emotion: an affective neuroscience approach. *Current Opinion in Behavioral Sciences*, 39, 161-167. <https://doi.org/10.1016/j.cobeha.2021.03.016>
- Santorelli, S. F., Kabat-Zinn, J., Blacker, M., Meleo-Meyer, F., & Koerbel, L. (2017). *Mindfulness-based stress reduction (MBSR) authorized curriculum guide*. Center for mindfulness in medicine, health care, and society (CFM). University of Massachusetts Medical School.
- Schaich, A., Braakmann, D., Rogg, M., Meine, C., Ambrosch, J., Assmann, N., ... & Fassbinder, E. (2021). How do patients with borderline personality disorder experience distress tolerance skills in the context of dialectical behavioral therapy?—A qualitative study. *Plos one*, 16(6), e0252403. <https://doi.org/10.1371/journal.pone.0252403>
- Segal, Z., Williams, M., & Teasdale, J. (2018). *Mindfulness-based cognitive therapy for depression*. Guilford publications.
- Sharma, A., & McClellan, J. (2021). Emotional and behavioral dysregulation in severe mental illness. *Child and Adolescent Psychiatric Clinics*, 30(2), 415-429. <https://doi.org/10.1016/j.chc.2020.10.010>
- Sharma, M., Kacker, S., & Sharma, M. (2016). A brief introduction and review on galvanic skin response. *Int J Med Res Prof*, 2(6), 13-17. <https://doi.org/10.21276/ijmrp.2016.2.6.003>

- Shea, D. (2014). *Cognitive behavioral approaches for counselors*. SAGE Publications.
- Sheppes, G. (2020). Transcending the “good & bad” and “here & now” in emotion regulation: Costs and benefits of strategies across regulatory stages. In *Advances in experimental social psychology* (Vol. 61, pp. 185-236). Academic Press. <https://doi.org/10.1016/bs.aesp.2019.09.003>
- Shiffman, S., Stone, A. A., & Hufford, M. R. (2008). Ecological momentary assessment. *Annu. Rev. Clin. Psychol.*, 4, 1-32. <https://doi.org/10.1146/annurev.clinpsy.3.022806.091415>
- Sikka, P., Stenberg, J., Vorobyev, V., & Gross, J. J. (2022). The neural bases of expressive suppression: a systematic review of functional neuroimaging studies. *Neuroscience & Biobehavioral Reviews*, 138, 104708. <https://doi.org/10.1016/j.neubiorev.2022.104708>
- Šimić, G., Tkalčić, M., Vukić, V., Mulc, D., Španić, E., Šagud, M., ... & R. Hof, P. (2021). Understanding emotions: origins and roles of the amygdala. *Biomolecules*, 11(6), 823. <https://doi.org/10.3390/biom11060823>
- Simione, L., & Saldarini, F. (2023). A critical review of the monitor and acceptance theory of mindfulness. *Mindfulness*, 14(6), 1317-1328. <https://doi.org/10.1007/s12671-023-02129-0>
- Smith, W., Wadley, G., Webber, S., Tag, B., Kostakos, V., Koval, P., & Gross, J. J. (2022, April). Digital emotion regulation in everyday life. In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (pp. 1-15). <https://doi.org/10.1145/3491102.3517573>
- Sörman, K., Garke, M. Å., Isacsson, N. H., Jangard, S., Bjureberg, J., Hellner, C., ... & Jayaram-Lindström, N. (2022). Measures of emotion regulation: Convergence and psychometric properties of the difficulties in emotion regulation scale and emotion regulation questionnaire. *Journal of Clinical Psychology*, 78(2), 201-217. <https://doi.org/10.1002/jclp.23206>
- Steward, T., Davey, C. G., Jamieson, A. J., Stephanou, K., Soriano-Mas, C., Felmingham, K. L., & Harrison, B. J. (2021). Dynamic neural interactions supporting the cognitive reappraisal of emotion. *Cerebral Cortex*, 31(2), 961-973. <https://doi.org/10.1093/cercor/bhaa268>
- Stover, A. D., Shulkin, J., Lac, A., & Rapp, T. (2024). A Meta-analysis of cognitive reappraisal and personal resilience. *Clinical Psychology Review*, 102428. <https://doi.org/10.1016/j.cpr.2024.102428>
- Strosahl, K. D., & Robinson, P. J. (2017). *The mindfulness and acceptance workbook for depression: Using acceptance and commitment therapy to move through depression and create a life worth living*. New Harbinger Publications.
- Sureka, P. J. (2023). *Emotional ability resources: A therapist's guide to unlocking the power within you*. Hay House, Inc.
- Teper, R., Segal, Z. V., & Inzlicht, M. (2013). Inside the mindful mind: How mindfulness enhances emotion regulation through improvements in executive control. *Current Directions in Psychological Science*, 22(6), 449-454. <https://doi.org/10.1177/0963721413495869>
- Thomas, E. A., Hamrick, L. A., Owens, G. P., & Tekie, Y. T. (2020). Posttraumatic growth among undergraduates: Contributions from adaptive cognitive emotion regulation and emotional intelligence. *Traumatology*, 26(1), 68. <https://doi.org/10.1037/trm0000203>
- Tyra, A. T., Fergus, T. A., & Ginty, A. T. (2023). Emotion suppression and acute physiological responses to stress in healthy populations: A quantitative review of experimental and correlational investigations. *Health Psychology Review*, 1-25. <https://doi.org/10.1080/17437199.2023.2251559>
- Valiente-Gómez, A., Moreno-Alcázar, A., Treen, D., Cedrón, C., Colom, F., Perez, V., & Amann, B. L. (2017). EMDR beyond PTSD: A systematic literature review. *Frontiers in psychology*, 8, 1668. <https://doi.org/10.3389/fpsyg.2017.01668>
- Vally, Z., & Ahmed, K. (2020). Emotion regulation strategies and psychological wellbeing: Examining cognitive reappraisal and expressive suppression in an Emirati college sample. *Neurology, Psychiatry and Brain Research*, 38, 27-32. <https://doi.org/10.1016/j.npbr.2020.09.001>
- Van Dijk, S., McKay, M., Wood, J. C., Brantley, J., Fanning, P., Pool, E., & Ona, P. E. Z. (2023). *Distress tolerance made easy: dialectical behavior therapy skills for dealing with intense emotions in difficult times*. New Harbinger Publications.
- Volkaert, B., Wante, L., Van Beveren, M. L., Vervoort, L., & Braet, C. (2020). Training adaptive emotion regulation skills in early adolescents: The effects of distraction, acceptance, cognitive reappraisal, and problem solving. *Cognitive Therapy and Research*, 44, 678-696. <https://doi.org/10.1007/s10608-019-10073-4>

- Vosahlikova, M., & Svoboda, P. (2016). Lithium—therapeutic tool endowed with multiple beneficiary effects caused by multiple mechanisms. *Acta Neurobiologiae Experimentalis*, 76(1), 1-19.
- Walkup, J. T., Friedland, S. J., Peris, T. S., & Strawn, J. R. (2021). Dysregulation, catastrophic reactions, and the anxiety disorders. *Child and Adolescent Psychiatric Clinics*, 30(2), 431-444. <https://doi.org/10.1016/j.chc.2020.10.011>
- Wang, D., Cao, D., & Kiani, A. (2023). How and when can job-insecure employees prevent psychological distress against the COVID-19 pandemic? The role of cognitive appraisal and reappraisal. *Current Psychology*, 1-13. <https://doi.org/10.1007/s12144-023-04331-8>
- Watkins, E. R., & Roberts, H. (2020). Reflecting on rumination: Consequences, causes, mechanisms and treatment of rumination. *Behaviour Research and Therapy*, 127, 103573. <https://doi.org/10.1016/j.brat.2020.103573>
- Wearne, T. A., Lucien, A., Trimmer, E. M., Logan, J. A., Rushby, J., Wilson, E., ... & McDonald, S. (2019). Anxiety sensitivity moderates the subjective experience but not the physiological response to psychosocial stress. *International Journal of Psychophysiology*, 141, 76-83. <https://doi.org/10.1016/j.ijpsycho.2019.04.012>
- Webb, A. J. (2023). *Acceptance and Commitment Therapy (ACT): Foundational principles, processes, and treatment components*. Authorea Preprints.
- Wehrwein, E. A., Orer, H. S., & Barman, S. M. (2016). Overview of the anatomy, physiology, and pharmacology of the autonomic nervous system. <https://doi.org/10.1002/cphy.c150037>
- Weis, C. N., Webb, E. K., deRoos-Cassini, T. A., & Larson, C. L. (2022). Emotion dysregulation following trauma: Shared neurocircuitry of traumatic brain injury and trauma-related psychiatric disorders. *Biological psychiatry*, 91(5), 470-477. <https://doi.org/10.1016/j.biopsych.2021.07.023>
- Wessa, M., Sandner, M., Rimpel, J., & Schönfelder, S. (2024). The influence of acute stress exposure on cognitive reappraisal: a psychophysiological study. *Stress*, 27(1), 2329663. <https://doi.org/10.1080/10253890.2024.2329663>
- Wheeler, M. S., Arnkoff, D. B., & Glass, C. R. (2017). The neuroscience of mindfulness: How mindfulness alters the brain and facilitates emotion regulation. *Mindfulness*, 8, 1471-1487. <https://doi.org/10.1007/s12671-017-0742-x>
- Wilms, R., Lanwehr, R., & Kastenmüller, A. (2020). Emotion regulation in everyday life: The role of goals and situational factors. *Frontiers in Psychology*, 11, 522763. <https://doi.org/10.3389/fpsyg.2020.00877>
- Wright, J. H., Brown, G. K., Thase, M. E., & Basco, M. R. (2017). *Learning cognitive-behavior therapy: An illustrated guide*. American Psychiatric Pub.
- Zeifman, R. J., Boritz, T., Barnhart, R., Labrish, C., & McMain, S. F. (2020). The independent roles of mindfulness and distress tolerance in treatment outcomes in dialectical behavior therapy skills training. *Personality Disorders: Theory, Research, and Treatment*, 11(3), 181. <https://doi.org/10.1037/per0000368>
- Zhang, Q., Zhao, H., & Zheng, Y. (2019). Effectiveness of mindfulness-based stress reduction (MBSR) on symptom variables and health-related quality of life in breast cancer patients—a systematic review and meta-analysis. *Supportive Care in Cancer*, 27, 771-781. <https://doi.org/10.1007/s00520-018-4570-x>
- Zhao, J., Mo, L., Bi, R., He, Z., Chen, Y., Xu, F., ... & Zhang, D. (2021). The VLPFC versus the DLPFC in downregulating social pain using reappraisal and distraction strategies. *Journal of Neuroscience*, 41(6), 1331-1339.
- Ziv, M., Goldin, P. R., Jazaieri, H., Hahn, K. S., & Gross, J. J. (2013). Emotion regulation in social anxiety disorder: behavioral and neural responses to three socio-emotional tasks. *Biology of Mood & Anxiety Disorders*, 3, 1-17. <https://doi.org/10.1186/2045-5380-3-20>
- Zotey, V., Mayeli, A., Misaki, M., & Bodurka, J. (2020). Emotion self-regulation training in major depressive disorder using simultaneous real-time fMRI and EEG neurofeedback. *NeuroImage.Clinical*, 27, 102331. <https://doi.org/10.1016/j.nicl.2020.102331>