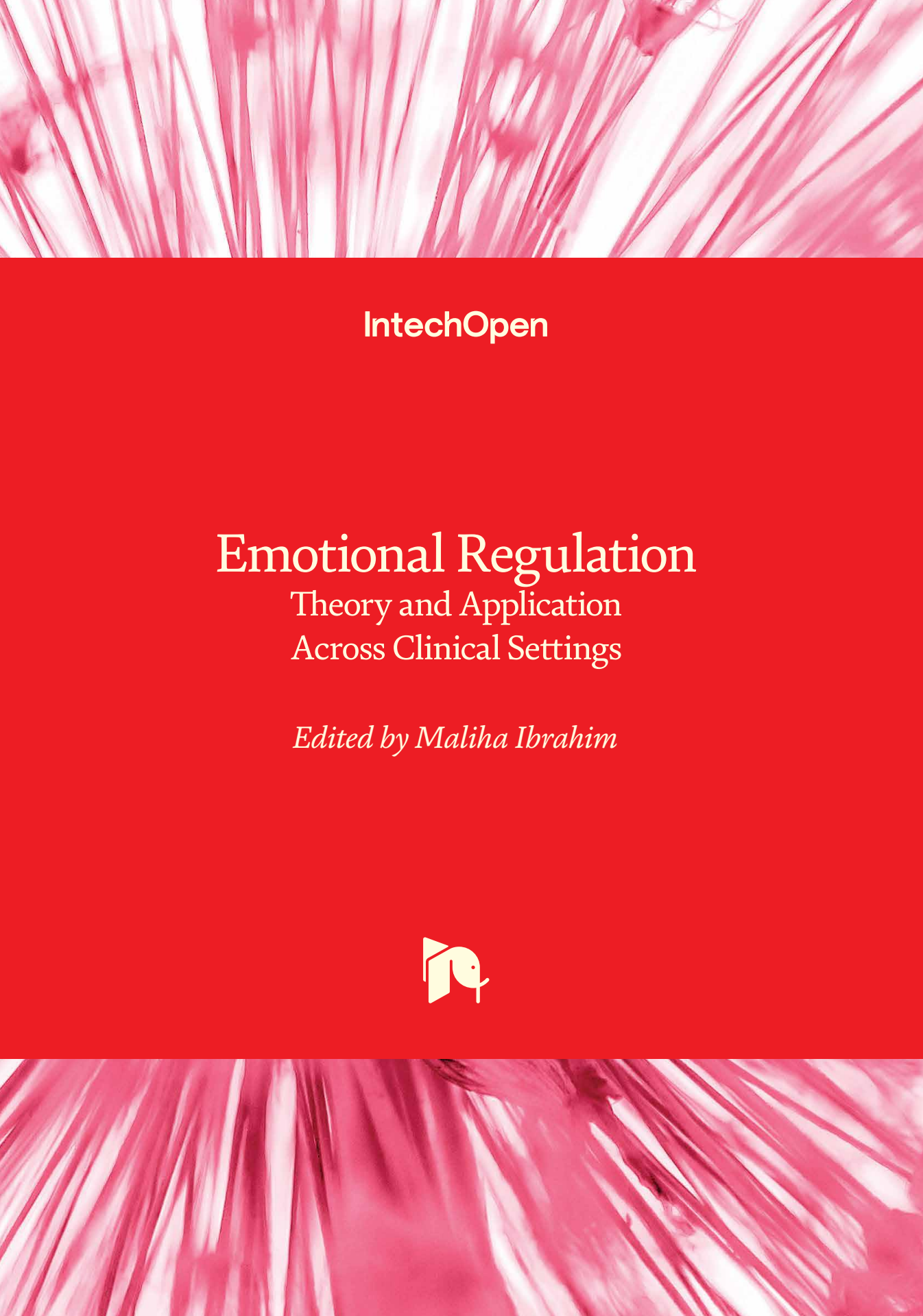


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Emotional Regulation

Theory and Application
Across Clinical Settings

Edited by Maliha Ibrahim



Emotional Regulation - Theory and Application Across Clinical Settings

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Meet the editor



Maliha Ibrahim (She/They), Ph.D., RP, is a Mental Health Researcher, Educator and Psychotherapist with over 15 years of experience. Maliha teaches various postgraduate-level courses, including couples and family therapy, ethics in psychotherapy, research and statistical methods, humanistic, cognitive and relational counselling, socio-cultural psychology, trauma-focused counselling and practicum. Maliha is also a trainer of the person-of-the-therapist (POTT) model of psychotherapy, an experiential training program for trainee counsellors. Maliha has received several grants from esteemed funders and academic bodies and published over 20 peer-reviewed research journal articles and several book chapters in interventions for depression, suicidality, attachment and family therapy, resilience and mental health in minority populations and school-based mental health interventions for youth.

Contents

Preface	XI
Chapter 1	1
Individual Differences in Emotion-Regulation Development <i>by Ainzara Favini, Alessia Teresa Virzì, Carolina Lunetti, Loreta Cannito, Tiziana Quarto and Paola Palladino</i>	
Chapter 2	23
Emotional Flooding in Couple Relationships: Psychosocial Aspects and Regulatory Strategies <i>by Álvaro García del Castillo-López, María Berenguer-Soler, David Pineda and José A. García del Castillo</i>	
Chapter 3	45
Perspective Chapter: Emotion Regulation in Attention Deficit/Hyperactivity Disorder (ADHD) – A Lifespan Perspective <i>by Supriya Malik</i>	
Chapter 4	65
Emotion Regulation in Individuals with ADHD: A Clinical Guide <i>by Mahdavi Abed and Hejazi Elaheh</i>	
Chapter 5	85
Emotion Regulation through Cognitive Strategies <i>by Vincent De Paul Savarimuthu, Dona Amalorpavam Maria Joseph and Muthuchamy Irulandi</i>	
Chapter 6	109
Emotion Regulation across the Lifespan: Adapting Interventions for Children, Adults, and Older Adults <i>by Anteneh T. Asmamaw</i>	
Chapter 7	133
Applying Emotional Regulation Strategies to Manage Climate Distress <i>by Maliha Ibrahim</i>	

Preface

In a rapidly transforming and constantly evolving world, with a constant state of flux across socio-political, environmental and cultural contexts, emotional regulation at individual, relational, and community levels may be a key feature of resilience. Emotional regulation is the core mechanism in many clinical processes and across most populations in clinical practice [1, 2]. Authors highlight that assessing and promoting emotional regulation is one way to encourage individuals to engage in mental health-promoting behaviours and reduce the risk of overall impact on functioning [3]. In terms of individual psychology, it applies to models like Cognitive Behavioural Therapy (CBT), Dialectical behavioural therapy (DBT), Acceptance and Commitment Therapy (ACT), interpersonal therapy, humanistic therapy, psychodynamic approaches and even new modalities like Internal Family Systems. As a treatment mechanism, emotion is also applicable to integrated treatments for ADHD, neurodivergence and developmental treatments with children as well as adults [1, 2]. In terms of systemic therapy, it is increasingly seen as a common mechanism for change in couples and family therapy models. Coregulation is an important skill for partners or family members to enhance communication, increase cohesion and reduce relational conflict. It might also be the most crucial aspect of managing our personal well-being and supporting one another in terms of skill building towards serving our communities, providing psychological first aid, or participating in community-based prevention and intervention efforts for enhanced well-being. Emotional regulation has been seen as an important factor in disaster preparedness, resilience and change as well as other aspects of climate psychology [3].

In this book, we have addressed the application of emotional regulation to various contexts, using different strategies, including cognitive strategies, emotional regulation and mutual regulation in couples, emotional regulation strategies to cope with chronic diseases, ER for neurodivergence and ADHD, ER for combatting climate distress and climate change. The value in doing so is seeing emotional regulation beyond just a personal technique housed within an individual's MH to an aspect that can be applied to the therapeutic relationship, interpersonally in key relationships and connection with natural systems around us.

One of our chapters reviews the individual differences in emotional regulation, which pertains to how emotional regulation may show up based on differential mental health in individuals, particularly dispositional emotional functioning and adjustments made by each individual based on their context. In the chapter *Emotional Flooding in Couple Relationships: Psychosocial Aspects and Regulatory Strategies*, the mechanisms involved in expressing and regulating emotions for communication and conflict resolution in romantic couples are discussed, focused on containing emotional flooding.

Emotional regulation in ADHD seems to be a key area of application for emotional regulation strategies and thus also serves as the focus of this book, with three chapters addressing the various aspects. Different individuals living with ADHD across the

lifespan and accessing therapies, especially those suffering from Attention-Deficit Hyperactivity Disorder (ADHD), resort to various strategies to regulate their emotions. The chapters examine problems associated with emotion regulation in people with ADHD, emotion regulation strategies, parenting, and emotion regulation, along with related neurological mechanisms, as well as guidance for the path forward regarding clinical interventions. A theory of emotion regulation in ADHD is proposed in one chapter, which includes difficulties in executive functioning, response control and self-monitoring. The lifespan aspect is discussed in another, wherein for children with ADHD, the cycle of emotion dysregulation leads to negative feedback, leading to further emotion dysregulation, which may later manifest as anxiety responses or depression in adulthood, where the individual is easily overwhelmed due to difficulties in regulating themselves.

Cognitive strategies for emotional regulation are reviewed in a separate chapter. The cognitive components of emotional regulation, such as cognitive reappraisal, restructuring, thought challenging, distraction, and reality testing, are considered, and they help individuals modify emotional responses to meet their situational demands. Additional strategies, including metacognitive approaches, rumination, self-compassion, and cognitive fusion and defusion, are also explored to contribute to emotional resilience and well-being. New, innovative techniques like cognitive bias modification (CBM) and acceptance-based strategies rooted in mindfulness are also suggested.

Finally, emotional regulation in the context of surmounting ecological distress and environmental changes is discussed in a chapter on emotional regulation strategies to manage climate distress. This chapter sets the tone for managing heightened stress, anxiety, depression, and, in severe cases, post-traumatic stress disorder (PTSD). The chapter tackles the impact on various groups and available innovations, particularly highlighting the role of emotional regulation.

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References

- [1] Menefee DS, Ledoux T, Johnston CA. The importance of emotional regulation in mental health. *American Journal of Lifestyle Medicine*. 2022;**16**(1):28-31. DOI: 10.1177/15598276211049771

- [2] Tamir M, Ito A, Miyamoto Y, Chentsova-Dutton Y, Choi JH, Cieciuch J, et al. Emotion regulation strategies and psychological health across cultures. *American Psychologist*. 2024;**79**(5): 748-764. DOI: 10.1037/amp0001237

- [3] Orrù L, Taccini F, Mannarini S. Worry about the future in the climate change emergency: A mediation analysis of the role of eco-anxiety and emotion regulation. *Behavioral Sciences*. 2024;**14**(3):255. DOI: 10.3390/bs14030255

Chapter 1

Individual Differences in Emotion-Regulation Development

*Ainzara Favini, Alessia Teresa Virzì, Carolina Lunetti,
Loreta Cannito, Tiziana Quarto and Paola Palladino*

Abstract

The present chapter examines individual differences in emotionality and emotion regulation from a developmental perspective, considering the dispositional and endogenous characteristics of emotion-related processes and specific emotion regulation behaviors. Individual differences represent psychological, cognitive, and emotional aspects of individuals' characteristics through the life span, developed from biological (i.e., heritable aspects) and contextual (i.e., non-heritable aspects) factors. Addressing individual differences in thinking, behaving, and experiencing emotions is crucial for studying psychological adjustment because these differences can explain how and why people follow adaptive or maladaptive pathways during their lives. Dispositionally, individual differences in emotion regulation conceive temperamental characteristics of emotionality, particularly negative emotionality tendencies, defined as individual differences in susceptibility to negative emotions (sadness, anxiety, fear, anger, or frustration) and the frequency of negative emotional responses. Another aspect that plays a fundamental role is individuals' beliefs, conceptualized as self-efficacy beliefs, the ability to be a proactive actor in the context. Self-efficacy in emotion regulation is a complex process of initiating, avoiding, inhibiting, maintaining, or modulating internal feelings and different emotion-related components (i.e., physiological processes, cognition, and behavior), which can influence individuals' adjustment. Regulatory emotional self-efficacy can mediate and affect the expression and modulation of emotions.

Keywords: emotionality, emotion-regulation, emotional self-efficacy, development of emotion regulation, individual differences

1. Introduction

This chapter examines individual differences in emotionality and emotion regulation from a developmental perspective, considering the dispositional and endogenous characteristics of emotion-related processes and specific emotion regulation behaviors.

Individual differences, in general, represent the infinite number of ways in which individuals differ from each other [1]. The key point in this field is to identify

or summarize the most important aspects or dimensions of individual functioning reflected by those differences, such as psychological, cognitive, and emotional aspects of individuals' human nature [1]. Individual differences emerge during development, and they come from biological (i.e., heritable aspects) and contextual (i.e., non-heritable aspects) factors that interact. Individual differences in thinking, behaving, and experiencing emotions can lead people to adaptive or maladaptive pathways across the lifespan. Hence, focusing on individual differences is crucial to better understanding the variety of individual developmental routes that people follow along their lives [1, 2].

Addressing individual differences within a developmental approach needs to focus on “personality” and “temperament,” which Caspi and colleagues considered as two interconnected facets of individual differences [3, 4]. In this view, *“temperament represents the affective, activational, and attentional core of personality, whereas personality includes...the content of thought, skills, habits, values, defenses, morals, beliefs, and social cognition”* ([5], p. 100). In line with this view, “personality characteristics” can be defined as *“broader range of individual differences in thinking, feeling, and behaving”* ([3], p. 454), related to many different behaviors that can be solicited differently, depending on the individual's perception of the relevance of the situation [6].

At a dispositional level, emotion regulation encompasses both emotional tendencies and reactions related to responsiveness to external and internal emotional environments and the expression or inhibition of those reactions and tendencies [5]. Temperamental functioning of positive and negative emotionality tendencies is defined as individual differences in susceptibility to negative (i.e., sadness, anxiety, fear, anger, or frustration) or positive (i.e., affiliation, enjoyment, or happiness) emotions and in the frequency of emotional responses with specific valence [e.g., [5, 7]]. Previous studies evidenced the importance of temperamental characteristics as the “building blocks” of personality and cognitive functioning in adolescence and later adulthood [7]. On the positive pole of dispositional emotionality, empathy is a basic human ability essential to moral and social growth [8]. People can connect with others through it, comprehend their feelings and experiences, and react to them according to how they interpret the circumstances [9].

Regarding negative emotionality development, previous studies hypothesized two distinct low-order traits: one referred to anxiety, and one referred to anger/frustration [7]. In childhood, this trait is associated with difficulties settling emotions when children are in aroused contexts. In contrast, in adults, it is linked with the general tendency to experience negative emotions, the vulnerability to stressful situations, and the tendency to incur negative relationships [10, 11].

Another aspect of emotional functioning that plays a fundamental role is the set of individual beliefs that, in the light of a socio-cognitive perspective, are defined as self-efficacy, the ability to be a proactive actor in the context [12]. Self-efficacy beliefs in emotion regulation are conceptualized as complex processes of initiating, avoiding, inhibiting, maintaining, or modulating internal feelings and different emotion-related components (i.e., physiological processes, cognition, and behavior), influencing youths' adjustment [13, 14]. Self-efficacy beliefs represent one of the most important predictors of effective performance in the specific domain of functioning considered, so regulatory emotional self-efficacy can mediate and affect (similarly to temperamental tendencies) the expression and the modulation of emotions and affect individual behavior [13].

The following pages provide a systematic description of mechanisms that lead individuals at earlier stages of development toward effective emotion regulation.

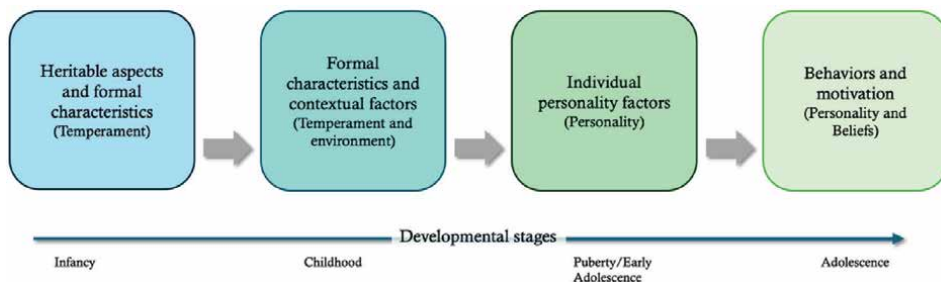


Figure 1.
 The conceptual proposed model of emotion regulation functioning related to individual differences.

These mechanisms include individual dispositional characteristics, contextual influences, and task-related behaviors, following the conceptual model proposed in **Figure 1**.

2. Dispositional emotional functioning

Previous research has shown that personality and temperamental characteristics can be operationalized into macro-categories, definable “traits”: personality traits are considered more inclusive, broader, and higher-order traits, while temperamental traits are considered narrow, low-level traits [3, 5].

Regarding temperament, the model proposed by Rothbart and colleagues [e.g., [5, 15–17]] defines this level of functioning as “*individual differences in emotional, motor, and attentional reactivity measured by latency, intensity, and recovery of response, and self-regulation processes such as effortful control that modulate reactivity. These differences are biologically based and are linked to an individual’s genetic endowment*” ([16], p. 207), and they are affected by biological factors, experiences, and maturation. In this view, according to the Influential Theory [5, 18], temperament can be organized into two core aspects (or factors); reactivity mechanisms are considered as processes involved in motor, affective, and sensory systems, whereas self-regulation mechanisms are considered as processes that can control and orient functioning [19].

The *Reactive Factor* is strictly related to emotionality [16]. This factor appears earlier in development and is the most anchored to the psychobiological system [19]. It includes tendencies (e.g., negative emotionality) and reactions (e.g., specific emotions and physiological activation) [20]. It is related to the individual’s responsiveness to the external and internal environment and the expression or inhibition of those reactions and tendencies [5, 20].

On the other hand, the *Regulative Factor* is more related to self-regulation [16]. This factor, which develops later than reactivity, is more anchored in social development and includes a wide range of processes, such as effortful control and orienting, that allow the flexible regulation of reactivity [5, 20].

The two core aspects of temperament can be organized into three broad dimensions, comparable to the temperament structure of other higher-ordered animals, characterized by several more specific dimensions [5, 16]. In particular, the domain of effortful control conceives the voluntary part of the regulative factor, whereas the domains of negative affectivity and extraversion/surgency express reactivity, emotional tendencies, and emotion-related behaviors [5, 9].

The domain of Effortful Control conceives the expression of the self-regulatory processes [5, 15]. It includes aspects related to attention (i.e., the ability to maintain attentional focus or to shift the focus as needed to deal with task demands), inhibition (i.e., the capacity to effortfully suppress inappropriate responses under instructions or in novel/uncertain situations), perceptual sensitivity (i.e., how people detect stimuli from the external environment, independently from their physiological perceptions), and low pleasure (i.e., the pleasure derived from activities or stimuli with low intensity, complexity, novelty, or incongruity) [5, 16, 21].

The domain of Negative Affectivity conceives individual emotional tendencies and responsiveness in terms of negative emotions, such as frustration (i.e., interruption or block of an ongoing activity or task), fear (i.e., anticipation of threats of danger, pain, or harm), discomfort (i.e., uncomfortable feelings related to intensity, rate or complexity of external or internal stimuli), sadness (i.e., negative feelings including unhappiness and sorrow regret), or soothability (i.e., the ability to calm and recover from emotional distress) [5, 16].

The domain of extraversion/surgency conceives approach or appetitive behaviors. It is related to activity level (i.e., physiological and motor activity), low shyness (i.e., few behavioral inhibitions in new and unexpected situations), high pleasure (i.e., the pleasure derived from activities or stimuli with high intensity, complexity, novelty, or incongruity), smiling (i.e., individual responsiveness in terms of positive emotions), impulsivity (i.e., speed of the response initiation), positive anticipation (i.e., positive feelings derived from expected pleasurable events), and affiliation (i.e., desire of closeness with others) [5, 16].

In terms of individual differences that are more anchored to the personality domain, we consider one of the most accredited models for understanding the structure of personality, the “Big Five” or the “Five Factors” Model [22–25]. In this view, personality traits are conceptualized as basic tendencies and represent one of the fundamental aspects, with characteristic adaptations and self-concept [22]. This configuration can be considered cross-sectionally and longitudinally: in the former case, external influences represent the context or the situation in which individuals act; in the latter case, objective biography represents personality development over the life course, according to individual adaptations [25]. Following the Five Factors Model, personality traits are quantifiable into five dimensions [1, 6, 22]:

- Energy/Extraversion (with the sub-domains of “dynamism” and “dominance”) is an energetic approach that includes characteristics such as sociability, activity, assertiveness, self-confidence, and positive emotionality. It also contains facets of warmth, gregariousness, and excitement-seeking. Markers of the positive pole of this trait are social status in groups or the number of friends, while poorer relationships or peer rejection mark the negative pole.
- Agreeableness (with the sub-domains of “cooperativeness” and “politeness”) refers to sensitivity toward others and their needs. It is a prosocial orientation that includes characteristics such as altruism, tendermindedness, trust, and modesty. Its facets include trust, straightforwardness, and compliance. Good performance in work groups marks the positive pole, while interpersonal problems or antagonistic approaches toward others mark the negative pole.
- Conscientiousness (with the sub-domains of “scrupulousness” and “perseverance”) is socially prescribed control that orients behaviors and includes

characteristics such as thinking before acting, delaying gratification, precision, fulfilling commitments, following norms and rules, planning, organizing, and prioritizing tasks; is characterized by facets of competence, order, dutifulness, achievement striving, and self-discipline. Markers of the positive pole of this trait are higher academic and job performances or results. In contrast, the negative pole is marked by negative habits (such as smoking or substance abuse) and lack of self-control.

- Neuroticism/emotional stability (with the sub-domains of “emotion control” and “impulse control”) is emotional stability that includes characteristics of changing mood and negative feelings such as anxiety, nervousness, sadness, and tenseness. It also contains facets of anger, hostility, depression, self-consciousness, impulsiveness, and vulnerability. Considering emotional stability, the positive pole is marked by positive feelings, mood stability, and satisfaction, while poorer coping strategies and reactions or frequent mood changes mark the negative pole.
- Openness (with the sub-domains of “openness to culture” and “openness to experiences”) is a broader dimension that describes the complexity of an individual’s mental and experiential life, including intellect, cultural interests, and interest in other people. Facets of fantasy, esthetics, feelings, actions, ideas, or values characterize it. Markers of the positive pole of this trait are good creativity, success in artistic activities, or better education, while conservative attitudes and closed-mindedness mark the negative pole.

Those two personality and temperamental structure models shared some macro-domains because the three temperamental domains are related, in terms of mechanisms and behaviors, with some personality traits of the Big Five model [26]: in particular, effortful control is associated with conscientiousness, negative affectivity to neuroticism, and extraversion/surgency to energy/extraversion [e.g., [3, 22, 26]].

The parallelisms between temperamental and personality functioning are highly relevant to understanding emotion-related self-regulation abilities, their developmental pathways, and their mechanisms of functioning [18, 21]. The domain of extraversion/positive emotionality allows people to actively engage with the world or avoid intense social experiences [21]. This trait is associated with expressing positive emotions in childhood, whereas in adults, it is linked with positive moods [27–29]. The domain of neuroticism/negative emotionality led people to experience the world as distressing or threatening [21]. This trait concerns individual differences in susceptibility to various negative emotions, internalized emotions such as sadness, anxiety, or fear, and externalized emotions, such as anger or frustration [5, 7, 21]. Due to this distinction in terms of emotional valence and the knowledge of different biological routes that encompass psycho-physiological mechanisms of inhibition and activation, previous studies hypothesized two distinct low-order traits: one referred to anxiety, and one referred to anger/frustration [7]. In childhood, the general high-order trait is associated with difficulties settling emotions when children are in aroused contexts [11, 18, 28]. In adults, it is linked with the general tendency to experience negative emotions, the vulnerability to stressful situations, and the tendency to incur negative relationships [10, 11, 28].

Lastly, conscientiousness/constraints concern the strength and extent of impulse control, such as delayed gratification and modulating impulsive expressions [21]. This trait concerns individual differences in cognitive, behavioral, and emotional control,

and voluntary behavioral control [19, 30]. In childhood, this trait is associated with the capacity to control and constraint behaviors and responses, with the capacity to focus and shift attention, and with the capacity to be responsible, attentive, and persistent; in adults, this trait is linked with the capacity to employ voluntary control, with cognitive, behavioral, and emotional self-regulation, and with the capacity to be attentive, careful, persistent, and planful [19, 30]. It appears clear that the factor pertaining to the modulation, inhibition, and expression of behaviors and impulses also plays a crucial role in emotional stimulations, as well as the inhibition, modulation, and activation of adequate moods and emotion-related behavioral responses to different contextual and environmental demands [8, 14]. In this sense, researchers in the last 30 years have focused on the relationships between temperamental domains of emotionality and voluntary self-regulation with adjustment in children and adolescents [e.g., [21, 31, 32]].

As previously mentioned, Negative Affectivity refers to individual reactivity and proneness to experience various negative emotions and feelings, such as anger, frustration, fear, discomfort, anxiety, or sadness [33]. In contrast, effortful control represents the “voluntary” part of self-regulation processes [5], which refers to the capacity to regulate behavior and attention, as well as the ability to inhibit impulsive reactions and regulate emotionality [33]. Focusing on the domain of negative affectivity, previous research supported the existence of two separate underlying processes that emerge earlier in childhood that work differently and can lead to different emotional experiences: the sub-domain of fear and the sub-domain of anger [5, 20]. Fear is involved in the behavioral inhibition system [34], including neuro-mechanisms governing serotonin and norepinephrine [35]. This emotion can be considered a proxy for later fear and sadness, as well as low impulse, activity, and aggression [20]. In other words, fear is a protective factor for externalizing problems, such as aggressive behaviors, but it can also predispose individuals to later internalizing problems, such as anxiety, social withdrawal, or depressive mood problems [5]. Anger is involved in the “rage” system [36], which includes the hypothalamus, amygdala, and serotonergic systems [34]. This emotion can be considered a proxy for later anger and frustration, high activity, discomfort, and impulsivity [20]. Also, anger can predispose to later externalizing problems, such as disruptive conduct or behavioral issues, but not to later increase Fear [5].

By recognizing and experiencing other people’s emotions (i.e., empathy), individuals are motivated to act prosocially, which, consequently, helps people become more aware of their context concerning their understanding of other’s emotions, which reduces the possibility of being overtaken by them (i.e., personal distress) [37]. When we consider dispositional functioning, it is crucial to consider another core aspect of empathy-related responses: sympathy [38]. Sympathy is an emotional response resulting from apprehension and concern for another’s emotional distress without necessarily feeling what the other person feels [39, 40], and it can be an antecedent of empathy or co-exist with it. For instance, one can share sadness with a friend (i.e., empathy) and become concerned for their situation and want to alleviate their suffering (i.e., sympathy) [38], or one can directly feel concern for someone upon realizing they are upset [41]. As mentioned above, in addition to sympathy, personal distress occurs when sharing someone’s emotions, which leads to being overwhelmed by them [39]. Therefore, it is essential to consider the multidimensionality of the construct, as empathy consists of a cognitive and an affective component [42]. The term “cognitive empathy” describes the ability to take the role or perspective of another person (i.e., perspective taking), which involves the capacity to recognize and categorize emotions

and their contextual signals [43]. The “affective component” refers to an emotional reaction that is more suitable or consistent with another person’s situation than one’s own without becoming overly affected [43].

Empathy and empathy-related responses have been shown to promote children’s and adolescents’ well-being [44]. For instance, children with higher levels of empathy exhibit lower aggression or externalizing problems [45] and better academic achievement [e.g., [39]]. A longitudinal study by Zhou and colleagues [46] observed that empathy is negatively associated with externalizing problems over 2 years among primary school children [46]. Empathy and sympathy are also fundamental at earlier developmental stages since these abilities are identifiable from a very young age [45]. For instance, infants often cry in response to other infants’ cries, and 6-month-olds seem to react to the distress of peers by exhibiting distress reactions themselves [47], which may be seen as a precursor to empathy [48]. Therefore, across development, research has shown how positive behaviors and individual characteristics such as empathy, sympathy, and socioemotional competencies can account for more positive developmental pathways in children [13, 49].

It is essential to consider all these mechanisms underlying the association between personality and individuals’ development, especially during the transition from childhood to adolescence, because, at this stage, the development of some personality characteristics, such as self-regulatory abilities, self-concepts, or cognitive competences, is still an ongoing process, that can influence and can be influenced by the “person-environment transactions” [e.g., [20]]. Therefore, focusing on earlier developmental periods becomes crucial to understanding how individual differences in personality can affect concurrent and later development, especially in emotion-related functioning [e.g., [3, 5, 7]].

Influences between personality characteristics and individual development over time can affect several important areas of personal functioning, such as the relational area, the academic/occupational area, or the individual’s well-being [e.g., [3, 39, 50]]. In the sociorelational area, personality strongly influences social competencies [9, 26, 31]. During childhood, personality can impact relationships with parents, whereas during adolescence, personality significantly affects youths’ capacity to establish successful relationships with peers, friendships, and intimate and romantic relationships [5, 9, 30]. Those influences occur due to three mechanisms: people select others who are like themselves; people react to others following their trait-correlated behaviors; people evoke others’ behaviors, reinforcing their trait-correlated behaviors [3, 7, 51, 52]. Considering the academic and occupational developmental pathways, personality can influence cumulatively academic and job achievement skills across the lifespan: starting from academic and school performances during childhood, personality can improve academic performance from early to late adolescence [53], which in turn can influence future orientations toward job and career searching, as well as job-related performances [e.g., [54]]. School adjustment and school performance are affected mainly by the conscientiousness/constraint domain, which is fundamental for collecting successfully various performance tasks, but also by the agreeableness and openness domains [3, 14, 55]. Lastly, personality has a crucial influence on well-being, affecting health maintenance, promoting physical integrity, and behaviors related to health, such as health-promoting or health-damaging behaviors [28, 33, 35]. Conscientiousness can promote healthy and non-risky behaviors, such as coping behaviors, distress reduction, or treatment adherence [3, 35]. Similarly, Disagreeableness and Neuroticism can promote damaging behaviors such as smoking, drinking, risky driving behaviors, or unhealthy eating behaviors [3, 53, 56].

3. Emotional functioning in the context

Earlier developmental stages are crucial developmental periods for individual adjustment over time [e.g., [51, 56]]. Understanding mechanisms, processes, and antecedents of those successful or unsuccessful developmental trajectories is essential for promoting youths' and adults' mental health and for preventing emotional problems and emotion-related mental disorders [e.g., [57]]. In this regard, emotion-related self-regulation abilities and their development are highly relevant [14].

From a behaviorist perspective, people react to environmental contingencies by changing their behaviors and creating new behaviors that will be maintained [12, 39]. Environmental contingencies can be divided into two types: implicit contingencies, which are unspoken expectations and demands affected by the social context, and explicit contingencies, which are concrete demands relevant to individual behavior [58]. For example, how specific parenting practices influence children's psychological functioning is an example of these explicit influences [e.g., [59]]; expectations about the acquisition of a new social role (e.g., a leader position in a group) are associated with a variety of implicit demands that others consider appropriate for that role [60].

Another possible source of change is the individual's ability to reflect on their actions and behaviors critically [12]. This process results from both environmental contingencies (reflecting on our behaviors in new situations) and self-insight (focusing in depth on our behaviors to activate different behaviors in the future) [61]. According to the model proposed by Bandura [12, 62, 63], individuals can learn and modify their own behaviors by watching and listening to others. People can achieve different perspectives and behaviors by observing other significant individuals, like parents and siblings, friends and teachers in childhood and adolescence, and coaches, mentors, or bosses in adulthood [63, 64]. In addition, people can change their behaviors through interactions with others and the feedback they provide them [65].

Thus, as underlined by Caspi and Roberts, those mechanisms "can work any time to engender continuity and change" ([66], p. 319), and they can affect both continuity and discontinuity in personality development, that is stability and change in patterns of individual functioning. For example, people try to select environments and events that fit with their personality characteristics, but in some cases, even when individuals proactively pick up environments, those selections do not fit perfectly, and several "imperfections," such as over-demandingness, can lead to discontinuity in personality [60]. According to a socio-cognitive perspective, individuals are proactive actors influencing their daily lives and behaviors [12, 67]. In this interactionist approach, individuals are not isolated units of functioning; their behaviors, emotions, thoughts, and cognitions continuously influence and are influenced by their environment and social contexts [12, 62]. From this perspective, individual functioning and the relationship between personality and adjustment are bidirectionally related in a continuous process that can affect development and personality, especially in earlier stages [13, 68, 69].

Optimal self-regulating abilities can help youths modulate and manipulate their experiences, and individuals' perceptions of their abilities to manipulate and control situations represent one of the most effective determinants of adjustment [12, 13]. Bandura conceptualized these perceptions as self-efficacy beliefs representing "*dynamic constructs that can be enhanced through mastery experiences as a result of individuals' capacities to reflect and learn from experience*" ([13], p. 1). Self-efficacy beliefs can orient habits and tendencies, accounting for individuals' proactive role in controlling their own lives based on cognitive self-regulation and reflective thinking,

which can also influence motivations and goal orientation [12]. These beliefs help individuals modulate their goal-oriented behaviors when they are exposed to experiences or situations that they feel are challenging [13, 68]. Consequently, individuals who feel capable of activating their self-regulating abilities have more probability of effectively achieving their aspirations and objectives because these beliefs represent one of the most predictive success factors [12, 68].

Self-regulatory beliefs can influence individual vulnerability to incur emotional problems, such as anxiety or depression [e.g., [70]]. When people face stressful or threatening situations, self-efficacy beliefs can influence, for instance, the perceived capabilities of situational management [71]. Moreover, self-efficacy can predispose individuals to modify negative situations into beneficial situations because it allows people to activate effective problem-solving strategies and cope with the situation's difficulties [71]. In addition, self-efficacy beliefs can buffer the effects of self-regulatory abilities by fostering cognitive appraisal of stressful situations and the consequent negative feelings associated with the situation [72, 73].

A core characteristic of self-efficacy beliefs is that they are not a general construct. Still, they vary according to the domain of functioning involved, so there are a variety of self-efficacy beliefs for each context that people perceive as challenging [74]. For instance, the extent to which individuals feel adequately capable of effortfully regulating behaviors toward transgressive activities or feel adequately able to activate self-regulatory skills against peer pressure to behave transgressively is an example of self-regulatory efficacy [68]. Furthermore, regulatory emotional self-efficacy is a crucial component of the self-regulatory process, as it involves the complex ability to initiate, avoid, inhibit, maintain, or modulate internal feelings and various emotion-related factors in service of personal adjustment [14]. Effective emotion regulation, facilitated by emotional self-efficacy, can be a proxy indicator of successful performance in this domain [75]. These beliefs significantly impact how individuals manage negative and positive emotions. Self-efficacy in managing negative affect [13] refers to one's ability to make adverse events more tolerable and avoid being overwhelmed by negative emotions [13, 76]. At the same time, self-efficacy in managing positive emotions enhances positive emotional expression because it enables people to feel and convey emotions in response to enjoyable experiences [13]. The ability to effectively regulate negative affect while appropriately experiencing positive emotions is crucial for psychological well-being [68, 74]; for instance, individuals who find it challenging to regulate strong negative emotions may express these feelings through anger or frustration [77] while others might feel overwhelmed by emotions such as fear or anxiety [78].

Furthermore, experiencing positive emotions leads to several benefits for people's well-being, including enhanced cognitive performance, protection against adverse events, and the development of adaptive coping mechanisms [79], and they also facilitate and enhance social connections [80].

Various studies have evidenced the crucial role of self-efficacy in emotion regulation for children and adolescents' adjustment [55, 81, 82]. For example, in chronic stressful situations, the perceived ability to foster and maintain a positive mood can enhance resilience, exercise effective coping strategies toward difficulties, and activate proactive problem-solving strategies [83–85]. In this sense, self-efficacy in using memories of positive emotional experiences and humor to face challenges and to cope with stressful experiences play a key role in enhancing positive emotions, modulating negative consequences of stressful situations and the negative feelings associated with, and promoting well-being and adjustment, also in the presence of

chronic illness conditions [84, 86]. Self-efficacy beliefs in the emotional domain can protect children and adolescents from other contextual negative situations, such as family risk factors [e.g., [81, 82]]. When children and adolescents possess adequate self-efficacy in regulating and modulating their negative emotions, they are more protected from the potentially detrimental effect of harmful parenting practices, parental injuries, or family psychopathology [e.g., [82, 87]]. This protective mechanism is beneficial when youths face reactive negative emotions, such as anger or frustration [87].

Therefore, fostering social competence and psychological well-being across various developmental stages requires understanding how empathy, self-regulation, and emotion regulation interact.

4. Models for understanding adjustment in emotional functioning

A key point for understanding associations between personality and adjustment over the life course is to focus on continuity/discontinuity between personality structure and an individual's developmental pathways over time. This research question was primarily investigated in adults' clinical psychopathology, but growing evidence supported the importance of assuming a life span perspective to understand how individual differences in personality development can be related to adjustment at earlier stages, such as childhood and early adolescence [88]. A growing body of research supports the role of personality in predicting adjustment over time: it is now well-known that some individual differences in personality can be considered predictors of emotional and behavioral problems [e.g., [59, 88–90]].

Several theoretical models were proposed to explain the relationship between personality and psychopathology, which were initially developed with adults but are also applicable to children and adolescents [7]. Four models were proposed: the complication/scar model, the pathoplasty/exacerbation model, the vulnerability model, and the spectrum model [91].

1. The complication (scar) model considers psychopathology because of an individual's premorbid personality that can influence that personality characteristic; for example, low levels of emotional stability can lead to some anxiety or depressive symptoms, which can lead to lower emotional stability.
2. The pathoplasty (exacerbation) model hypothesized that the emergence of psychopathology could be influenced by an individual's pre-existing characteristics, which can affect the presentation, severity, course, and resolution of that psychopathology; for example, an individual with a substance dependence problem can be affected by his high level of inhibition which can lead to an increase in the severity of that problem.
3. The vulnerability (predisposition) model postulates that a specific personality or temperamental characteristic can increase or decrease an individual's vulnerability to incur a particular form of psychopathology, which can also affect the severity and the maintenance of that psychopathology; for example, low conscientiousness can be associated with higher risk to incur in conduct or antisocial disorders, from childhood to adulthood, because of low inhibition.

4. The spectrum model posits that a manifestation of an issue or a problematic behavior can be considered on a continuum, from adjustment to maladjustment, so the association between personality and psychopathology is a dimensional relation, hypothesized common processes underlying some personality characteristics and some disorders; for example, shyness and internalizing problems shared some predictors and common underlying processes.

More research is needed to clarify specific processes underlying the four models for understanding the relations between personality and psychopathology, but it is essential to take in mind the crucial role of continuity and change of individual development over time to focus on a more comprehensive picture of those relations from a developmental perspective [26, 91]. In line with previous research, it is reasonable that each model can provide theoretical support for a specific research question, and each model can explain a specific link between emotional and behavioral problems and individual differences [3, 7]. For example, analyzing the extent to which individual differences in personality structure can predispose people to later specific unsuccessful pathways can support the vulnerability model [91]. Nonetheless, as argued by Shiner and Caspi [7], “longitudinal studies in which temperament, or personality, is measured before the emergence of psychopathology provide the most compelling evidence of a possible causal association” (p. 18). As a result, the vulnerability model can theoretically explain how children’s and adolescents’ personalities can affect the development of emotional and behavioral problems later during adolescence, according to a dimensional conceptualization of the relation between personality and adjustment.

5. Conclusion

As we have highlighted in the previous paragraphs, the domain of emotion-related regulatory abilities and capacities is of fundamental importance for individual adjustment throughout their life, especially at earlier stages, when those abilities settle their bases and starting points for their pathways [2, 21, 26]. Adaptive emotional functioning concerns the expression of positive emotions and moods, low susceptibility to negative emotions, and lower probabilities of experiencing difficulties in settling emotions when children and youths face ambiguous and potentially aroused contexts [29, 30, 45]. Moreover, adaptive emotion-related regulatory abilities can protect children, youths, and adults from emotional vulnerabilities in stressful situations, especially in adverse childhood experiences or chronic stressful contexts [18, 84, 92, 93].

Effects of adaptive emotion-regulation development can be observed in various offline and online domains of functioning, such as academic, relational, and cognitive maturation, because, in general, positive emotionality and negative emotion regulation predict a better adjustment [26, 46, 93]. For example, when children and adolescents possess adequate levels of emotional functioning, they are more inclined to perform better at school, and they show higher academic motivation and more adaptive empathy-related responses to classmates and school staff [40, 43, 93]. Adaptive emotion-related regulation can also predict better relations, more adaptive coping strategies, and a better conflict management style [51, 52, 94]. In the cognitive domain, adequate emotion-related self-regulatory abilities predispose people to be

less emotionally sensitive to external stimulation, such as music or intense auditory stimulation [e.g., [95]].

In terms of behaviors associated with emotional functioning during development, intense negative emotionality predisposes differently to emotional vulnerability: high levels of sadness are associated with the vulnerability to internalized negative emotions, such as anxiety, depression, worries, and withdrawal, that in turn may be related to the development of internalizing problems, that are, panic attacks, depressive symptoms, somatic problems, sleep problems, and social withdrawal [7, 21, 82]. Differently, high levels of anger/frustration lead people to be more inclined to be vulnerable to irritability, aggression, anger, rage, and opposite behaviors, which in turn predispose to the manifestation of externalizing problems, such as deviant conduct, vandalism, excessive use or drug abuse, violent behaviors, antisocial conducts, and antisocial pathways [30, 59, 78]. Therefore, studying emotion-related self-regulation means focusing on crucial developmental mechanisms underlying empathetic and prosocial behaviors from a young age, facing the challenges of distinguishing emotionality from its regulation [47, 50]. Therefore, it is more effective to focus on the processes involved in emotion regulation rather than the amount of emotion experienced or expressed [45]. Children with higher emotion-related self-regulation are better at managing personal distress, which leads them to focus more on other-oriented emotional processes such as empathy and sympathy [40, 96]. Empirical studies have supported a positive link between emotion-related self-regulation and empathy and empathy-related responses, such as sympathy [51, 94]. In terms of individual beliefs, possessing high levels of self-regulatory emotional self-efficacy in expressing positive emotions predicts better social performances, as well as academic achievement, and protects individuals from internalizing and mood problems [14, 39, 97]. Similarly, high levels of self-efficacy in managing negative emotions predict better emotional and social adjustment and protect children and adolescents from psychopathological outcomes [70, 82, 87].

As we underlined, it is crucial to examine the unique and specific contributions of dispositional and personal cognitive beliefs related to emotion regulation for children and adolescents adjustment because these individual differences can inform us not only on the practical abilities and capacities that individuals possess in a specific period of their lives but also because these aspects are essential proxies for individual potentialities, so they can inform us on the prospective developmental pathways that individuals may undertake in the future [87, 89, 93].

Future directions should consider all these aspects, expanding and implementing further investigations of how dispositional and socio-cognitive developmental aspects of individual emotion-related self-regulation functioning influence concurrent specific emotional behaviors and reactions [26, 69, 76]. In addition, a deeper look at longitudinal consequences of how dispositions and socio-cognitive emotion-related mechanisms influence individual adjustment could allow clinical, developmental, and social psychologists to have more evident knowledge of the specific predictors of internalizing and/or externalizing problems that youths and adults could manifest, due to their emotion-related difficulties and impairments [88, 93].

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Conflict of interest

The authors declare no conflict of interest.

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References

- [1] John OP, Robins RW. Handbook of Personality. Theory and Research. 4th ed. New York: Guilford Press; 2022. 942 p
- [2] Cicchetti D, Rogosch FA. A developmental psychopathology perspective on adolescence. *Journal of Consulting and Clinical Psychology*. 2002;**70**(1):6-20. DOI: 10.1037/0022-006X.70.1.6
- [3] Caspi A, Roberts BW, Shiner RL. Personality development: Stability and change. *Annual Review of Psychology*. 2005;**56**:453-484. DOI: 10.1146/annurev.psych.55.090902.141913
- [4] McCrae RR, Costa PT Jr, Ostendorf F, Angleitner A, Hřebíčkova M, Avia MD, et al. Nature over nurture: Temperament, personality, and life span development. *Journal of Personality and Social Psychology*. 2000;**78**(1):173-186. DOI: 10.1037/0022-3514.78.1.173
- [5] Rothbart MK, Bates JE. Temperament. In: Damon W, Lerner R, Eisenberg N, editors. *Handbook of Child Psychology: Social, Emotional, and Personality Development*. 6th ed. Vol. 3. New York: Wiley; 2006. pp. 99-166. DOI: 10.1002/9780470147658.chpsy0303
- [6] Matthews G. The nature of personality traits. In: Matthews G, Deary IJ, Whiteman MC, editors. *Personality Traits*. 3rd ed. New York: Cambridge University Press; 2009. pp. 1-148
- [7] Shiner R, Caspi A. Personality differences in childhood and adolescence: Measurement, development, and consequences. *Journal of Child Psychology and Psychiatry*. 2003;**44**(1):2-32. DOI: 10.1111/1469-7610.00101
- [8] Eisenberg N, Fabes RA. Prosocial development. In: Damon W, Eisenberg N, editors. *Handbook of Child Psychology, Social, Emotional, and Personality Development*. 5th ed. Vol. 3. New York: Wiley; 1998. pp. 701-778
- [9] Eisenberg N, Miller PA. The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*. 1987;**101**(1):91-119
- [10] Tellegen A. Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In: Tuma AH, Maser JD, editors. *Anxiety and the Anxiety Disorders*. Hillsdale, NJ: Lawrence Erlbaum; 1985. pp. 681-706
- [11] Watson D, Clark LA. Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*. 1984;**96**:465-490. DOI: 10.1037/0033-2909.96.3.465
- [12] Bandura A. Social cognitive theory: An agentic perspective. *Annual Review of Psychology*. 2001;**52**(1):1-26. DOI: 10.1146/annurev.psych.52.1.1, 0066-4308/01/0201-0001\$14.00
- [13] Caprara GV, Di Giunta L, Eisenberg N, Gerbino M, Pastorelli C, Tramontano C. Assessing regulatory emotional self-efficacy in three countries. *Psychological Assessment*. 2008;**20**(3):227-237. DOI: 10.1037/1040-3590.20.3.227
- [14] Eisenberg N, Valiente C, Eggum ND. Self-regulation and school readiness. *Early Education and Development*. 2010;**21**(5):681-698. DOI: 10.1080/10409289.2010.497451
- [15] Evans DE, Rothbart MK. Developing a model for adult temperament.

Journal of Research in Personality.
 2007;**41**(4):868-888. DOI: 10.1016/j.
 jrp.2006.11.002

[16] Rothbart MK. Temperament,
 development, and personality.
 Current Directions in Psychological
 Science. 2007;**16**(4):207-212. DOI:
 10.1111/j.1467-8721.2007.00505.x

[17] Rothbart MK, Derryberry D.
 Development of individual differences in
 temperament. In: Lamb ME, Brown AL,
 editors. *Advances in Developmental*
Psychology. Vol. 1. Hillsdale, NJ:
 Erlbaum; 1981. pp. 37-86

[18] Vervoort L, Wolters LH,
 Hogendoorn SM, Prins PJ, De Haan E,
 Boer F, et al. Temperament, attentional
 processes, and anxiety: Diverging
 links between adolescents with and
 without anxiety disorders? *Journal*
of Clinical Child & Adolescent
Psychology. 2011;**40**(1):144-155. DOI:
 10.1080/15374416.2011.533412

[19] Rothbart MK, Ahadi SA,
 Hershey K, Fisher P. Investigations
 of temperament at 3 to 7 years: The
 children's behavior questionnaire. *Child*
Development. 2001;**72**:1394-1408. DOI:
 10.1111/1467-8624.00355

[20] Rothbart MK, Ahadi SA, Evans DE.
 Temperament and personality: Origins
 and outcomes. *Journal of Personality and*
Social Psychology. 2000;**78**(1):122-135.
 DOI: 10.1037/0022-3514.78.1.122

[21] Muris P, Meesters C, Blijlevens P.
 Self-reported reactive and regulative
 temperament in early adolescence:
 Relations to internalizing and
 externalizing problem behavior and "big
 three" personality factors. *Journal of*
Adolescence. 2007;**30**(6):1035-1049. DOI:
 10.1016/j.adolescence.2007.03.003

[22] Caprara GV, Barbaranelli C,
 Borgogni L, Perugini M. The "big five

questionnaire": A new questionnaire
 to assess the five-factor model.
Personality and Individual
Differences. 1993;**15**(3):281-288. DOI:
 10.1016/0191-8869(93)90218-R

[23] Digman JM. Personality structure:
 Emergence of the five-factor model.
Annual Review of Psychology.
 1990;**41**(1):417-440. DOI: 10.1146/
 annurev.ps.41.020190.002221

[24] Digman JM. Higher-order factors of
 the big five. *Journal of Personality and*
Social Psychology. 1997;**73**(6):1246-1256.
 DOI: 10.1037/0022-3514.73.6.1246

[25] McCrae RR, Costa PT Jr. Domains
 and facets: Hierarchical personality
 assessment using the revised NEO
 personality inventory. *Journal of*
Personality Assessment. 1995;**64**:21-50.
 DOI: 10.1207/s15327752jpa6401_2

[26] Shiner RL, DeYoung CG. The
 structure of temperament and
 personality traits: A developmental
 perspective. In: Zelazo PD, editor. *The*
Oxford Handbook of Developmental
Psychology: Self and Other. Vol. 2.
 New York (NY): Oxford Library of
 Psychology; 2013. pp. 113-141

[27] Goldsmith HH. Studying
 temperament via construction of
 the toddler temperament behavior
 assessment questionnaire. *Child*
Development. 1996;**67**:218-235. DOI:
 10.1111/j.1467-8624.1996.tb01730.x

[28] Lemery KS, Goldsmith HH,
 Klinnert MD, Mrazek DA. Developmental
 models of infant and childhood
 temperament. *Developmental*
Psychology. 1999;**35**(1):189-204. DOI:
 10.1037/0012-1649.35.1.189

[29] Watson D, Clark LA. Extraversion
 and its positive emotional core. In:
 Hogan R, Johnson J, Briggs S, editors.

Handbook of Personality Psychology. San Diego, CA: Academic Press; 1997. pp. 767-793. DOI: 10.1016/B978-012134645-4/50030-5

[30] Eisenberg N, Guthrie IK, Fabes RA, Shepard S, Losoya S, Murphy BC, et al. Prediction of elementary school children's externalizing problem behaviors from attentional and behavioral regulation and negative emotionality. *Child Development*. 2000;**71**:1367-1382. DOI: 10.1111/1467-8624.00233

[31] Eisenberg N, Sadovsky A, Spinrad TL, Fabes RA, Losoya SH, Valiente C, et al. The relations of problem behavior status to children's negative emotionality, effortful control, and impulsivity: Concurrent relations and prediction of change. *Developmental Psychology*. 2005;**41**(1):193-211. DOI: 10.1037/0012-1649.41.1.193

[32] Lengua LJ, Long AC. The role of emotionality and self-regulation in the appraisal-coping process: Tests of direct and moderating effects. *Applied Developmental Psychology*. 2002;**23**(4):471-493. DOI: 10.1016/S0193-3973(02)00129-6

[33] Rothbart MK. Temperament and plasticity in childhood. In: Hann DM, Huffman LC, Lederhendler I, Meinecke D, editors. *Advancing Research on Developmental Plasticity: Integrating the Behavioral Science and the Neuroscience of Mental Health*. Washington D.C: U.S. Government Printing Office; 1998. pp. 223-231

[34] Gray JA. *The Neuropsychology of Anxiety. An Enquiry into the Functions of the Septo-Hippocampal System*. New York: Oxford University Press; 1982. 448 p. DOI: 10.1017/S0140525X00013066

[35] Fowles DC. Psychophysiology and psychopathology: A motivational

approach. *Psychophysiology*. 1988;**25**:373-392. DOI: 10.1111/j.1469-8986.1988.tb01873.x

[36] Panksepp J. Toward a general psychobiological theory of emotions. *Behavioral and Brain Sciences*. 1982;**5**:407-467. DOI: 10.1017/S0140525X00012759

[37] Spinrad TL, Eisenberg N. Prosocial behavior and empathy-related responding: Relations to children's well-being. In: Robinson MD, Eid M, editors. *The Happy Mind: Cognitive Contributions to Well-Being*. Vol. 2017. Cham (CH): Springer International Publishing; 2017. pp. 331-347. DOI: 10.1007/978-3-319-58763-9_18

[38] Eisenberg N. Prosocial behavior. In: Bear GG, Minke KM, editors. *Children's Needs III: Development, Prevention, and Intervention*. Lansing (MI): National Association of School Psychologists; 2006. pp. 313-324

[39] Caprara GV, Luengo Kanacri BP, Gerbino M, Zuffianò A, Alessandri G, Vecchio GM, et al. Positive effects of promoting prosocial behavior in early adolescence: Evidence from a school-based intervention. *International Journal of Behavioral Development*. 2014;**38**(4):386-396. DOI: 10.1177/0165025414531464

[40] Eisenberg N, Spinrad TL, Valiente C. Emotion-related self-regulation, and children's social, psychological, and academic functioning. In: Balter L, Tamis-LeMonda CS, editors. *Child Psychology: A Handbook of Contemporary Issues*. 3rd ed. New York (NY): Psychology Press; 2015. pp. 219-244. DOI: 10.4324/9781315764931

[41] Eisenberg N. Emotion, regulation, and moral development. *Annual Review of Psychology*. 2000;**51**(1):665-697. DOI: 10.1146/annurev.psych.51.1.665

- [42] Davis MH. Empathy: A Social Psychological Approach. New York: Routledge; 2018. DOI: 10.4324/9780429493898
- [43] Eisenberg N, Fabes RA. Emotion regulation and the development of social competence. In: Clark MS, editor. *Review of Personality and Social Psychology*. Vol. 14. Emotion and social behavior. Newbury Park, CA: Sage; 1992. pp. 119-150
- [44] Hui BP, Ng JC, Berzaghi E, Cunningham-Amos LA, Kogan A. Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin*. 2020;**146**(12):1084-1116. DOI: 10.1037/bul0000298
- [45] Eisenberg N, Spinrad TL, Eggum ND. Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*. 2010;**6**(1):495-525. DOI: 10.1146/annurev.clinpsy.121208.131208
- [46] Zhou Q, Eisenberg N, Losoya SH, Fabes RA, Reiser M, Guthrie IK, et al. The relations of parental warmth and positive expressiveness to children's empathy-related responding and social functioning: A longitudinal study. *Child Development*. 2002;**73**(3):893-915. DOI: 10.1111/1467-8624.00446
- [47] Eisenberg N, Wentzel M, Harris JD. The role of emotionality and regulation in empathy-related responding. *School Psychology Review*. 1998;**27**(4):506-521. DOI: 10.1080/02796015.1998.12085934
- [48] Malti T, Chaparro MP, Zuffianò A, Colasante T. School-based interventions to promote empathy-related responding in children and adolescents: A developmental analysis. *Journal of Clinical Child & Adolescent Psychology*. 2016;**45**(6):718-731. DOI: 10.1080/15374416.2015.1121822
- [49] Denham SA. Social-emotional competence as support for school readiness: What is it and how do we assess it? *Early Education and Development*. 2006;**17**(1):57-89. DOI: 10.1207/s15566935eed1701_4
- [50] Cole PM, Martin SE, Dennis TA. Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*. 2004;**75**(2):317-333. DOI: 10.1111/j.1467-8624.2004.00673.x
- [51] Yavuz HM, Colasante T, Galarneau E, Malti T. Empathy, sympathy, and emotion regulation: A meta-analytic review. *Psychological Bulletin*. 2024;**150**(1):27-44. DOI: 10.1037/bul0000426
- [52] Yu R, Branje S, Keijsers L, Meeus W. Associations between young adult romantic relationship quality and problem behaviors: An examination of personality-environment interactions. *Journal of Research in Personality*. 2015;**57**:1-10. DOI: 10.1016/j.jrp.2015.01.003
- [53] Shiner RL. Linking childhood personality with adaptation: Evidence for continuity and change across time into late adolescence. *Journal of Personality and Social Psychology*. 2000;**78**(2):310-325. DOI: 10.1037/0022-3514.78.2.310
- [54] Barrick MR, Stewart GL, Piotrowski M. Personality and job performance: Test of the mediating effects of motivation among sales representatives. *Journal of Applied Psychology*. 2002;**87**(1):43-51. DOI: 10.1037//0021-9010.87.1.000
- [55] Gerbino M, Zuffianò A, Eisenberg N, Castellani V, Luengo Kanacri BP,

- Pastorelli C, Caprara GV Adolescents' prosocial behavior predicts good grades beyond intelligence and personality traits. *Journal of Personality*. 2018;**86**(2):247-260. DOI: 10.1111/jopy.12309
- [56] De Fruyt F, De Clercq B. Antecedents of personality disorder in childhood and adolescence: Toward an integrative developmental model. *Annual Review of Clinical Psychology*. 2014;**10**:449-476. DOI: 10.1146/annurev-clinpsy-032813-153634
- [57] Compas BE, Reeslund KL. Processes of risk and resilience during adolescence. In: Lerner RM, Steinberg L, editors. *Handbook of Adolescent Psychology, Volume 1: Individual Bases of Adolescent Development*. Hoboken: Wiley; 2009. pp. 561-588. DOI: 10.1002/9780470479193.adlpsy001017
- [58] Kagan J. *Galen's Prophecy: Temperament in Human Nature*. New York: Basic Books; 1994
- [59] Thartori E, Zuffianò A, Pastorelli C, Di Giunta L, Lunetti C, Lansford JE, et al. The interactive effects of maternal personality and adolescent temperament on externalizing behavior problem trajectories from age 12 to 14. *Personality and Individual Differences*. 2018;**134**:301-307. DOI: 10.1016/j.paid.2018.06.021
- [60] Caspi A, Roberts BW. Personality development across the life course: The argument for change and continuity. *Psychological Inquiry*. 2001;**12**(2):49-66. DOI: 10.1207/S15327965PLI1202_01
- [61] Deci EL, Ryan RM. A motivational approach to self: Integration in personality. In: Dienstbier RA, editor. *Perspectives on Motivation: Nebraska Symposium on Motivation*. Lincoln: University of Nebraska Press; 1990. pp. 237-288
- [62] Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Advances in Behavior Research and Therapy*. 1978;**1**(4):139-161. DOI: 10.1016/0146-6402(78)90002-4
- [63] Bandura A. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall; 1986. DOI: 10.4135/9781446221129.n6
- [64] Holland JL. *Making Vocational Choices: A Theory of Vocational Personalities and Work Environments*. 3rd ed. Lake Magdalene(FL): Psychological Assessment Resources; 1997
- [65] Blumer H. *Symbolic Interactionism: Perspective and Method*. Berkeley (CA): University of California Press; 1986
- [66] Caspi A, Roberts BW. Personality continuity and change across the life course. In: Pervin LA, editor. *Handbook of Personality: Theory and Research*. Vol. 2. New York (NY): The Guilford Press; 1990. pp. 300-326
- [67] Magnusson D. The person approach: Concepts, measurement models, and research strategy. *New Directions for Child and Adolescent Development*. 2003;**101**:3-23. DOI: 10.1002/cd.79
- [68] Bandura A, Caprara GV, Barbaranelli C, Gerbino M, Pastorelli C. Role of affective self-regulatory efficacy in diverse sphere of psychosocial functioning. *Child Development*. 2003;**74**(3):769-782. DOI: 10.1111/1467-8624.00567
- [69] Mischel W, Shoda Y. Toward a unified theory of personality: Integrating dispositions and processing dynamics within the cognitive-affective processing system. In: John OP, Robins RW, Pervin LA, editors. *Handbook of*

Personality: Theory and Research. New York, NY: The Guilford Press; 2008. pp. 208-241

[70] Caprara GV, Di Giunta L, Pastorelli C, Eisenberg N. Mastery of negative affect: A hierarchical model of emotional self-efficacy beliefs. *Psychological Assessment*. 2013;**25**(1):105-116. DOI: 10.1037/a0029136

[71] Bandura A. *Self-Efficacy: The Exercise of Control*. New York: Freeman; 1997

[72] Arch EC. Affective control efficacy as a factor in willingness to participate in a public performance situation. *Psychological Reports*. 1992;**71**:1247-1250. DOI: 10.2466/pr0.1992.71.3f.1247

[73] Kent G, Gibbons R. Self-efficacy and the control of anxious cognitions. *Journal of Behavior Therapy & Experimental Psychiatry*. 1987;**18**:33-40. DOI: 10.1016/0005-7916(87)90069-3

[74] Caprara GV. Personality: Filling the gap between basic processes and molar functioning. In: von Hofsten C, Backman L, editors. *Psychology at the Turn of the Millennium, 2. Social, Development, and Clinical Perspectives*. Brighton, England: Psychology Press; 2002. pp. 201-224. DOI: 10.4324/9780203989432

[75] Brass NR, Memmott-Elison MK, Brockmeier L, Hung C, Bergin C. Prosocial behavior and school engagement during adolescence: The mediating role of self-regulation. *Journal of Applied Developmental Psychology*. 2022;**83**:101477. DOI: 10.1016/j.appdev.2022.101477

[76] Daganzo MAA, Alampay LP, Lansford JE. Filipino mothers' self-efficacy in managing anger and in

parenting, and parental rejection as predictors of child delinquency. *Philippine Journal of Psychology*. 2014;**47**(2):1-26

[77] Eisenberg N, Cumberland A, Spinrad TL, Fabes RA, Shepard SA, Reiser M, et al. The relations of regulation and emotionality to children's externalizing and internalizing problem behavior. *Child Development*. 2001;**72**(4):1112-1134. DOI: 10.1111/1467-8624.00337

[78] Olson SL, Schilling EM, Bates JE. Measurement of impulsivity: Construct coherence, longitudinal stability, and relationship with externalizing problems in childhood and adolescence. *Journal of Abnormal Child Psychology*. 1999;**27**:151-165. DOI: 10.1023/a:1021915615677

[79] Folkman S, Moskowitz JT. Positive affect and the other side of coping. *American Psychologist*. 2000;**55**(6):647-654. DOI: 10.1037/0003-066X.55.6.647

[80] Fredrickson BL, Joiner T. Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*. 2002;**13**(2):172-175. DOI: 10.1111/1467-9280.00431

[81] Alessandri G, Tavorucci S, Perinelli E, Eisenberg N, Golfieri F, Caprara GV, et al. Regulatory emotional self-efficacy beliefs matter for (mal) adjustment: A meta-analysis. *Current Psychology*. 2023;**42**(35):31004-31023. DOI: 10.1007/s12144-022-04099-3

[82] Di Giunta L, Iselin ARI, Lansford JE, Eisenberg N, Lunetti C, Thartori E, et al. Parents' and early adolescents' self-efficacy about anger regulation and early adolescents' internalizing and externalizing problems: A longitudinal study in three countries. *Journal of Adolescence*. 2018;**64**:124-135. DOI: 10.1016/j.adolescence.2018.01.009

- [83] Bryant FB. Savoring beliefs inventory (SBI): A scale for measuring beliefs about savouring. *Journal of Mental Health*. 2003;12:175-196. DOI: 10.1080/0963823031000103489
- [84] Gerbino M, Milioni M, Alessandri G, Eisenberg N, Caprara MG, Kupfer A, et al. Self-efficacy in retrieving positive emotional experience and using humor. *European Journal of Psychological Assessment*. 2016;34(6):409-420. DOI: 10.1027/1015-5759/a000356
- [85] Jose PE, Lim BT, Bryant FB. Does savoring increase happiness? A daily diary study. *The Journal of Positive Psychology*. 2012;7:176-187. DOI: 10.1080/17439760.2012.671345
- [86] Gómez-Tabares AS, Marín MN. Prosocial trends and their relationship with empathy and emotional self-efficacy in adolescents in psychosocial vulnerability. *Revista Colombiana de Psicología*. 2020;29(2):125-147. DOI: 10.15446/rcpv29n2.78430.GNOLO
- [87] Di Giunta L, Lunetti C, Lansford JE, Eisenberg N, Pastorelli C, Bacchini D, et al. Predictors and outcomes associated with the growth curves of self-efficacy beliefs in regard to anger and sadness regulation during adolescence: A longitudinal cross-cultural study. *Frontiers in Psychology*. 2023;14:1010358. DOI: 10.3389/fpsyg.2023.1010358
- [88] Krueger RF, Tackett JL. Personality and psychopathology: Working toward the bigger picture. *Journal of Personality Disorders*. 2003;17(2):109-128. DOI: 10.1521/pedi.17.2.109.23986
- [89] Castellani V, Pastorelli C, Eisenberg N, Gerbino M, Di Giunta L, Ceravolo R, et al. Hostile, aggressive family conflict trajectories during the transition to adulthood: Associations with adolescent big five and emerging adulthood adjustment problems. *Journal of Adolescence*. 2014;37(5):647-658. DOI: 10.1016/j.adolescence.2013.12.002
- [90] Klimstra T, Akse J, Hale WW III, Raaijmakers QA, Meeus W. Longitudinal associations between personality traits and problem behavior symptoms in adolescence. *Journal of Research in Personality*. 2010;44(2):273-284. DOI: 10.1016/j.jrp.2010.02.004
- [91] Tackett JL. Evaluating models of the personality–psychopathology relationship in children and adolescents. *Clinical Psychology Review*. 2006;26:584-599. DOI: 10.1016/j.cpr.2006.04.003
- [92] Kalia V, Knauff K. Emotion regulation strategies modulate the effect of adverse childhood experiences on perceived chronic stress with implications for cognitive flexibility. *PLOSOne*. 2020;15(6):e0235412. DOI: 10.1371/journal.pone.0235412
- [93] Eisenberg N, Spinrad TL, Hernández MM, Zuffianò A. Top-down self-regulation as a Core construct in Children's and adolescents' optimal development. *American Psychologist*. 2024;79(9):1255-1268. DOI: 10.1037/amp0001408
- [94] Jambon M, Colasante T, Peplak J, Malti T. Anger, sympathy, and children's reactive and proactive aggression: Testing a differential correlate hypothesis. *Journal of Abnormal Child Psychology*. 2019;47:1013-1024. DOI: 10.1007/s10802-018-0498-3
- [95] Quarto T, Fasano MC, Taurisano P, Fazio L, Antonucci LA, Gelao B, et al. Interaction between DRD2 variation and sound environment on mood and emotion-related brain activity. *Neuroscience*. 2017;341:9-17. DOI: 10.1016/j.neuroscience.2016.11.010

[96] Decety J, Jackson PL. A social-neuroscience perspective on empathy. *Current Directions in Psychological Science*. 2006;**15**(2):54-58. DOI: 10.1111/j.0963-7214.2006.00406.x

[97] Lunetti C, Di Giunta L, Comitale C, Favini A. Feedback sensitivity, scholastic adjustment and prosocial behavior: The mediation effect of academic self-efficacy. *Futures*. 2024;**2**(4):194-204. DOI: 10.3390/future2040016

Emotional Flooding in Couple Relationships: Psychosocial Aspects and Regulatory Strategies

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Abstract

In this chapter, the mechanisms involved in the expression and regulation of emotions that influence the processes of communication and conflict resolution in romantic couples are discussed, focusing on emotional flooding. Emotional flooding in couple relationships is a key concept in the development of this chapter. This state, characterized by an overwhelming emotional response that exceeds the couple's capacity to manage it constructively, has a direct and negative impact on the functioning of the personal relationship and can worsen perceptions of the relationship, increase conflict and affect long-term satisfaction and stability. One of the basic strategies to mitigate the negative effects of emotional flooding requires an increase in emotional awareness and certain regulatory skills. Empathy, effective communication and emotional intelligence are essential to gain emotional awareness and understanding, to promote a supportive and understanding environment in which adaptive patterns develop, and to create healthy interpersonal relationship spaces in which couples can prosper. This chapter is a valuable and up-to-date evidence-based resource that will be useful in both academic and clinical settings for addressing emotional and relational issues in couple dynamics, offering practical insights for improving cohabitation and shared emotional well-being.

Keywords: emotional flooding, couples, romantic relationships, emotional regulation, emotional intelligence, conflict

1. Introduction

Relationships are one of the most complex and enriching experiences in human life. The way in which love has been defined and understood over time has varied across time, people and topics, ranging from mythology and philosophy to biology and psychology. This chapter focuses on one of the most challenging and critical aspects of romantic relationships: emotional flooding and its psychosocial implications.

Emotional flooding refers to a state in which intense emotions exceed a person's ability to manage them constructively. In the context of couple relationships, this phenomenon can have a significant negative impact, increasing conflict, decreasing satisfaction and compromising long-term stability. Understanding the mechanisms underlying this flood and implementing effective emotional regulation strategies are essential to facilitating healthy and long-lasting relationships.

This chapter explores the theoretical and practical underpinnings of emotional flooding in couples, from psychological models of love to the neurobiological foundations that influence our emotional responses. It also examines several strategies based on emotional intelligence and effective communication that can help couples deal with emotional challenges and build a more satisfying partnership.

It is important to understand that emotions play a central role in the dynamics of human relationships. The ability to regulate these emotions and communicate effectively can determine the success or failure of a relationship. This chapter provides a detailed, evidence-based view of how emotions affect couple interactions and suggests practical strategies for improving the quality of these relationships.

2. The foundations of love and its historical development

Love, often considered one of the most intense and desirable human emotions, has been the subject of profound reflection and study throughout history. The evolution of its concept shows how it has been influenced by socio-cultural, philosophical and biological contexts, resulting in a wide and sometimes contradictory range of definitions and understandings. Although researchers have developed models and theories to describe it, love remains a deeply personal and universally relevant issue, intimately linked to the human condition. As such, it continues to be a fertile field for research and exploration in various disciplines, offering new insights into one of the most fundamental and transformative experiences of human life. Understanding that love can manifest itself in many ways can help couples work through their differences and strengthen their relationships. In addition, learning about the biological and cultural factors that influence love can help demystify many of the irrational expectations people often have about romantic relationships.

The study of love has been approached from a diverse range of theoretical perspectives. From Freudian psychoanalysis, which did not focus specifically on love but explored issues related to sexuality and human relationships [1], to Bowlby's attachment theories, which highlight the importance of early relationships with caregivers in the formation of adult romantic attachments [2], psychology has offered different models for understanding this complex phenomenon. Behaviorist theories, for example, have explored how reinforcement and rewards influence the formation and maintenance of romantic relationships [3], while cognitive-behavioral theories have focused on how beliefs and expectations about love affect relationship satisfaction [4].

From a biological perspective, love is considered to have evolutionary roots that benefit the survival of the species [5]. This perspective is supported by neurobiological studies that have demonstrated how love affects not only our behavior but also has a physical substrate in the brain [6]. Recent research has identified the areas of the brain involved in the experience of romantic love and attachment, and shown how neurotransmitters such as oxytocin and dopamine play a crucial role in the euphoria and well-being associated with love. These studies have shown that activation of the

ventral tegmental area and the caudate nucleus is prominent in people experiencing romantic love, supporting the hypothesis that romantic love is influenced by subcortical dopaminergic pathways of the brain's reward system [7]. Oxytocin, often called the "love hormone," is well known for its role in bonding. It is released in large quantities during childbirth and lactation, facilitating bonding between mother and child [8]. In romantic contexts, oxytocin is released during physical contact and affective interactions, strengthening the bond between partners [9]. In this sense, Maureira defines love as "the physiological need of an exclusive partner for copulation, reproduction and nurturing, the satisfaction of which generates pleasure" (p. 325), and concludes that the couple relationship is a combination of biological and social factors in which love functions as an essential biological component mediated by psychosocial aspects such as commitment, intimacy or romance [10].

Dopamine is closely linked to the brain's reward system. The release of dopamine in the nucleus accumbens produces feelings of pleasure and motivation and reinforces behaviors that are perceived as rewarding, such as being with a loved one [11]. These advances have led to a deeper understanding of the biological basis of love and how it interacts with psychological and environmental factors. For example, the interaction between oxytocin and the dopaminergic system suggests that positive affective experiences can strengthen love bonds while increasing feelings of reward and well-being [12]. In addition, research has begun to explore how individual differences in the levels of oxytocin and dopamine receptors may influence the variability of love experiences between people [13]. Neuroscience has also shown how romantic love can affect the perception of pain and stress. Functional magnetic resonance imaging studies have shown that activation of brain areas associated with romantic love can reduce pain perception, similar to the analgesic effect of opioids [14]. In addition, the presence of a loved one can reduce levels of cortisol, a hormone associated with stressful situations, suggesting that the social support provided by romantic relationships may have a buffering effect against stress [15].

Love manifests itself in different forms and intensities, from "a strong emotional inclination towards another person" [16, p.22] to a compendium of essential components as collected by Sternberg in his Triangular Theory of Love. Sternberg identified seven types of love: affection (intimacy without passion or commitment), passion (passionate love without intimacy or commitment), empty love (commitment without passion or intimacy), romantic love (intimacy and passion without commitment), companionate love (intimacy and commitment without passion), illusory love (passion and commitment without intimacy) and consummate love (intimacy, passion and commitment). Each of these types represents a different way of relating, highlighting how variations in these components can influence the nature and quality of love relationships [17].

The Color Theory of Love, proposed by John Alan Lee in 1973, is one of the most widely accepted theories for understanding the different ways in which people experience and express love. This theory draws an analogy between love styles and colors, suggesting that just as primary colors combine to create secondary colors, primary love styles combine to create secondary styles. The three primary styles are Eros, Storge and Ludus and the three resulting secondary styles are Agape, Mania andPragma [18].

Eros is the style of love based on passion and physical attraction. People who experience Eros are often deeply attracted to their partner's physical appearance and seek an intense emotional connection from the start. This type of love is romantic and passionate and is characterized by a strong desire for intimacy and physical contact.

Eros is a love that values beauty and immediate attraction, and relationships often begin quickly with great emotional intensity.

Storge represents a love based on friendship and companionship. This style develops slowly and is based on trust and emotional intimacy. People who experience Storge value stability and loyalty in their relationships and prefer to build a deep and lasting connection over time. Unlike Eros, Storge focuses less on physical attraction and more on compatibility and mutual understanding.

Ludus is the style of love that treats love as a game. People who prefer Ludus enjoy the thrill of dating and conquest and are not looking for a serious commitment. This type of love is fun and spontaneous, and relationships tend to be superficial and short-lived. People in Ludus avoid deep relationships and may have several partners at the same time.

Agape is a selfless, altruistic love that combines elements of Eros and Storge. People who experience Agape cares more about their partner's well-being than their own and are willing to give without expecting anything in return. This style of love is generous and compassionate, focusing on the happiness and care of the other person.

Mania is an obsessive and dependent love that results from the combination of Eros and Ludus. It is characterized by obsession and jealousy, and people who experience it need constant reassurance from their partner. Mania is an intense and often anxious love where emotional dependency can lead to unstable and conflictual relationships.

Pragma is a practical and logical love, resulting from the combination of Storge and Ludus. People who prefer Pragma look for a partner who meets certain practical and compatibility criteria, such as financial stability, education and similar values. This style of love is rational and calculated and values long-term compatibility over passion or emotion.

The Color Theory of Love has been widely used in research to explore how these different love styles affect relationship satisfaction and dynamics [19–21]. For example, studies have shown that couples with high levels of Eros and low levels of Ludus tend to report higher levels of satisfaction and stability [22, 23]. In addition, preferences for particular love styles may vary significantly across cultures, reflecting context-specific values and social norms [24]. Furthermore, at the cultural level, we found significant differences in the value placed on each style, for example, some cultures place more value on factors such as stability and compatibility, which would be represented by Storge and Pragma, while others prefer passion and emotion, as represented by Eros and Ludus [25].

This theory has also been explored in terms of its circumplex structure, which suggests that love styles can be organized in a circular pattern in which adjacent styles are more closely related than opposite styles. According to Lee, this circumplex model suggests that, like a colored disc, each love style has a closer relationship with its neighbors in the circle and a more distant relationship with styles on the opposite side of the circle. This arrangement implies that people can experience and express combinations of love styles fluidly, depending on circumstances and interactions with their partners.

However, recent research has questioned this arrangement and suggested new configurations based on empirical studies that explore the spatial location of love styles on the love attitude scale. For example, Cassepp-Borges and Ferrer's study used love attitude scales to assess the validity of the circumplex structure in a Brazilian sample. Their results showed that although the six love styles proposed by Lee (Eros, Ludus, Storge, Agape, Mania and Pragma) were clearly identified,

the spatial arrangement of these styles did not follow the circular pattern originally predicted [26].

Using multidimensional scaling analyses, these authors found that certain love styles, such as Eros and Ludus, were in opposite positions, suggesting an oppositional rather than complementary relationship. Similarly, they found that Mania and Storge were also positioned opposite each other in two-dimensional space, suggesting a dichotomy rather than a continuous progression of styles. These findings suggest that the nature of love styles is more complex than Lee's original circular model suggests and that the relationships between styles can be better understood through new spatial configurations based on empirical data.

In addition, these studies also indicate that the circumplex model may not fully capture individual differences in the experience of love. For example, some individuals may exhibit characteristics of multiple love styles simultaneously, which is not consistent with a strictly circular representation. Hendrick and Hendrick also pointed out that although measures of love styles often have a clear factor structure, correlations between factors are generally low, suggesting relative independence between styles rather than a continuous relationship [19].

On the other hand, the integration of Attachment Theory with Love Color Theory has provided new insights into how love styles may be organized. Hazan and Shaver proposed that love styles may be influenced by attachment patterns developed in childhood, with dimensions of anxiety and avoidance modulating how love is experienced and expressed in adulthood. This perspective has been used to reinterpret Lee's love styles, suggesting that combinations of styles may reflect different levels of these attachment dimensions [27, 28].

Love is undoubtedly a multifaceted phenomenon that varies considerably across historical and cultural contexts. The study of love from different theoretical and methodological perspectives has enriched our understanding of this complex experience. The combination of biological and psychological approaches has provided a deeper insight into the neurobiological basis of love and its interaction with behavior and the environment. Research on love styles has revealed the diversity in the way people experience and express love, underlining the importance of recognizing these variations to improve therapeutic and counseling practice. In addition, reconsideration of the circumplex model of love styles, supported by new empirical evidence, highlights the need to develop more dynamic models that more accurately reflect the complexity and fluidity of love relationships.

3. The romantic couple concept

From the idealized romantic love of literature to more contemporary forms such as what Giddens defines as "confluent relationships," characterized by equality and a focus on eroticism and mutual gratification, the influence of social norms, values and cultural expectations on the construction of the concept of love and romantic partnership is evident [27]. This type of relationship differs from traditional models of love and marriage, which are often based on fixed gender roles and social expectations. In a confluent relationship, both parties seek an emotional and physical connection that enriches their individual lives, and these relationships are more dynamic and adaptable to personal and social changes.

In order to define and study romantic partnerships, it is therefore necessary to examine the individual and socio-cultural characteristics of the people involved in an

intimate relationship. Factors such as economics, values and age directly influence the construction of the romantic couple and shape the expectations and dynamics within the relationship.

The economic context of people in a relationship plays a crucial role in the way the romantic couple develops. Financial difficulties can lead to tensions and conflicts in the relationship, affecting the couple's stability and satisfaction [28]. On the other hand, economic security can facilitate greater stability and mutual support, allowing couples to focus on personal growth and building a life together.

In societies with high levels of economic inequality, relationships may be affected by differences in purchasing power, which may influence power dynamics within the relationship [29]. In addition, the ability to access economic resources may determine couples' opportunities to engage in joint activities and experiences that strengthen emotional attachment and relationship satisfaction.

Cultural values and norms are essential to understanding how romantic relationships are formed and maintained. Each culture has its own implicit expectations and rules about couple's behavior that influence how people perceive and manage their relationships [30]. For example, in collectivist cultures, romantic relationships may be more oriented toward fulfilling family and social expectations, whereas in individualistic cultures, self-fulfillment and personal growth may be more of a priority [31].

In addition, gender norms and expectations about roles within the couple also vary culturally. In some societies, men and women are expected to play traditional roles, which may influence the division of responsibilities within the relationship. These cultural values affect not only the structure of the relationship but also the satisfaction and well-being of the individuals involved.

Age and life stage are also important factors in the formation of romantic relationships. For the youngest, couple relationships are fundamental for emotional empowerment, providing a space for identity exploration and emotional support [32]. During adolescence and young adulthood, romantic relationships contribute to the development of social and emotional skills and the formation of an independent identity [33]. Adolescents' primary goals in formalizing a romantic partnership tend to focus on attraction and sexual relations [34, 35], but there is also a need for young people to gain more freedom in relationships in order to change their lives for the better. As some authors rightly point out, the concept of romance in relationships has changed considerably, and young people and adolescents understand other types of love in a couple in addition to romantic love, such as confluent or liquid love [36, 37].

Later in life, romantic relationships may serve different functions. For older adults, relationships can be an important source of emotional support and companionship, helping to cope with the challenges associated with aging and loneliness [38]. In addition, relationships in older age can contribute to overall well-being and mental health by providing a sense of purpose and belonging. Emotional support and personal growth are key elements in building and maintaining healthy romantic relationships. Mutual support enables couples to face challenges and resolve conflicts effectively, thereby strengthening the emotional bond [39]. Similarly, relationships that foster personal growth, where both partners support each other's individual goals and aspirations, tend to be more satisfying and longer lasting [40].

Until a few years ago, marriage was the only truly socially accepted form of union if one chose to share a home with one's partner; however, the gradual decision by couples to live together without having married first has given way to cohabitation as a relational alternative to marriage or as a "trial period" which, if it goes well, could lead to marriage [41]. In this sense, the couple can be defined as a "bonded unit,"

which must take into account the context as well as the participants and the concepts that define it, going beyond the mere sum of the persons. It is a complex, consensual and meaningful interaction that remains stable over time [42], understood as a network of relationships in which different characteristic communication sequences take place [43]. We, therefore, understand that in the romantic couple, in addition to passion, the needs of attachment and recognition must be satisfied, there is no need to share a home, and the individual needs of its members must be combined with the needs arising from the relationship [17, 44, 45].

The romantic couple is probably the one that brings together a greater number of elements of intimacy compared to other types of couples, it must generate boundaries that configure and differentiate it from others, including any system that defines it, without forgetting the issues of sexual, loving, unconditional support, fidelity and loyalty. Romantic relationships also involve preferences for the other member of the couple, before any other desire or priority that would take second place.

According to Whisman and Delinsky, the romantic partner is constructed on the basis of cognitive generalizations elaborated from one's own experience, which are responsible for processing information in an oriented and ordered way [46]. The formation of cognitive schemas in the romantic couple relationship [47] can help to understand in a different way how certain events in the couple relationship are perceived, thought about and remembered. According to the authors, when the association of these schemas is embedded in a positive valence, satisfaction increases. In addition, cognitive schemas can also predict future behavior in the couple relationship [48].

The evolution of love and romantic relationships reflects the ongoing adaptation of cultural norms and expectations over time. As society progresses, relationships are reconfigured to meet individual and collective needs, and couple dynamics are influenced by a range of economic, cultural and demographic factors. In particular, young couples look to their relationships for emotional support and personal growth, while adult and older couples see them as a refuge from loneliness and a source of meaning in life. It is, therefore, essential that the study of couple relationships takes into account the specificities of the population, avoiding generic conceptualizations and considering both individual and socio-cultural aspects that define the complexity of romantic relationships.

4. Couple conflicts

Couple relationships, like any other human interaction, are subject to a range of challenges and tensions that can manifest themselves as conflict. These conflicts should not be seen simply as one-off disagreements but as expressions of the complex underlying dynamics that shape intimate interactions. The management and resolution of these conflicts are critical to the health and viability of the relationship. Conflict is an inevitable phenomenon in all human relationships, but it is more pronounced in those of greater closeness, such as intimate relationships [49].

Conflict in couples often arises from differences in needs and desires. These differences may be superficial, such as disagreements about household chores, or more profound, related to fundamental values or life expectations. Studies of marital conflict have used a variety of theories to understand its nature and manage its effects. Social Exchange Theory, proposed by Kelley and Thibaut, suggests that conflict arises when costs outweigh perceived benefits in a relationship [50]. This approach

emphasizes the importance of fairness and balance in relationships, suggesting that couples are happier and more stable when they feel that both parties contribute and receive equally. On the other hand, Systems Theory interprets conflict as a breakdown in communication that can be repaired through improved communication [51]. Lack of clear and effective communication can lead to misunderstanding and conflict, so developing communication skills such as active listening and assertive expression can significantly improve a couple's ability to resolve conflict [52].

It is important to understand that conflict is not inherently negative. If managed properly, it can be an opportunity to grow and strengthen the relationship or to stimulate curiosity and learn new problem-solving skills such as negotiation and compromise [53, 54]. These skills are not only useful for resolving the current conflict but also strengthen the relationship by equipping individuals with tools to manage future disagreements effectively. In addition, the process of conflict resolution can foster greater intimacy and emotional connection, as couples who work together to overcome challenges develop a deeper sense of trust and cooperation [40]. Rather than avoiding or suppressing tensions, confronting them openly and honestly allows couples to explore the underlying causes of their disagreements. This process of exploration can uncover unmet needs and desires and provide a basis for developing solutions that benefit both partners. The ability to manage conflict in this way requires effective communication skills, empathy and a commitment to continually improve the relationship. This is why couples, who manage conflict effectively, using resolution strategies such as validating feelings and seeking cooperative solutions, tend to have longer and more satisfying relationships [55–57].

On the other hand, inadequate conflict management can have a profoundly destructive effect on a relationship. When conflict is handled aggressively or avoided altogether, it can perpetuate cycles of negativity and hostility [58]. These destructive patterns can manifest in a variety of ways, including constant criticism, contempt, excessive defensiveness and emotional withdrawal [58]. Such behaviors not only exacerbate conflict but also undermine the emotional foundation of the relationship, leading to a decrease in the overall satisfaction and well-being of the individuals involved [59].

Conflict is an inevitable part of all intimate and marital relationships. It is not the presence of conflict that distinguishes satisfied from dissatisfied couples, but the way in which these conflicts are handled or resolved [60]. A negative atmosphere can prevent open and honest communication, leading to the accumulation of resentments and aggravating existing problems. In addition, the perpetuation of negative patterns can make couples less able to resolve future conflicts constructively, trapping them in a vicious cycle of conflict and resentment [56]. The frequency and intensity of conflict also play an important role in the overall perception of the relationship, as couples who experience frequent and high-intensity conflict tend to report lower levels of satisfaction and stability [59].

One of the most important triggers of couple conflict is described as the decision-making process. The possible sources of tension are many and most of them depend on the decisions that are made about the problem that has arisen. According to Kirchler et al. what most strengthens the couple are shared and consensual decisions [61]. When couples make decisions together, each partner feels that his or her opinions and needs are valued and considered, which promotes an atmosphere of cooperation and mutual support. In addition to improving communication and empathy, shared decision making also increases couple commitment and cohesion, as shared decisions create a sense of unity and common purpose that can help

couples cope with the challenges and tensions that inevitably arise in any long-term relationship [62].

On the other hand, individual decisions, especially those involving a position of superiority or power over the other, can be a significant source of conflict and tension in the relationship. When one partner makes decisions unilaterally, it can create feelings of resentment and inequality. This power imbalance can cause trust and mutual respect to be compromised, leading to further dissatisfaction and possible relationship breakdown [63].

Unilateral decisions often involve a lack of communication and disregard for each other's needs and wishes. This dynamic can lead to recurrent conflict, as the partner who feels excluded or belittled may react with defensiveness or aggression. In fact, lack of communication and unilateral control are common predictors of relationship dissolution [55].

It is interesting to assess what a couple can do to maintain a stable relationship. For Dindia and Canary, effective maintenance must be based on three conditions: stability, continuity and repair [64]. Later, Canary and Daiton describe up to five forms of effective maintenance in the couple relationship: (1) care and stability (through behaviors that help the relationship), (2) quality (through elements related to mutual trust, selfless love or commitment, among others), (3) repair (using tools such as conflict prevention), (4) maintenance (adapting to the type of relationship established from the beginning), and (5) adaptation (to changes that may occur in the couple's relationship) [65].

One of the fundamental pillars of the couple relationship is maintenance. According to Rivera et al., the behavior that makes couples stay together longer is based on a positive and satisfactory relationship [66]. In fact, the authors identify up to four effective positive maintenance motives: need, trust, commitment and romantic cohabitation. In the same line is the work of Peel and Catalano, who suggest that it is necessary to be very attentive to self-sabotage in the couple's relationship in order to avoid conflict, and who identify the following as maintenance motives: trust, acceptance, good communication, commitment and security [67].

Conflict management in couple relationships is an essential component of long-term stability and satisfaction. Although disagreements are inevitable and reflect the complex dynamics of intimate interactions, their proper management can transform potential points of tension into opportunities for growth and strengthening of the relationship. Joint decision-making, based on open communication and mutual respect, is the key to avoiding the feelings of resentment and inequality that can result from unilateral decisions. Constructive resolution strategies, such as negotiation, compromise and emotional validation, not only help to resolve current conflicts, but also strengthen the relationship by equipping individuals with tools to deal effectively with future disagreements. In addition, the development of communication and emotional skills is crucial to fostering an environment of cooperation and mutual support. Finally, maintaining the relationship requires ongoing efforts in areas such as stability, quality of interaction, repairing damage and adapting to change. Together, these elements contribute to building more resilient and satisfying relationships, providing a solid foundation for dealing with challenges and promoting a lasting and healthy bond.

5. Emotional intelligence in couples

Emotional intelligence (EI), a psychological construct essential for understanding and regulating one's own and others' emotions, plays a crucial role in the dynamics

of couple relationships. This ability has a significant impact on how couples interact, resolve conflicts and maintain long-term relationship satisfaction. EI can be defined as the ability to effectively identify and manage one's own and others' emotions [68]. In the couple context, this skill translates into an enhanced ability to communicate constructively, to understand and validate each other's feelings, and to manage conflict without escalating tensions.

In general, there are many components involved in the context of couple relationships from the point of view of EI. Following the components proposed by Bar-On for the general population, they can be extrapolated to the couple: (a) Intrapersonal component (in which we can include, among others, assertiveness, independence or self-concept). (b) Interpersonal component (including, among others, relationships with others or empathy). (c) Mood-related component (ranging from optimism or happiness to pessimism or unhappiness). (d) Stress-related component (tolerance, self-control, etc.). (e) Adaptation-related component (which could include, among others, flexibility or problem-solving) [69]. Concerning these components, some studies show that all of them have a significant relationship with the couple's relationship, marking the level of satisfaction/dissatisfaction in the couple [70–73].

EI has a profound effect on couple communication. Couples with high EI are more likely to negotiate conflict, express their needs and feelings, and respond constructively to their partner's, resulting in more effective and satisfying communication [74, 75]. This translates into more open communication that is less prone to misunderstanding, resentment or escalation of conflict because people with high EI are better able to put themselves in the other person's shoes, anticipate emotional reactions and manage their own responses adaptively. EI affects mental health. When emotions are adequately regulated, mental health problems are avoided because better psychological adjustment can be achieved [76]. We can find a direct relationship between a person's mental health and their impact on the mental health of those around them, especially their partner [77]. Sánchez et al. study focuses on examining the relationship between Perceived Emotional Intelligence (PEI) and mental health among couples. Their study, conducted with 73 couples aged between 40 and 64, employed the Trait Meta Mood Scale-24 (TMMS-24) and the Mental Health-5 (MH-5) to assess the participants' EI and mental health. The results obtained indicate that an indirect association exists between one partner's PEI and the other's mental health. Particularly, predominantly the own PEI contributes to the prediction of the individual's mental health, whereas the partner's mental health contributes less to that but still meaningfully. This has a connotation that one can only improve on his or her own self-affecting EI to in turn have a positive effect on the affective variables of the partner. Furthermore, the study shows an influence on family health since better EI of one of the partners have positive consequences on the family mental health. Such studies reinforce the relationship between emotion and mind as well as the role that these two factors play in shaping the couple and the family's behavior. Addressing the management of emotions is also significant for the adaptational value, thus promoting the individual's psychological well-being as well as contributing to the development of a healthier environment within a family unit [78].

At the heart of many couple disputes lies ineffective emotional management. Couples with developed emotional skills have a greater ability to manage disagreements effectively without damaging the emotional bond they share. These couples use conflict resolution strategies that promote understanding and cooperation rather than competition and resentment. Conflict is an inevitable aspect of any close relationship, but how it is handled can have a significant impact on the health and longevity of the relationship. According to Gottman's research [55], couples with high EI are better

equipped to manage conflict without letting it escalate into damaging confrontation. These couples use several key strategies that set them apart from their less emotionally intelligent counterparts. Effective conflict resolution begins with the ability to recognize and regulate one's emotions. Couples with developed emotional skills can identify their emotional states and understand their impact on interactions. This self-awareness allows them to manage their reactions rather than react impulsively. For example, instead of responding to criticism with defensiveness or contempt, an emotionally intelligent partner might take a moment to calm down and respond constructively. Gottman's research identifies four behaviors—criticism, contempt, defensiveness, and stonewalling—that are particularly damaging to relationships, often referred to as the “Four Horsemen of the Apocalypse.” Emotionally intelligent couples actively work to avoid these behaviors. For example, instead of criticizing, they might express a specific complaint or need. Instead of showing contempt, they focus on appreciation and respect. Rather than becoming defensive, they take responsibility for their part in the conflict, and instead of stonewalling, they engage in the conversation or take a short break to cool down if needed [55, 58].

In this sense, some studies have shown that certain variables related to Gottman's model, such as communication, stress and the nature of the couple's resources, are generators of discomfort and instability, to the point that they can lead to separation. Effective communication within a family is crucial for maintaining healthy relationships and satisfaction. Ineffective communication, especially during conflicts, can lead to feelings of dissatisfaction and marital instability. Studies have shown that negative communication patterns, often exacerbated by stress, are associated with lower marital satisfaction and higher rates of separation [59]. Research by Rodríguez-Mateo et al. has provided substantial evidence to support the critical role of these variables in marital stability. Their study confirms that communication and resources are significant predictors of family satisfaction. In addition, stress was found to negatively affect both satisfaction and stability, further highlighting the importance of these factors in relationship dynamics [79].

In conflict situations, couples with high levels of EI tend to use more constructive resolution strategies, avoiding escalation of aggression and encouraging open and respectful dialog [74]. These strategies not only resolve the current conflict but also strengthen the relationship in the long term by establishing positive patterns of interaction.

Many couple imbalances are related to emotions. One of the most important is that of emotional dependence on one partner. Dependence is associated with low self-esteem, affective deficits, loneliness and inner poverty. In addition, the dependent person's perception of the partner relationship is negative [80, 81] and he/she may feel unable to break the relationship because of his/her emotional dependence and great capacity for self-deception [82].

Regarding certain relationship variables, such as duration or satisfaction, it has been shown that relationships with good EI are more satisfied with their partners and have a more stable and long-lasting cohabitation [83]. For example, self-regulation through EI leads to more balanced couple relationships, which has a significant impact on couple satisfaction [84]. High EI contributes to a warmer, more understanding and supportive relationship climate, all of which are associated with greater relationship satisfaction and a lower likelihood of separation. Other variables that increase couple satisfaction are related to resilience coupled with EI [85]. Similarly, partners' empathy significantly increases happiness and satisfaction [86], as do couples who live their relationship together and make decisions as a team [87].

Emotional competence is related to self-efficacy, i.e., the ability to have expressed emotions understood by each partner. Among these emotional competencies, emotional awareness (which includes self-esteem and self-confidence) also plays an important role in the couple's relationship [88]. In this sense, it has been found that couples with lower levels of satisfaction are those in which women are more demanding and emotionally negative than men, and men are more emotionally withdrawn and less receptive [89].

Despite the clear benefits, developing and maintaining high EI requires effort and commitment. Couples can face particular challenges when their levels of EI are uneven, which can lead to imbalances in the way each person deals with feelings and conflict. Couples therapy and emotional skills training programs provide opportunities for couples to improve their emotional intelligence. These programs are designed to teach couples how to identify, understand and manage complex emotions and how to communicate their needs and desires effectively.

6. Emotional flooding

The human brain evolved to adapt to complex social contexts and to survive in the face of physical threats, developing advanced emotional centers such as the amygdala and the limbic system, which preceded the development of the neocortex, responsible for rational thought. The most primitive part is the brain stem, from which the emotional centers later developed. Millions of years later, in mammals, the thinking brain, or neocortex, developed, with the function of interpreting and understanding the stimuli and situations received through the various sensory systems. This neurological configuration underlines the dominance of emotions in our reactions and behaviors. Humans are emotional and rational beings, but it is the most primitive emotional system that determines human behavior in certain situations. All of this is manifested in how we respond to perceptions of threat or conflict, even in modern contexts where physical threats are less frequent [90, 91].

Emotional flooding in couple relationships is a psychological phenomenon in which intense emotions overwhelm the capacity for thought and rational response, leading to impulsive actions that often damage the relationship. This phenomenon involves such a high-stress response that it interferes with the ability to think clearly, communicate effectively and solve problems [55]. It is crucial to understand intense and persistent conflict in intimate relationships, where emotional responses can dominate and overshadow logical thinking, leading to disproportionate and often destructive reactions. Couples in which one or both partners experience high levels of emotional flooding tend to be less effective at conflict resolution, which may contribute significantly to dissatisfaction and the persistence of intimate partner violence [92]. On the other hand, couples in which women have higher perceived emotional intelligence and use positive conflict resolution strategies experience significantly lower levels of emotional flooding, which in turn contributes to greater relationship satisfaction and a lower incidence of destructive conflict [93].

Relationship conflict may be perceived as a threat to the person's well-being, which causes the brain to respond in a defensive way. The dominance of emotions in human response can be seen in how we respond to conflict and threat in modern contexts. Although physical threats are less common in modern society, our emotional responses still dominate. This is manifested in situations of interpersonal stress and conflict, where automatic emotional responses can lead to disproportionate reactions and escalation of conflict [94].

The relationship between emotional repression and emotional flooding creates a major problem in a couple's relationship. When experiences based on negative emotions accumulate in the relationship, even if there are also some positive ones, they can easily lead to aggressive and violent behaviors that deteriorate the couple more quickly. The events that are archived in the couple's history (rejections, aggressions, happy moments, losses, etc.) can cause an emotional breakout at a given moment, due to the appearance of a stimulus that, because of its similarity to the lived experiences, acts as a trigger. According to Soler and Conangla [95], the emotional brain is automatically activated and the rational brain is overridden, leading to a complete emotional flooding with consequences that can be very undesirable (crying, screaming, violence, etc.). In this line, in order to avoid emotional flooding, it is essential to manage emotions appropriately, avoiding emotional repression or suppression of emotions. The proper management of emotions can be achieved through self-regulation, where mechanisms such as motivation and willpower are used to manage and avoid emotional flooding [96].

In the context of couple relationships, the interplay between the cognitive and the emotional can be particularly volatile. The rapid onset of emotions in the face of perceptions of threat or conflict can dominate the response before we are able to offer a rational response [94]. This dynamic is crucial in emotional flooding, where intense and often negative emotions can trigger impulsive responses that exacerbate conflict rather than resolve it. During emotional flooding, the sympathetic nervous system is activated, leading to increased heart rate, blood pressure and cortisol levels. This physiological response is a manifestation of the body preparing for a 'fight or flight' response, but in the context of a couple's argument it backfires and intensifies emotional reactivity [58, 97].

In a situation of emotional flooding, another person's emotions are experienced as overwhelming and lead to emotional and/or cognitive flooding. At such times, the person is likely to be hypervigilant to aversive conditioned cues, to increasingly perceive the negative aspects of the relationship and the partner as global and stable aspects of the relationship, and to distort the cues received from the environment, perceiving a greater threat than is actually present, leading the person to enter a state of negative attribution that is difficult to change [98]. Emotional flooding manifests itself in impulsive behaviors and overreactions, where individuals feel they are losing control of their emotions, leading to responses that they often regret [91]. Intense emotional arousal impairs cognitive functioning, especially the executive functions necessary for decision-making and emotional regulation. Couples in this state often experience irrational and negative thoughts, which can lead to escalating tensions, as this cognitive distortion may include exaggerated interpretations of each other's negative intentions, fueling emotional reactivity and conflict [4, 99]. This state not only causes stress and distress in the moment but can also create recurring cycles of conflict and heightened defensiveness between partners. Defensiveness, a common response to feeling attacked or criticized, can become a significant barrier to conflict resolution. As couples repeatedly engage in these negative cycles, trust and intimacy erode, with long-term consequences for the health of the relationship [59]. At this point, the couple no longer resolves the conflict in a constructive way, coming together to resolve the situation that is causing discomfort, but rather they distance and confront each other, focusing on the person rather than the problem and the solution. In the couple's environment, the balance between emotion and reason is fundamental to guarantee a functional and adaptive behavior of the individual to the environment [100].

In a state of emotional flooding, partners may have difficulty listening to and understanding their partner, often reacting defensively and resorting to destructive behaviors such as criticism, contempt, and emotional withdrawal. These behaviors not only exacerbate the current conflict but also damage the relationship in the long term [101, 102]. On the other hand, emotional self-awareness can help to identify moments of high emotional intensity and to curb emotional peaks by taking steps to reduce arousal levels, either through behavioral responses, such as removing oneself from the situation by taking a walk, engaging in physical activity, or doing relaxation exercises, among others, or through cognitive responses such as talking to someone I trust to better understand what has happened, identifying negative and destructive thoughts to change them to more realistic thoughts, or trying to change the focus by finding a solution to the situation that is causing discomfort and taking the focus away from the other person, among others [91, 103].

Emotional regulation and mindfulness are effective techniques for managing and mitigating the effects of emotional flooding. These practices promote greater awareness of emotions and help people manage their responses more effectively, encouraging more thoughtful and constructive interactions rather than impulsive and destructive responses. James J. Gross's research on emotional regulation highlights the effectiveness of techniques such as cognitive reappraisal and suppression in managing intense emotions. Gross explains that cognitive reappraisal, in particular, can help people change their perspective on emotional situations, thereby reducing their emotional impact [104]. Cognitive reappraisal involves reinterpreting a potentially emotion-eliciting situation in a way that changes its emotional impact. For instance, viewing a stressful event as a challenge rather than a threat can reduce feelings of anxiety and helplessness. Suppression, another strategy identified by Gross, involves inhibiting the outward signs of inner emotions. While suppression can be useful in certain contexts, such as maintaining professionalism in a difficult work environment, it is generally less effective than reappraisal because it does not address the underlying emotional response and can lead to increased physiological stress. Mindfulness has been shown to be effective in reducing stress and improving emotional regulation, reducing emotional reactivity and increasing resilience. Mindfulness practices, such as mindful breathing and meditation, help individuals focus on the present moment and recognize their emotions without judgment. This emotional awareness allows people to understand their emotions as they occur, leading to better regulation of emotional responses and more considerate interactions [105, 106]. The emotional awareness promoted by mindfulness allows people to recognize and understand their emotions in the moment, leading to better regulation of emotional responses and more considerate interactions. Mindfulness-based therapy (MBT) has been successfully used to treat depression, anxiety, and other emotional disorders. MBT enhances emotional self-awareness and improves emotional regulation skills by encouraging individuals to observe their thoughts and feelings from a detached perspective. This detachment reduces the intensity of emotional reactions and promotes a calm, balanced approach to dealing with stressors [107].

Another effective strategy for reducing emotional flooding is Gottman's "time-out" pauses. This technique involves taking a deliberate break during heated arguments to allow individuals to cool down. Physiological research supports the effectiveness of this approach; taking a time-out reduces cortisol levels and physiological activation, which helps prevent the escalation of conflict. This cooling-off period can be crucial in preventing impulsive, destructive responses and promoting more rational, constructive dialog once both parties are calmer [101, 108].

7. Conclusions

Love is a complex phenomenon that has structured human relationships for thousands of years. We build our lives around those we consider important, and the relationships we form shape our most intimate environment, with romantic relationships being one of the deepest and most important that we can develop with our peers. In this context, emotions are experienced with such intensity that, without appropriate strategies, the impact on the relationship can be devastating. Emotional flooding is a critical phenomenon in couple relationships, characterized by overwhelming emotional responses that interfere with rational thinking and constructive problem solving and directly affect key relationship factors such as satisfaction or stability. Effective conflict management and emotional intelligence emerge as essential variables in promoting relationship satisfaction and stability. Couples who develop emotional skills and use constructive conflict resolution strategies are better equipped to deal with the challenges of intimate relationships and reduce the incidence and impact of emotional flooding. Techniques such as cognitive reappraisal, mindfulness and time-out are highlighted as effective tools for managing intense emotional arousal and promoting healthier interactions.

In summary, understanding and managing emotional flooding in couple relationships requires a multidimensional approach that integrates emotional awareness, regulation and communication skills, as well as attitudes of mutual openness and trust. By fostering an environment of trust and emotional connection, couples can transform potential conflict into opportunities for growth and strengthening of their bonds, and improve their coping and conflict resolution strategies. By understanding the impact of these emotions on our behavior as a couple, we can try to avoid emotional flooding, gain control and thus increase the chances of success in building a healthy, future-proof relationship.

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References

- [1] Freud S. Observations on transference-love (further recommendations on the technique of psycho-analysis III). The Standard Edition of the Complete Psychological Works of Sigmund Freud. 1915;**12**:157-171
- [2] Bowlby J. Attachment and Loss: Volume I: Attachment. New York, NY: Basic Books; 1969
- [3] Skinner BF. Science and Human Behavior. Oxford, England: Macmillan; 1953
- [4] Beck AT. Love Is Never Enough: How Couples Can Overcome Misunderstandings, Resolve Conflicts, and Solve Relationship Problems through Cognitive Therapy. New York, NY: Harper & Row; 1988
- [5] Fisher HE. Por qué amamos: Naturaleza y química del amor romántico. Madrid, Spain: Suma de Letras; 2005
- [6] Zeki S. The neurobiology of love. FEBS Letters. 2007;**581**(14):2575-2579
- [7] Fisher HE, Aron A, Brown LL. Romantic love: An fMRI study of a neural mechanism for mate choice. The Journal of Comparative Neurology. 2005;**493**(1):58-62
- [8] Carter CS. Neuroendocrine perspectives on social attachment and love. Psychoneuroendocrinology. 1998;**23**(8):779-818
- [9] Zak PJ. The Moral Molecule: The Source of Love and Prosperity. New York, NY: Dutton; 2012
- [10] Maureira F. Los cuatro componentes de la relación de pareja. Revista electrónica de psicología Iztacala. 2011;**14**(1):321-332
- [11] Aron A, Fisher H, Mashek DJ, Strong G, Li H, Brown LL. Reward, motivation, and emotion systems associated with early-stage intense romantic love. Journal of Neurophysiology. 2005;**94**(1):327-337
- [12] Young LJ, Wang Z. The neurobiology of pair bonding. Nature Neuroscience. 2004;**7**(10):1048-1054
- [13] Walum H, Westberg L, Henningsson S, Neiderhiser JM, Reiss D, Igl W, et al. Genetic variation in the vasopressin receptor 1a gene (AVPR1A) associates with pair-bonding behavior in humans. Proceedings of the National Academy of Sciences. 2008;**105**(37):14153-14156
- [14] Younger J, Aron A, Parke S, Chatterjee N, Mackey S. Viewing pictures of a romantic partner reduces experimental pain: Involvement of neural reward systems. PLoS One. 2010;**5**(10):13309
- [15] Ditzen B, Neumann ID, Bodenmann G, Dawans B, Turner RA, Ehlert U, et al. Effects of different kinds of couple interaction on cortisol and heart rate responses to stress in women. Psychoneuroendocrinology. 2007;**32**(5):565-574
- [16] Brenlla ME, Brizzio A, Carreras A. Actitudes hacia el amor y apego. Psicodebate. 2004;**4**:7-23
- [17] Sternberg RJ. A triangular theory of love. Psychological Review. 1986;**93**(2):119-135
- [18] Lee JA. The Colors of Love: An Exploration of the Ways of Loving. Toronto, Canada: New Press; 1973
- [19] Hendrick C, Hendrick S. A theory and method of love. Journal

of Personality and Social Psychology. 1986;**50**(2):392-402

[20] Kim J, Hatfield E. Love types and subjective well-being: A cross cultural study. *Social Behavior and Personality: An International Journal*. 2004;**32**(2):173-182

[21] Lee JA. A typology of styles of loving. *Personality and Social Psychology Bulletin*. 1977;**3**(2):173-182. Available from: <http://journals.sagepub.com/doi/10.1177/014616727700300204>

[22] Davis KE, Todd MJ. Assessing friendship: Prototypes, paradigm cases and relationship description. *Advances in Descriptive Psychology*. 1985;**4**:79-122

[23] Sprecher S, Regan PC. Passionate and companionate love in courting and young married couples. *Sociological Inquiry*. 1998;**68**(2):163-185

[24] Gao G, Ting-Toomey S. *Communicating Effectively with the Chinese*. New York, NY: SAGE Publications, Inc; 1998

[25] Dion KK, Dion KL. Individualistic and collectivistic perspectives on gender and the cultural context of love and intimacy. *Journal of Social Issues*. 1993;**49**(3):53-69. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/j.1540-4560.1993.tb01168.x>

[26] Cassepp-Borges V, Ferrer E. Are we missing the Circumplexity? An examination of love styles. *Journal of Relationships Research*. 2019;**10**:e21. Available from: https://www.cambridge.org/core/product/identifier/S1838095619000131/type/journal_article

[27] Giddens A. *The Transformation of Intimacy: Sexuality, Love, and Eroticism in Modern Societies*. Stanford, CA: Stanford University Press; 1999

[28] Conger RD, Elder GH Jr, Lorenz FO, Conger KJ, Simons RL, Whitbeck LB, et al. Linking economic hardship to marital quality and instability. *Journal of Marriage and the Family*. 1990;**52**(3):643-656

[29] Cherlin AJ. *The Marriage-Go-Round: The State of Marriage and the Family in America Today*. New York, NY: Knopf; 2010

[30] Triandis HC. *Individualism and Collectivism*. New York, NY: Westview Press; 1995

[31] Kagitcibasi C. Autonomy and relatedness in cultural context: Implications for self and family. *Journal of Cross-Cultural Psychology*. 2005;**36**(4):403-422

[32] Cervalllos AC, Jerves EM. Las relaciones de pareja en los adolescentes de Cuenca: Su relación con el machismo/marianismo. *Interpersona*. 2017;**11**(2):126-140

[33] Erikson EH. *Identity: Youth and Crisis*. New York, NY: W. W. Norton & Company; 1968

[34] Barrera F, Vargas E. Relaciones familiares y cogniciones románticas en la adolescencia: El papel mediador de la autoeficacia romántica. *Revista de Estudios Sociales*. 2005;**21**:27-35

[35] Contreras MF. Construcción y vivencia de las relaciones de pareja en los jóvenes estudiantes de las Facultades de Medicina, Arquitectura, y Administración de la Universidad Autónoma Benito Juárez de Oaxaca. *Academo*. 2016;**3**(2):1-20

[36] Flores B, Guzmán M, Martínez L, Jiménez M, Rojas JL, Preciado N. Caracterización de las (nuevas) relaciones románticas de adolescentes. *Avances en Psicología*. 2021;**29**(1):47-58

- [37] Bauman Z. Amor líquido. Acerca de la fragilidad de los vínculos humanos. Buenos Aires, Argentina: Fondo de Cultura Económica; 2005
- [38] Antonucci TC, Akiyama H, Takahashi K. Attachment and close relationships across the life span. *Attachment & Human Development*. 2004;**6**(4):353-370
- [39] Cutrona CE. Social Support in Couples: Marriage as a Resource in Times of Stress. Thousand Oaks, CA: Sage Publications, Inc; 1996
- [40] Feeney BC, Collins NL. A new look at social support: A theoretical perspective on thriving through relationships. *Personality and Social Psychology Review*. 2015;**19**(2):113-147
- [41] Sahib P, Gu X. To tie the knot or not: Cohabitation, marriage and individuals' attitudes to risk. *Demographic Research*. 2002;**6**(13):355-382
- [42] Espriella R. Terapia de pareja: Abordaje sistémico. *Revista Colombiana de Psiquiatría*. 2008;**37**(1):257-270
- [43] Cuervo JJ. Parejas viables que perduran en el tiempo. *Diversitas: Perspectivas en Psicología*. 2013;**9**(2):257-270
- [44] Domínguez M. Diez años de cambios en las parejas españolas. Madrid, Spain: Centro de Investigaciones Sociológicas; 2011
- [45] Castrillón E. Terapia de pareja: Una mirada a sus procesos. *Revista Colombiana de Psiquiatría*. 2008;**37**(1):187-197. Available from: <http://www.redalyc.org/articulo.oa?id=80615420015>
- [46] Whisman MA, Delinsky SS. Marital satisfaction and an information-processing measure of partner-schemas. *Cognitive Therapy and Research*. 2002;**26**(5):617-627
- [47] Londero A, Natividade JC, Ferés T. Romantic relationship and partner schemas: Concepts associated with a positive. *Trends in Psychology*. 2020;**28**:511-528
- [48] Heim E, Ajzen I, Schmidt P, Seddig D. Women's decisions to stay in or leave an abusive relationship: Results from a longitudinal study in Bolivia. *Violence Women*. 2018;**24**(14):1639-1657. DOI: 10.1177/1077801217741993
- [49] Lulofs RS, Cahn DD. Conflict: From Theory to Action. Boston, MA: Allyn & Bacon; 2000
- [50] Kelley HH, Thibaut JW. Interpersonal Relations: A Theory of Interdependence. New York, NY: Wiley; 1978
- [51] Rubén B. Communication and conflict: A systems perspective. *The Quarterly Journal of Speech*. 1978;**64**(2):202-210
- [52] Watzlawick P, Bavelas JB, Jackson DD. Pragmatics of Human Communication: A Study of Interactional Patterns, Pathologies and Paradoxes. New York, NY: W. W. Norton & Company; 2011. 304 p
- [53] Cardona P, Wilkinson H. El conflicto también puede ser positivo (si sabemos gestionarlo). *Doc Inéd*. 2008;**40**:1-4
- [54] Sillars AL, Canary DJ. Conflict in personal relationships. In: Vangelisti AL, editor. *Handbook of Family Communication*. New York, NY: Lawrence Erlbaum Associates; 2013. pp. 413-430
- [55] Gottman JM, Levenson RW. The timing of divorce: Predicting when a

couple will divorce over a 14-year period. *Journal of Marriage and the Family*. 2000;**62**(3):737-745

[56] Bradbury TN, Fincham FD, Beach SR. Research on the nature and determinants of marital satisfaction: A decade in review. *Journal of Marriage and the Family*. 2000;**62**(4):964-980

[57] Meeks BS, Hendrick SS, Hendrick C. Communication, love and relationship satisfaction. *Journal of Social and Personal Relationships*. 1998;**15**(6):755-773

[58] Gottman JM. What Predicts Divorce? The Relationship between Marital Processes and Marital Outcomes. Vol. xvi. Hillsdale, NJ, US: Lawrence Erlbaum Associates, Inc; 1994, 521 p. (What predicts divorce? The relationship between marital processes and marital outcomes)

[59] Fincham FD, Beach SR. Conflict in marriage: Implications for working with couples. *Annual Review of Psychology*. 1999;**50**(1):47-77

[60] Moland MM. Conflict and Satisfaction in Romantic Relationships (Master's Thesis). Hays, KS: Fort Hays State University; 2011. Available from: <https://scholars.fhsu.edu/theses/154>

[61] Kirchler E, Rodler C, Holzl E, Meier K. Conflict and Decision-Making in Close Relationships: Love, Money and Daily Routines. Hove, UK: Psychology Press; 2001

[62] Beach SRH, Tesser A. Decision making power and marital satisfaction: A self-evaluation maintenance perspective. *Journal of Social and Clinical Psychology*. 1993;**12**(4):471-494

[63] Gómez M, Leyva M. El poder en la pareja: Una mirada a las decisiones unilaterales. *Revista de Psicología*. 2002;**20**(1):23-34

[64] Dindia K, Canary DJ. Definitions and theoretical perspectives on maintaining relationships. *Journal of Social and Personal Relationships*. 1993;**10**:163-173

[65] Canary DJ, Dainton M. Maintaining relationships. In: Reis HT, Sprecher S, editors. *Encyclopedia of Human Relationships*. Thousand Oaks, CA: SAGE; 2009

[66] Rivera S, Tonatiuh G, Jaen C, Velasco P, Villanueva R. El mantenimiento en las relaciones de pareja: Una forma de medirlo. *Acta de investigación psicológica*. 2022;**12**(1):117-135

[67] Peel R, Caltabiano N. Why do we sabotage love? A thematic analysis of lived experiences of relationship breakdown and maintenance. *Journal of Couple & Relationship Therapy*. 2021;**20**(2):99-131

[68] Mayer JD, Salovey P, Caruso DR. Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*. 2004;**15**(3):197-215

[69] Bar-On R. Bar-On Emotional Quotient Short Form (EQI: Short): Technical Manual. Toronto, CA: Multi-Health Systems; 2002

[70] Capafons JI, Sosa CD. Relaciones de pareja y habilidades sociales: El respeto interpersonal. *Behavioral Psychology*. 2015;**23**(1):25-34

[71] García B, Quezada L. Inteligencia emocional como predictora de la satisfacción con la relación, entre jóvenes víctimas y no víctimas de violencia en el noviazgo. *Suma Psicológica*. 2020;**17**(29):166-175

[72] López C. Inteligencia emocional y relaciones interpersonales en los

estudiantes de enfermería. Educación médica. 2015;**16**(1):83-92

[73] Quiroz RE. Relación de satisfacción marital con inteligencia emocional en cónyuges adventistas del Séptimo Día del “Distrito Misionero de Lurín.”. Revista Muro de la Investigación. 2016;**5**(1):15-26

[74] Brackett MA, Warner RM, Bosco JS. Emotional intelligence and relationship quality among couples. Personal Relationships. 2005;**12**(2):197-212. Available from: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-20444473860&doi=10.1111%2fj.1350-4126.2005.00111.x&partnerID=40&md5=835c8475cb9c036d8cf9fb2cd420a4f6>

[75] Schutte NS, Malouff JM, Bobik C, Coston TD, Greeson C, Jedlicka C, et al. Emotional intelligence and interpersonal relations. The Journal of Social Psychology. 2001;**141**(4):523-536. Available from: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-0035431227&doi=10.1080%2f00224540109600569&partnerID=40&md5=b9e0fe03b4959d8e5635110c9cf8c46f>

[76] Ciarrochi JV, Chan A, Caputi P. A critical evaluation of the emotional intelligence construct. Personality and Individual Differences. 2000;**28**(3):539-561

[77] Bischof J, Wittmund B, Angermeyer MC. Alltag mit der depression des partners [everyday life with the depression of one's spouse]. Psychotherapeut. 2002;**47**(1):11-15

[78] Sánchez MT, Montañés J, Latorre JM, Fernández-Berrocal P. Análisis de las relaciones entre la inteligencia emocional percibida y la salud mental en la pareja. Ansiedad y Estrés. 2006;**12**(2/3):343-353

[79] Rodríguez H, Luján I, Díaz C, Rodríguez JC, González Y.

Satisfacción familiar, comunicación e inteligencia emocional. International Journal of Educational Psychology. 2018;**1**(1):117-128

[80] Bornstein RF, Hopwood CJ. Evidence-based assessment of interpersonal dependency. Professional Psychology: Research and Practice. 2017;**48**(4):251-258

[81] Camarillo L, Ferre F, Echeburúa E, Amor PJ. Escala de dependencia emocional de la pareja: Propiedades psicométricas. Actas Españolas de Psiquiatría. 2020;**48**(4):145-153. Available from: https://www.researchgate.net/publication/344246121_Partner%27s_Emotional_Dependency_Scale_Psychometrics

[82] Moral MV, Sirvent C, Ovejero A, Cuetos G. Dependencia emocional en las relaciones de pareja como Síndrome de Artemisa: Modelo explicativo. Terapia Psicológica. 2018;**36**(3):156-166

[83] Malouff JM, Schutte NS, Thorsteinsson EB. Trait emotional intelligence and romantic relationship satisfaction: A meta-analysis. American Journal of Family Therapy. 2014;**42**(1):53-66

[84] Knudson-Martin C, Mahoney AR. The myth of equality. In: Knudson-Martin C, Mahoney AR, editors. Couples, Gender and Power: Creating Change in Intimate Relationships. New York, NY: Springer; 2009. pp. 43-61

[85] Barani D, Thiagarajan S, Nigesh K. Role of infertility, emotional intelligence and resilience on marital satisfaction among Indian couples. International Journal of Applied Psychology. 2013;**3**(3):31-37

[86] Schröder-Abé M, Schütz A. Walking in each other's shoes: Perspective taking

mediates effects of emotional intelligence on relationship quality. *European Journal of Personality*. 2011;25(2):155-169. Available from: <https://www.scopus.com/inward/record.uri?eid=2-s2.0-79953104421&doi=10.1002%2fper.818&partnerID=40&md5=5f8170a6dafa6a5020a5bd9c215450a1>

[87] Seider BH, Hirschberger G, Nelson KL, Levenson RW. We can work it out: Age differences in relational pronouns, physiology, and behavior in marital conflict. *Psychology and Aging*. 2009;24(3):604-613

[88] Vázquez N, Díaz G. La importancia de las emociones en los conflictos de pareja. *MSC Métodos de Solución de Conflictos*. 2023;3(4):55-74

[89] Foran HM, O'Leary KD, Williams MC. Emotional abilities in couples: A construct validation study. *American Journal of Family Therapy*. 2012;40(3):189-207

[90] Correa J, Muñoz D. Vías de la emoción y la inhibición de la neocorteza cerebral. *CES Movimiento y Salud*. 2013;1(1):52

[91] Goleman D. *Inteligencia emocional*. Barcelona, Spain: Kairós; 1996

[92] Malik J, Heyman RE, Smith Slep AM. Emotional flooding in response to negative affect in couple conflicts: Individual differences and correlates. *Journal of Family Psychology*. 2020;34(2):145-154. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/fam0000584>

[93] Berenguer-Soler M, García del Castillo-López Á, Pineda D. Breaking the cycle of emotional flooding: The protective role of women's emotional intelligence in couple's conflict. *Frontiers in Psychology*. 2023;14:1-12. Available

from: <https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1217513>

[94] LeDoux J. *The Emotional Brain*. New York, NY: Fireside, Simon & Schuster; 1996

[95] Soler J, Conangla M. *Ecología Emocional. El arte de vivir vidas emocionalmente armónicas y sostenibles*. Barcelona, Spain: Amat Editorial; 2013

[96] Ríos J. Represión emocional, acto que perjudica la salud mental. *Asociación WAYRAYANA-Colombia*. 2020;1(1):1-15

[97] Levenson RW, Carstensen LL, Gottman JM. The influence of age and gender on affect, physiology, and their interrelations: A study of long-term marriages. *Journal of Personality and Social Psychology*. 1994;67(1):56-68

[98] Del Vecchio T, Lorber MF, Slep AMS, Malik J, Heyman RE, Foran HM. Parental flooding during conflict: A psychometric evaluation of a new scale. *Journal of Abnormal Child Psychology*. 2016;44(8):1587-1597. DOI: 10.1007/s10802-016-0137-9

[99] Gottman JM. A theory of marital dissolution and stability. *Journal of Family Psychology*. 1993;7(1):57-75

[100] Roberts TW, Koval JV. Applying brain research to couple therapy: Emotional restructuring. *Journal of Couple & Relationship Therapy*. 2002;2(1):1-13. DOI: 10.1300/J398v02n01_01

[101] Gottman JM, Silver N. *The Seven Principles for Making Marriage Work*. New York, NY: Three Rivers Press; 1999

[102] Gottman JM, Levenson RW. Marital processes predictive of later dissolution: Behavior, physiology, and health. *Journal of Personality and Social Psychology*. 1992;63(2):221-233

[103] Gross JJ, John OP. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*. 2003;**85**(2):348-362

[104] Gross JJ. Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*. 2002 May;**39**(3):281-291

[105] Baer RA. Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*. 2003;**10**(2):125-143. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1093/clipsy.bpg015>

[106] Kabat-Zinn J. *Full Catastrophe Living: Using the Wisdom of your Body and Mind to Face Stress, Pain, and Illness*, 15th Anniversary Ed. New York, NY, US: Delta Trade Paperback/Bantam Dell; 2005. xxxiii, 471 p. (Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness, 15th anniversary ed)

[107] Segal ZV, Williams JMG, Teasdale JD. *Mindfulness-Based Cognitive Therapy for Depression: A New Approach to Preventing Relapse*. New York, NY, US: Guilford Press; 2002. xiv, 351 p. (Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse)

[108] Sapolsky RM. *Why Zebras don't Get Ulcers: The Acclaimed Guide to Stress, Stress-Related Diseases, and Coping*. New York, NY: Henry Holt; 2004

Perspective Chapter: Emotion Regulation in Attention Deficit/Hyperactivity Disorder (ADHD) – A Lifespan Perspective

Supriya Malik

Abstract

Attention deficit/hyperactivity disorder (ADHD) is characterized by symptoms of inattention, hyperactivity, and impulsivity. One of the areas impacted in ADHD is executive functioning with significant difficulties in response control, self-monitoring, planning, and general regulation. These difficulties seem to be intertwined with identifying and managing emotions. In this chapter, a theory of emotion regulation in ADHD is proposed considering a lifespan approach. In ADHD, emotional regulation is impacted at every level—poor response control and emotional modulation along with poor monitoring of impact of emotional response on others. It is often seen that children with ADHD set themselves in cycles of emotion dysregulation leading to negative feedback leading to further emotion dysregulation. Taking a lifespan approach, this cycle consistently creates social environments where regulation is not taught, thereby giving a strong message of failure to the individual. Finally, these manifest as anxiety responses or depression in adults where the adult is easily overwhelmed due to constant inability to regulate themselves. Thus, although emotion dysregulation may be obvious in children, it becomes layered and complex in adults with ADHD. Understanding ADHD from such a lifespan approach is critical towards arriving at correct diagnosis at different developmental stages and towards treatment planning.

Keywords: ADHD, executive functioning, adult ADHD, emotion dysregulation, anxiety, depression

1. Introduction

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by difficulties in attention, hyperactivity, and impulsivity. Currently, the Diagnostic and Statistical Manual – 5 (DSM-V) distinguishes between three types: ADHD with marked difficulties in attention, ADHD with marked difficulties in hyperactivity and impulsivity, or ADHD with combined

presentation, where both inattention and hyperactivity symptoms are present [1]. A diagnosis of ADHD requires the person to meet a minimum of six symptoms of inattention, including difficulties with sustained attention, attention shifts, challenges in following instructions, difficulties with organizing, planning, task completion, procrastination, and increased distractibility; and six symptoms of hyperactivity and impulsivity, including restlessness, inability to remain calm, excessive motor activity, difficulties with waiting, and interrupting or intrusion [1]. The criteria further specify an age of onset before 12 years, with symptoms being present in two or more settings or environments and significantly impacting functioning [1].

Prevalence rates for ADHD in childhood vary between 5 and 7% [2, 3], while prevalence in adolescents and adults varies between 2 and 5% [3, 4]. There has been growing debate in the literature regarding the incidence of ADHD in adulthood, with some consensus that ADHD in adulthood is often undiagnosed and under-reported [5]. Furthermore, ADHD comes with a number of comorbid conditions in adulthood, often making identification and diagnosis extremely challenging. Substance use, mood disorders, anxiety disorders, and personality disorders are the most common psychiatric comorbidities identified in adult ADHD [6, 7].

Over the recent years, there has been recognition that ADHD has a significant impact on functioning across the lifespan. Although ADHD diagnosis primarily asks for difficulties in attention, hyperactivity, and impulsivity, ADHD often has a ripple effect on functioning in all areas of life including cognitive, social, academic, and occupational. Moreover, although most concerns in childhood revolve around the child's inability to cope with academic expectations, it is important to note that the social and emotional impact of ADHD in childhood can have far-reaching, deleterious consequences in adulthood.

2. ADHD and executive functioning

One of the key areas of cognitive functioning impacted in ADHD is executive functioning. Executive functioning is understood as the “complex cognitive processing requiring the coordination of several sub-processes to achieve a particular goal” [8]. These sub-processes include, among others, sustained attention, working memory, behavior inhibition, verbal fluency, planning, and motor responses [8–10]. Every executive function process and the coordination between them are needed for effortless adaptation and functioning in all domains of life. For example, attention shifting allows us to shift or switch our attention to important information in the surroundings, and it is often used during work, conversations, and our daily activities. Impairment in this process often affects the individual's ability to easily move into different contexts and impacts the ability to fluctuate back to an ongoing task. Hence, each individual process, although distinct, provides an important contribution to everyday functioning. At the same time, various everyday tasks, such as writing, call upon coordination of various executive functions. Thus, in certain tasks, a few of the executive functions may be needed, while at other times, all of them may be required to successfully carry out everyday activities.

Executive function impairments impact one's ability to control and adjust cognition, behavior, and emotion during significant times of uncertainty, change, and novelty [11]. Impairments in executive functioning lead to cognitive, behavioral,

and emotional dysregulation, where individuals with executive function disorders struggle with adaptability more than individuals with no such impairments.

In order to understand how ADHD and executive functioning are connected, Barkley [9, 12] proposed a theory suggesting that the major difficulties in ADHD are the outcome of an inability to moderate or inhibit predominant responses to a given situation [9]. Behavioral inhibition is the ability to stop an ongoing response or response pattern so as to create a delay during which self-directed action can take place [9]. This self-directed action, in turn, takes the form of one of the many executive functioning sub-processes, such as working memory and planning [8–10]. This delay in time and executive functioning helps the individual to implement effective and appropriate thoughts, emotions, and behaviors toward a task [9].

Barkley [9] proposed a hybrid model of executive dysfunction in ADHD. He attributed behavioral inhibition to four areas: (a) working memory, (b) self-regulation of affect/motivation/arousal, (c) internalization of speech, and (d) reconstitution. According to Barkley [12], behavior inhibition impacts these four functions such that the expression of each function is moderated by behavior inhibition. Consequently, these four executive functions affect the motor system, in terms of goal-directed behavior [9]. There is evidence to suggest a deficiency in behavior inhibition in ADHD, thus supporting Barkley's claims regarding inhibition as a core executive functioning impairment impacting other functions thereby leading to difficulties in goal-directed behaviors [9].

Due to the difficulties stated above, individuals with ADHD face a significant challenge in the modulation and moderation of both positive and negative emotions. When regulating emotions, behavioral inhibition in response to an emotion plays an important role [13]. For example, an anger response is often moderated based on context or the way a person exhibits excitement may differ for different people based on the level of behavioral inhibition they engage in. In ADHD, issues in behavior modulation, impulse control, and flexibility difficulties impact this regulation process. Being able to manage and adapt to the physiological response brought about by emotion is also affected by poor motor control, hyperactivity, and restlessness as observed in ADHD. For people with ADHD, the inability to stop behavior and create this delay is one of the reasons that they are often unable to inhibit immediate (and sometimes inappropriate) responses to situations, such as talking out of turn in conversations, maintaining focus and attention on tasks with little immediate reward or consequence, modulating emotional responses, or regulating motor movements [9, 14–16].

The ability to adapt to quick changes in the environment is not as well developed in individuals with ADHD, and therefore, moderating and changing an emotional response becomes extremely challenging. While regulating emotions, individuals need to modulate their behavior to meet a certain goal [13]. This also requires the individual with ADHD to be adept about alternative responses or behaviors, recognition of substitute behaviors, and switching behavioral responses to reach a desired goal. Therefore, basic challenges in behavior inhibition, impulse control, and inability to shift focus in ADHD contribute to the inability to respond appropriately to the situation, and hence, in overall emotional regulation.

Emotional reactivity, or hyper-responsiveness, is a common clinical trait described in ADHD research [9, 17]. In academic settings, individuals with ADHD expressed more irritability, hostility, and frustration than their non-ADHD peers [9, 17, 18]. The information on emotional hyper-responsiveness is not very definitive in regard to

out-of-school settings; however, it could be hypothesized that any academic difficulties related to emotion could be generalized to one's nonacademic life as well [19].

3. Emotion (dys)regulation and ADHD

Emotional regulation is the process by which an emotional state is changed in a way that either it is decreased or weakened or that it is increased or strengthened [20]. However, there is no consensus on one single definition of emotion regulation [21]. According to Gottman and Katz [13], emotion regulation happens when, in the presence of an emotion, an individual (a) inhibits or stops behavioral responses to the emotion, (b) self-soothes the physiological arousal that the emotion has produced, (c) refocuses his/her attention, and (d) organizes his/her self for a harmonious set of behaviors that are compatible with an external goal [13, 21, 22]. Bunford et al. [22] extended the definition to focus on intensity and speed, suggesting that “emotion regulation is an individual's ability to control (1) the speed with which and degree to which the physiological, experiential and behavioral expression of an emotion escalates, (2) the intensity of the physiological, experiential and behavioral expression of an emotion, and (3) the speed with which physiological, experiential and behavioral expression of an emotion de-escalates in a manner congruent with an optimal level” [22].

Emotion regulation is considered an important developmental milestone as it is a critical adaptive function impacting quality of life across the lifespan [23]. There is evidence to suggest that emotion regulation impacts social behavior and social acceptance [24], academic achievement [25], and overall improved well-being [26]. Emotion regulation has also been associated with fewer internalizing and externalizing problems [27] leading to better health and relationship outcomes [28]. Finally, emotion regulation leads to better psychological adaptability to situations [29]. In general, it is believed that with increasing age human beings learn to regulate their emotions and themselves better [30]. However, it is believed that various genetic, neurological, or social factors can impact one's ability to learn this important skill.

Emotional dysregulation (ED) is an individual's inability to perform any or all aspects of the modulatory processes involved in emotion regulation to a degree that this inability leads to the individual functioning significantly below his or her baseline [22]. Emotion dysregulation is also usually described as “impatience, low frustration tolerance and quickness to anger” [21]. Emotional regulation is affected by paying attention to important emotional stimuli in the environment and detecting the signal that emotional control is required. Individuals with ADHD face challenges in attending to such emotional stimuli due to difficulties in attention and attention shift, and hence, they are unable to adjust their emotions in an appropriate manner [31, 32]. An inclination for immediate reward over delayed reward can also contribute to emotional dysregulation, as it could be indicative of abnormality in limbic regions of the brain that are directly involved in emotion processing. ADHD was found to be moderately linked with this preference of smaller immediate reward signals [33]. Thus, executive functioning difficulties impact emotion regulation in individuals with ADHD.

Individuals with ADHD not only have difficulty in controlling negative emotions but they also experience difficulties in their ability to regulate positive emotions [21]. Braaten and Rosen [34] found that in comparison with children without ADHD, children with the disorder had difficulties with responding empathetically to both positive and negative emotions displayed by another person. They also found that

youth with ADHD displayed challenges with negative emotional processes as well as with positive emotion-related processes [34]. Some research has suggested gender differences in emotion dysregulation as observed in ADHD with emotion dysregulation found to be more common in males [22].

Changes in terms of context, maturation, and expectations are associated with differences in the expression of ADHD symptoms in childhood versus adolescence [35, 36], and it may be speculated that emotion dysregulation also shows up differently among children and adolescents with ADHD [22].

3.1 Emotion dysregulation in childhood

Learning how to regulate oneself starts in infancy and continues into early adolescence. Early in life children learn to regulate themselves through a caregiver. Interpersonal emotion regulation along with intrapersonal self-soothing strategies that infants and toddlers employ set the stage for children to independently manage their emotions [37]. An important aspect of emotion regulation in childhood is secure attachment with parents and parents becoming emotion regulation coaches [38]. Sensitive responding by parent toward the child's emotions impacts the development of emotional regulation [39]. Children with difficult temperaments along with parents who are themselves unable to regulate or pick up their child's cues impact the child's ability to learn emotion regulation skills.

Along with the importance of the interpersonal environment toward the development of emotion regulation, neurological advancements in the development of the frontal cortex and improved executive functioning are key factors that contribute to emotion regulation in childhood [40].

Executive functioning difficulties in children with ADHD have been established over the years [41]. In children with ADHD, neurobiological differences occur in childhood, along with increased behavioral challenges that come with hyperactivity and impulsivity. Temperamentally, parents describe children with ADHD as being more challenging [42]. This, in turn, impacts parenting such that parents become more prone to being critical and dismissive toward a child's behavior while being more dysregulated themselves. In general, harsh criticism and dismissive parenting have been suggested to impact emotion regulation development. Thus, for children with ADHD, there is a neurological disadvantage with poor executive functioning, along with a poor interpersonal environment that is created making it difficult for them to learn important emotion regulation skills.

Emotional dysregulation in children diagnosed with ADHD impacts them in multiple ways such as academic functioning, social relationships, and adaptability. In a study of 1500 children [43], quality of life-related to health was measured using parent report forms across multiple domains such as satisfaction, resilience, risk avoidance. ADHD symptoms were associated with lower health-related quality of life and problems related to emotion were found to have a bigger influence on self-esteem and well-being than inattention and hyperactivity. Crundwell [44] did a study on children with ADHD, where he tested the relationship between difficulties with behavior and emotional regulation [44]. Mothers of 32 children aged between 6 and 11 years diagnosed with ADHD completed questionnaires. The results showed that boys with ADHD who showed more emotional reactivity in terms of anger/frustration, and less behavior inhibition and self-control were reported as having more behavioral challenges [44]. Research has shown that children with ADHD exhibited more negative emotion in response to a task [33] and that children with ADHD

combined subtype displayed a strong level of emotion dysregulation and high levels of positive and negative behavior when compared to children with ADHD inattentive subtype and those without ADHD as reported by parent, teacher ratings, self-report forms, and observations on an emotional regulation task [45].

ADHD causes social challenges for children and can hamper their social interactions with peers. Melnick and Hinshaw [46] tried to predict social behaviors and social preferences by investigating children's emotion regulation strategies and parental responses [46]. Children with more aggressive ADHD symptoms were found to have a less constructive emotional regulation strategy. Emotional accommodation and negative responses predicted parent and teacher ratings of social preference [46]. This shows that children with ADHD experience difficulties in relationships due to emotional dysregulation. Another study that focused on the initial interactions among 233 elementary-age children aged between 8 and 10 years, varying in ADHD symptoms during a new playgroup found that ADHD severity was linked with a more negative rating, through the emotion dysregulation observed by coders who watched videos of the children as they engaged in tasks [47].

Additionally, emotional dysregulation in children and parents may contribute to family conflict, increased parental stress, and more aversive family interactions [48–50]. Previously, some studies indicated that, in a dyadic context, there was more coercion between mothers and sons with ADHD [51]. In mother-father-child interactions, it was found that there were more demanding interactions in the families of sons with ADHD compared to families of sons without ADHD [49]. The connection between hyperactivity and impulsivity in children and parental stress was determined to be partly affected by the presence of child emotional dysregulation, which suggested that parents found both their children's ADHD symptoms as well as their emotional dysregulation to be stressful [50].

A study on 2076 children with self-regulation difficulties that were followed for 14 years, showed that emotion dysregulation during childhood was related to a higher frequency of mood disorders, anxiety disorders, and substance abuse and there was also a risk for problems with the regulation in adulthood [52], thus indicating that childhood emotional dysregulation difficulties are associated with later mood-related issues.

3.2 Emotion dysregulation in adolescence and adulthood

Adolescence is a time of great change and is the most definitive transition throughout the human lifespan. During the transition from childhood to adulthood, adolescence may be seen as a period of both gain and decline in various cognitive processes. With regard to emotion regulation, largely a decline is observed with increased emotional reactivity, more negative affect, and increased fluctuations in mood [53]. This has also been associated with the later maturation of the prefrontal cortex, the hub of executive functioning.

In ADHD, just as in typical development, adolescence is a time for gains as well as cognitive decline. As the individual grows the behavioral expression of the symptoms of ADHD changes. Hyperactivity and restlessness take a different shape from motor-related hyperactivity in childhood to thought-related hyperactivity in adolescence and adulthood [54]. Although behavioral control increases with growing age, as compared to same-age peers, adolescents and adults with ADHD continue to demonstrate significant behavior inhibition challenges [55]. There is greater emotional dysregulation observed in adolescents with ADHD. In a recent study, young people with

ADHD expressed that they felt a lack of self-control due to the disinhibition of their thoughts, behaviors, and emotions, and they also felt different from their peers [16].

Adolescents and adults with emotional dysregulation tend to face difficulties such as increased risky behavior and challenges in peer and romantic relationships. Young adults with ADHD have been reported to be two times more likely to experience emotional dysregulation, and emotional dysregulation has also been linked to a lower quality of life, independent of classic ADHD symptoms [56]. In addition to difficulties in managing negative emotions such as sadness, frustration, some adolescents also struggle with regulating positive emotions such as excitement [22]. Individuals with ADHD and emotional dysregulation were significantly more impaired in terms of their family life, peer relationships, career attainment, and academic achievement than those with ADHD alone; this was also found to be true after controlling for comorbid disorders such as oppositional defiant disorder [57, 58].

In terms of peer relationships and social functioning, Bunford et al. [59] measured emotion dysregulation by using rating scales and they found that it was linked with prosocial behavior difficulties among adolescents with ADHD [59]. DuPaul and Clemen Shaw [60] conducted research on high-school students and the results indicated that emotional dysregulation has a significant impact on the relationship between ADHD and social deficiency in older adolescents [60]. Studies have shown that some youth with ADHD are very sensitive to rejection from peers and they are more likely to attribute less positive and more negative intent to peers, and in comparison, to their non-ADHD peers, they would react more aggressively [61, 62].

Previous findings indicate that there is a high incidence of alcohol and substance use among children and adolescents with ADHD [63–65]. Farrell and Danish [66] did a longitudinal study with 1256 middle-school students to evaluate the relationship between emotional restraint, peer drug association, and gateway drug use. They found that emotional dysregulation in the form of low emotional restraint was negatively related to gateway drug use among adolescent boys [66].

Lack of control over anger, irritability, arguments, mood lability, and impulsivity can negatively impact adult peer relationships [67–69]. Social relationships for adults with ADHD were negatively affected by emotional impulsiveness [21]; social functioning impairment was found to be majorly predicted by emotional lability [70]. Older adults with ADHD were more likely to report feeling lonely and having few family members in their support network than their non-ADHD counterparts [71]. Extremity of emotions has a direct impact on a person's ability to form long-lasting, trusting relationships. In ADHD, the challenges around moderating emotional responses can make the person appear overreactive, overwhelming, and overbearing leading to difficulties in forming trusting relationships.

In terms of their romantic relationships, individuals with emotional dysregulation face difficulties with partners as well. Couple intimacy is impacted by the inability to manage one's emotions and avoidance of close contact [72]. Adults with ADHD reported being less satisfied in their romantic relationships and were more likely to get divorced than adults without ADHD. Klein et al. [73] did a longitudinal study where adults diagnosed with ADHD during childhood were three times more likely to be divorced than adults in a comparison group [73]. Bruner et al. [74] conducted research on 189 undergraduate students to test if ADHD symptom levels in college students were related to poor relationship quality. They found that greater levels of ADHD symptoms were associated with lower relationship quality and that emotion dysregulation and relationship conflict mediated reports of low relationship quality among women with ADHD [74].

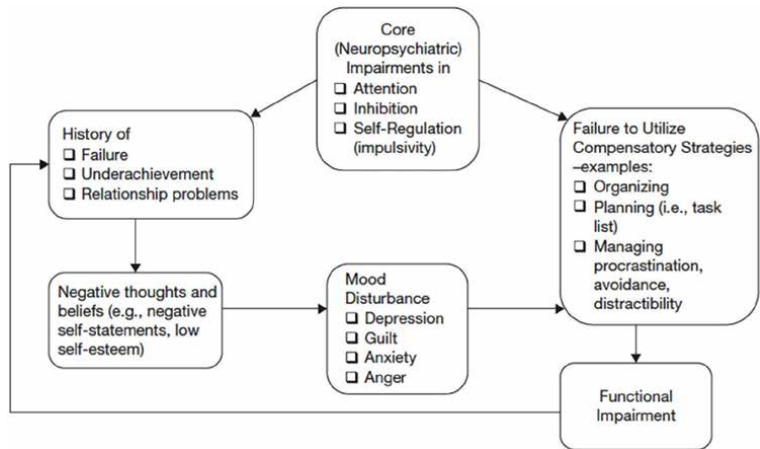


Figure 1.
Cognitive behavioral model of adult ADHD.

Individuals diagnosed with ADHD suffer from problems throughout life. However, even when childhood ADHD symptoms are reduced to below diagnostic level in adulthood, there is continued impairment. An important aspect that gets impacted in ADHD is mental health and well-being. Comorbidity rates have been reported to be as high as 80% in adults with ADHD, with substance use, mood disorders, anxiety disorders, and personality disorders as the most prominent ones [6].

An important relationship between early childhood difficulties in ADHD and later mental health issues was described in the Cognitive Behavior Model proposed by Safren and others [75]. This model stated that ADHD deficits such as attention, self-regulation, and inhibition, can lead to underachievement and repeated failure, along with issues in utilizing compensatory strategies such as planning, managing procrastination (**Figure 1**). As individuals age, these experiences would give rise to dysfunctional beliefs and cognitions which would in turn lead to the development of low self-concept, negative thoughts, and symptoms of anxiety and depression overtime, in a cyclical manner (**Figure 1**). These negative thoughts, symptoms of anxiety, and depression would increase the chances of future impairment [75]. This model, however, fails to recognize the role of emotional dysregulation as an important component in contributing to depression, anxiety, and functional impairment. It does not explain how emotional dysregulation can also play a vital role and why it is important to address emotion regulation difficulties at an early stage.

4. Lifespan model of emotion dysregulation in ADHD

As discussed previously emotional dysregulation is an important feature that develops in ADHD. We propose a theory of how childhood emotion dysregulation leads to the future development of psychiatric comorbidities in adults with ADHD, thereby stressing on the need for earlier intervention at an emotional level.

Barkley [9] proposed the theory of executive dysfunctioning in ADHD, where behavior inhibition difficulties were the key factor contributing to other symptoms observed in ADHD [9]. We extend that theory to suggest that in early childhood behavior inhibition is impacted in ADHD and this disinhibition is a key contributor

to emotional regulation difficulties in children with ADHD. Research to support this claim was discussed in the previous Section 3.1 where a clear association between behavior inhibition and emotional dysregulation was established. The inability to regulate as well as control impulses sets the child in a cycle of constant altercations with the social environment, that is, with parents, siblings, peers, teachers. There is an impact on social acceptance, which leads to increased social rejection [46]. This early social rejection and failure to develop stable relationships leads the child to be even more emotionally dysregulated (**Figure 2**). Moreover, due to impaired caregiver relationships, children with ADHD often do not learn emotional regulation strategies in the same way as typical children leading to further issues with emotional dysregulation. A bidirectional arrow in the model suggests this interlinking of emotional dysregulation and poor social acceptance (**Figure 2**). Support for this comes from intervention research which has suggested that emotion regulation programs for children with ADHD improve social functioning and social acceptance [76].

Moving into adolescence, as the child repeatedly gets feedback of social rejection a sense of inadequacy and failure sets in and they start to experience self-esteem challenges (**Figure 3**). Mazonne et al. [77] found that lower self-esteem is more common in subjects suffering from ADHD than in healthy controls, indicating that an early detection of psychological well-being is important in these children to decrease the ADHD symptoms' long-term impacts [77]. Students with ADHD have known impairments with regulating functions and hence, they may be at a disadvantage with respect to adaptability. Sanchez et al. [76] studied the impact of emotional regulation intervention in children with ADHD, the result indicated that there was a decrease in emotional dysregulation and an increase in the identification of emotions in a facial recognition task [76].

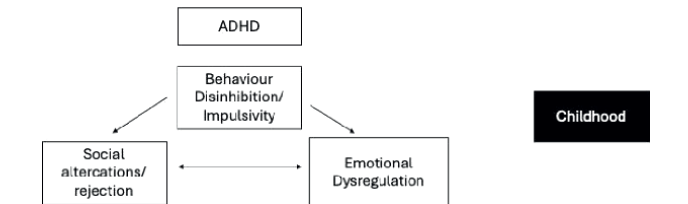


Figure 2.
Impact of emotional dysregulation in ADHD during childhood.

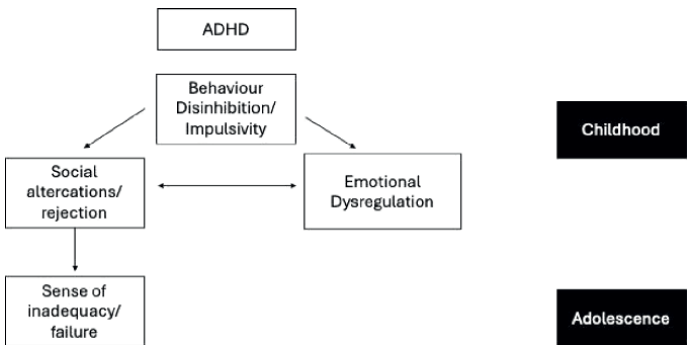


Figure 3.
Impact of emotional dysregulation in ADHD during adolescence.

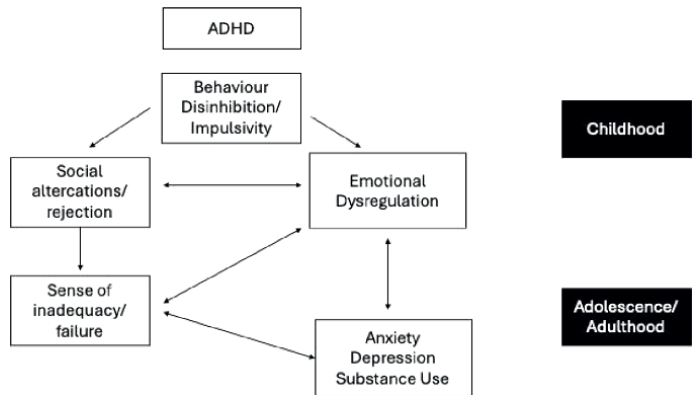


Figure 4.
Lifespan model of emotional dysregulation in ADHD.

With greater challenges in self-esteem and a decrease in emotional regulation during adolescence, the adolescent with ADHD becomes vulnerable leading to further emotional dysregulation (**Figure 4**). A bidirectional arrow is again used in the model presented to highlight the contribution of decreased self-esteem to emotional dysregulation, while emotional dysregulation challenges enhance the individual's sense of inadequacy (**Figure 4**). These repeated cycles of dysregulation and sense of failure lead to mood disorders, anxiety, and personality disorders (**Figure 4**). Anxiety and depression seem inevitable for an adult who has lived their life not knowing how to manage their emotions and how to navigate social relationships successfully [41]. Bidirectional arrows are again used to suggest the cyclic nature of emotional dysregulation, sense of failure, and mental health disorders, and how each of these contributes to the symptoms of others (**Figure 4**).

A recent study by Ginapp et al. [78] found that young adults diagnosed with ADHD in adulthood were often originally misdiagnosed with anxiety or depression and it also supported the phenomenon of adults wishing they had been diagnosed with ADHD sooner. Some participants mentioned that they had difficulties in maintaining societal responsibilities due to their ADHD symptoms that often manifested in feelings of anxiety and depression. Often once they were treated for ADHD, they reported that their anxious or depressive symptoms typically subsided [78]. Hence, an early diagnosis of ADHD in childhood along with appropriate intervention may help in preventing the development of psychological disorders in adulthood.

4.1 Clinical implications

The proposed model has important clinical implications specifically from a perspective of diagnosis and early intervention. If the “social experience” of early childhood ADHD is moderated by more understanding, supportive environments, and early intervention, the likelihood of later psychiatric disorders may reduce. A number of studies have suggested that deficits in emotion regulation are related to the frequency of internalizing and externalizing problems in ADHD, while children with ADHD with no problems with emotion regulation are comparable to their typically developing peers both behaviorally and emotionally [79, 80]. Thus, interventions targeting emotional regulation for children with ADHD would also see a decrease in behavioral and mood disorder symptoms. A growing body of intervention research

is showing precisely this. For example, the Managing Frustration in Children (MFC) intervention studies have demonstrated a decrease in negative emotion and depressive symptoms in children post a 12-week intervention program. Research has also demonstrated that parent training on helping children develop emotion regulation has good outcomes on the child's relationships and better social adjustment. However, we currently do not have longitudinal studies to suggest the impact of emotion regulation intervention on later comorbid psychiatric disorders. This will be an important area of research to understand the underlying comorbid conditions one sees with ADHD.

5. Conclusion

ADHD is a neurodevelopmental disorder that can lead to considerable problems in areas across the lifespan, including personal, social, academic, and occupational. Although previously understood as a childhood disorder, there is growing recognition and consensus over ADHD in adulthood. Symptom expression varies at individual, gender, and developmental levels, where certain symptoms may be more prominent in males or during childhood. However, executive functioning difficulties occur across the ADHD population as a generalized symptom of ADHD.

Emotion regulation is a skill that is considered under the larger umbrella of executive functioning. Previous research has shown that individuals with ADHD often experience emotional dysregulation as a consequence of their executive difficulties. Emotional dysregulation involves modulating both positive and negative emotions and the inability in controlling these emotions can lower an individual's functioning. This emotional dysregulation combined with ADHD has an impact on the adaptability of the individual and can cause impairment in multiple aspects of life such as social relationships, education, self-esteem. The cognitive behavior therapy (CBT) model of adult ADHD fails to mention the role of emotion dysregulation in the development of mood disorders and future impairment. We propose a theoretical model that takes into account how behavior inhibition difficulties lead to emotion dysregulation and in turn this adversely impacts a child's social relationships. As social relationships including caregiver relationships are impacted, children with ADHD do not learn effective emotional regulation strategies and instead, there is a growing sense of failure and inadequacy. As this continues in adolescence and adulthood, a cycle of emotional dysregulation and a sense of failure lead to the development of mood disorders, which lead to further emotional dysregulation. We gather evidence from ADHD research and lifespan studies of emotional regulation to suggest the relationship between early childhood emotional dysregulation and later mental health challenges.

5.1 Future research

There is ample research in ADHD on each of the components; however, none has used a developmental perspective to study the association between early childhood symptoms and later comorbid conditions. Further research is needed to find out if early intervention for emotional regulation in childhood has an impact on later social and mental health outcomes in adolescents and adults. We also need further research on how emotional dysregulation can impact the adaptability of an individual throughout their lifespan. Gender differences need to be evaluated carefully, as there is also a lack of studies done on female samples in terms of the impact of ADHD and

emotional dysregulation. Our current model does not differentiate based on gender or ADHD subtype. Research needs to address whether the subtype of ADHD changes the trajectory of the development of comorbid conditions. Finally, there is research on emotion regulation in adult ADHD as well as intervention research on comorbid conditions in ADHD; however, there is a paucity of adult ADHD research and treatment protocols evaluating the impact of therapeutic approaches on comorbid conditions, emotion regulation, and social adaptability.

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Conflict of interest

The authors declare no conflict of interest.

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References

- [1] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders: DSM-5. Washington, DC: American Psychiatric Association; 2013
- [2] Polanczyk G, De Lima MS, Horta BL, Biederman J, Rohde LA. The worldwide prevalence of ADHD: A systematic review and metaregression analysis. *American Journal of Psychiatry*. 2007;**164**(6): 942-948. DOI: 10.1176/ajp.2007.164.6.942
- [3] Polanczyk GV, Salum GA, Sugaya LS, Caye A, Rohde LA. Annual research review: A meta-analysis of the worldwide prevalence of mental disorders in children and adolescents. *Journal of Child Psychology and Psychiatry*. 2015;**56**(3):345-365. DOI: 10.1111/jcpp.12381
- [4] Fayyad J, De Graaf R, Kessler R, Alonso J, Angermeyer M, Demyttenaere K, et al. Cross-national prevalence and correlates of adult attention-deficit hyperactivity disorder. *The British Journal of Psychiatry*. 2007;**190**(5):402-409. DOI: 10.1192/bjp.106.034389
- [5] Ginsberg Y, Quintero J, Anand E, Casillas M, Upadhyaya HP. Underdiagnosis of attention-deficit/hyperactivity disorder in adult patients: A review of the literature. *The Primary Care Companion for CNS Disorders*. 2014;**16**(3):23591. DOI: 10.4088/PCC.13r01600
- [6] Choi WS, Woo YS, Wang SM, Lim HK, Bahk WM. The prevalence of psychiatric comorbidities in adult ADHD compared with non-ADHD populations: A systematic literature review. *PLoS One*. 2022;**17**(11):e0277175. DOI: 10.1371/journal.pone.0277175
- [7] Katzman MA, Bilkey TS, Chokka PR, Fallu A, Klassen LJ. Adult ADHD and comorbid disorders: Clinical implications of a dimensional approach. *BMC Psychiatry*. 2017;**17**:1-5. DOI: 10.1186/s12888-017-1463-3
- [8] Elliott R. Executive functions and their disorders: Imaging in clinical neuroscience. *British Medical Bulletin*. 2003;**65**(1):49-59. DOI: 10.1093/bmb/65.1.49
- [9] Barkley RA. A theory of ADHD. In: *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment*. New York, United States of America: Guilford Press; 2006. pp. 297-334
- [10] Biederman J, Petty C, Fried R, Fontanella J, Doyle AE, Seidman LJ, et al. Impact of psychometrically defined deficits of executive functioning in adults with attention deficit hyperactivity disorder. *American Journal of Psychiatry*. 2006;**163**(10):1730-1738. DOI: 10.1176/ajp.2006.163.10.1730
- [11] Burns E, Martin AJ. ADHD and adaptability: The roles of cognitive, behavioural, and emotional regulation. *Journal of Psychologists and Counsellors in Schools*. 2014;**24**(2):227-242. DOI: 10.1017/jgc.2014.17
- [12] Barkley RA. Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*. 1997;**121**(1):65. DOI: 10.1037/0033-2909.121.1.65
- [13] Gottman JM, Katz LF. Effects of marital discord on young children's peer interaction and health. *Developmental Psychology*. 1989;**25**(3):373. DOI: 10.1037/0012-1649.25.3.373

- [14] Martin AJ. Attention-deficit/hyperactivity disorder (ADHD), perceived competence, and self-worth: Evidence and implications for students and practitioners. *Handbook of Children with Special Health Care Needs*. 2012: 47-72. DOI: 10.1007/978-1-4614-2335-5_3
- [15] Martin AJ. The role of ADHD in academic adversity: Disentangling ADHD effects from other personal and contextual factors. *School Psychology Quarterly*. 2014;**29**(4):395. DOI: 10.1037/spq0000069
- [16] Travell C, Visser J. ADHD does bad stuff to you: Young people's and parents' experiences and perceptions of attention deficit hyperactivity disorder (ADHD). *Emotional and Behavioural Difficulties*. 2006;**11**(3):205-216. DOI: 10.1080/13632750600833924
- [17] Parker JD, Majeski SA, Collin VT. ADHD symptoms and personality: Relationships with the five-factor model. *Personality and Individual Differences*. 2004;**36**(4):977-987. DOI: 10.1016/S0191-8869(03)00166-1
- [18] Pisecco S, Wristers K, Swank P, Silva PA, Baker DB. The effect of academic self-concept on ADHD and antisocial behaviors in early adolescence. *Journal of Learning Disabilities*. 2001;**34**(5):450-461. DOI: 10.1177/002221940103400506
- [19] Hoza B, Waschbusch DA, Pelham WE, Molina BS, Milich R. Attention-deficit/hyperactivity disorder and control boys' responses to social success and failure. *Child Development*. 2000;**71**(2):432-446. DOI: 10.1111/1467-8624.00155
- [20] Cole PM, Martin SE, Dennis TA. Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*. 2004;**75**(2):317-333. DOI: 10.1111/j.1467-8624.2004.00673.x
- [21] Barkley RA, Fischer M. The unique contribution of emotional impulsiveness to impairment in major life activities in hyperactive children as adults. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2010;**49**(5):503-513. DOI: 10.1016/j.jaac.2010.01.019
- [22] Bunford N, Evans SW, Wymbs F. ADHD and emotion dysregulation among children and adolescents. *Clinical Child and Family Psychology Review*. 2015;**18**:185-217. DOI: 10.1007/s10567-015-0187-5
- [23] Scheibe S, Zacher H. A lifespan perspective on emotion regulation, stress, and well-being in the workplace. In: *The Role of Emotion and Emotion Regulation in Job Stress and Well Being*. Leeds, England: Emerald Group Publishing Limited; 2013. pp. 163-193. DOI: 10.1108/S1479-3555(2013)0000011010
- [24] Blair BL, Gangle MR, Perry NB, O'Brien M, Calkins SD, Keane SP, et al. Indirect effects of emotion regulation on peer acceptance and rejection: The roles of positive and negative social behaviors. *Merrill-Palmer Quarterly (Wayne State University Press)*. 2016;**62**(4):415. DOI: 10.13110/merrpalmquar1982.62.4.0415
- [25] Usán Supervía P, Quílez RA. Emotional regulation and academic performance in the academic context: The mediating role of self-efficacy in secondary education students. *International Journal of Environmental Research and Public Health*. 2021;**18**(11):5715. DOI: 10.3390/ijerph18115715

- [26] Quoidbach J, Berry EV, Hansenne M, Mikolajczak M. Positive emotion regulation and well-being: Comparing the impact of eight savoring and dampening strategies. *Personality and Individual Differences*. 2010;**49**(5):368-373. DOI: 10.1016/j.paid.2010.03.048
- [27] Mihic J, Novak M. Importance of child emotion regulation for prevention of internalized and externalized problems. *Journal of Early Childhood Education Research*. 2018;**7**(2):235-254
- [28] English T, John OP, Gross JJ. Emotion regulation in close relationships. In: Simpson JA, Campbell L, editors. *The Oxford Handbook of Close Relationships* (Oxford Library of Psychology). Oxford University Press; 2013. pp. 500-513. DOI: 10.1093/oxfordhb/9780195398694.013.0022
- [29] Kobylińska D, Kusev P. Flexible emotion regulation: How situational demands and individual differences influence the effectiveness of regulatory strategies. *Frontiers in Psychology*. 2019;**10**:72. DOI: 10.3389/fpsyg.2019.00072
- [30] Orgeta V. Specificity of age differences in emotion regulation. *Aging and Mental Health*. 2009;**13**(6):818-826. DOI: 10.1080/13607860902989661
- [31] Phillips ML, Ladouceur CD, Drevets WC. A neural model of voluntary and automatic emotion regulation: Implications for understanding the pathophysiology and neurodevelopment of bipolar disorder. *Molecular Psychiatry*. 2008;**13**(9):833-857. Available from: <https://www.nature.com/articles/mp200865#citeas>
- [32] Williams LM, Hermens DF, Palmer D, Kohn M, Clarke S, Keage H, et al. Misinterpreting emotional expressions in attention-deficit/hyperactivity disorder: Evidence for a neural marker and stimulant effects. *Biological Psychiatry*. 2008;**63**(10):917-926. DOI: 10.1016/j.biopsych.2007.11.022
- [33] Shaw P, Stringaris A, Nigg J, Leibenluft E. Emotion dysregulation in attention deficit hyperactivity disorder. *American Journal of Psychiatry*. 2014;**171**(3):276-293. DOI: 10.1176/appi.ajp.2013.13070966
- [34] Braaten EB, Rosen LA. Self-regulation of affect in attention deficit-hyperactivity disorder (ADHD) and non-ADHD boys: Differences in empathic responding. *Journal of Consulting and Clinical Psychology*. 2000;**68**(2):313. DOI: 10.1037//0022-006X.68.2.313
- [35] Langberg JM, Epstein JN, Urbanowicz CM, Simon JO, Graham AJ. Efficacy of an organization skills intervention to improve the academic functioning of students with attention-deficit/hyperactivity disorder. *School Psychology Quarterly*. 2008;**23**(3):407. DOI: 10.1037/1045-3830.23.3.407
- [36] Wolraich ML, Wibbelsman CJ, Brown TE, Evans SW, Gotlieb EM, Knight JR, et al. Attention-deficit/hyperactivity disorder among adolescents: A review of the diagnosis, treatment, and clinical implications. *Pediatrics*. 2005;**115**(6):1734-1746. DOI: 10.1542/peds.2004-1959
- [37] Eisenberg N, Spinrad TL, Eggum ND. Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*. 2010;**6**(1):495-525. DOI: 10.1146/annurev.clinpsy.121208.131208
- [38] Brumariu LE. Parent-child attachment and emotion regulation. *New Directions for Child and Adolescent*

Development. 2015;**2015**(148):31-45.
DOI: 10.1002/cad.20098

[39] Rutherford HJ, Wallace NS, Laurent HK, Mayes LC. Emotion regulation in parenthood. *Developmental Review*. 2015;**36**:1-4. DOI: 10.1016/j.dr.2014.12.008

[40] Lévesque J, Joannette Y, Mensour B, Beaudoin G, Leroux JM, Bourgouin P, et al. Neural basis of emotional self-regulation in childhood. *Neuroscience*. 2004;**129**(2):361-369. DOI: 10.1016/j.neuroscience.2004.07.032

[41] Parigger EM. *Language and Executive Functioning in Children with ADHD*. Amsterdam, Netherlands: Amsterdam Center for Language and Communication; 2012. Available from: <https://hdl.handle.net/11245/1.378400>

[42] Ullsperger JM, Nigg JT, Nikolas MA. Does child temperament play a role in the association between parenting practices and child attention deficit/hyperactivity disorder? *Journal of Abnormal Child Psychology*. 2016;**44**(1):167-178. DOI: 10.1007/s10802-015-9982-1

[43] Riley AW, Spiel G, Coghill D, Döpfner M, Falissard B, Lorenzo MJ, et al. Factors related to health-related quality of life (HRQoL) among children with ADHD in Europe at entry into treatment. *European Child & Adolescent Psychiatry*. 2006;**15**:i38-i45. DOI: 10.1007/s00787-006-1006-9

[44] Crundwell RM. An initial investigation of the impact of self-regulation and emotionality on behavior problems in children with ADHD. *Canadian Journal of School Psychology*. 2005;**20**(1-2):62-74. DOI: 10.1177/0829573506295458

[45] Wheeler Maedgen J, Carlson CL. Social functioning and emotional

regulation in the attention deficit hyperactivity disorder subtypes. *Journal of Clinical Child Psychology*. 2000;**29**(1):30-42. DOI: 10.1207/S15374424jccp2901_4

[46] Melnick SM, Hinshaw SP. Emotion regulation and parenting in AD/HD and comparison boys: Linkages with social behaviors and peer preference. *Journal of Abnormal Child Psychology*. 2000;**28**:73-86. DOI: 10.1023/A:1005174102794

[47] Lee CA, Milich R, Lorch EP, Flory K, Owens JS, Lamont AE, et al. Forming first impressions of children: The role of attention-deficit/hyperactivity disorder symptoms and emotion dysregulation. *Journal of Child Psychology and Psychiatry*. 2018;**59**(5):556-564. DOI: 10.1111/jcpp.12835

[48] Kobak RR, Cole HE, Ferenz-Gillies R, Fleming WS, Gamble W. Attachment and emotion regulation during mother-teen problem solving: A control theory analysis. *Child Development*. 1993;**64**(1):231-245. DOI: 10.1111/j.1467-8624.1993.tb02906.x

[49] Buhrmester D, Camparo L, Christensen A, Gonzalez LS, Hinshaw SP. Mothers and fathers interacting in dyads and triads with normal and hyperactive sons. *Developmental Psychology*. 1992;**28**(3):500. DOI: 10.1037/0012-1649.28.3.500

[50] Graziano PA, Garcia A. Attention-deficit hyperactivity disorder and children's emotion dysregulation: A meta-analysis. *Clinical Psychology Review*. 2016;**46**:106-123. DOI: 10.1016/j.cpr.2016.04.011

[51] Johnston C, Murray C, Hinshaw SP, Pelham WE, Hoza B. Responsiveness in interactions of mothers and sons with ADHD: Relations to maternal and child characteristics. *Journal of Abnormal*

Child Psychology. 2002;**30**:77-88.
 DOI: 10.1023/A:1014235200174

[52] Althoff RR, Verhulst FC, Rettew DC, Hudziak JJ, van der Ende J. Adult outcomes of childhood dysregulation: A 14-year follow-up study. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2010;**49**(11):1105-1116. DOI: 10.1016/j.jaac.2010.08.006

[53] Herres J, Ewing ES, Kobak R. Emotional reactivity to negative adult and peer events and the maintenance of adolescent depressive symptoms: A daily diary design. *Journal of Abnormal Child Psychology*. 2016;**44**:471-481. DOI: 10.1007/s10802-015-0043-6

[54] Singh A, Yeh CJ, Verma N, Das AK. Overview of attention deficit hyperactivity disorder in young children. *Health Psychology Research*. 2015;**3**(2):2115. DOI: 10.4081/hpr.2015.2115

[55] Pedersen A, Ohrmann P. Impaired behavioral inhibition in implicit sequence learning in adult ADHD. *Journal of Attention Disorders*. 2018;**22**(3):250-260. DOI: 10.1177/1087054712464392

[56] Ben-Dor Cohen M, Eldar E, Maeir A, Nahum M. Emotional dysregulation and health related quality of life in young adults with ADHD: A cross sectional study. *Health and Quality of Life Outcomes*. 2021;**19**:1-1. DOI: 10.1186/s12955-021-01904-8

[57] Wehmeier PM, Schacht A, Barkley RA. Social and emotional impairment in children and adolescents with ADHD and the impact on quality of life. *Journal of Adolescent Health*. 2010;**46**(3):209-217. DOI: 10.1016/j.jadohealth.2009.09.009

[58] Biederman J, Ball SW, Monuteaux MC, Mick E, Spencer TJ,

McCreary M, et al. New insights into the comorbidity between ADHD and major depression in adolescent and young adult females. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2008;**47**(4):426-434. DOI: 10.1097/CHI.0b013e31816429d3

[59] Bunford N, Evans SW, Langberg JM. Emotion dysregulation is associated with social impairment among young adolescents with ADHD. *Journal of Attention Disorders*. 2018;**22**(1):66-82. DOI: 10.1177/1087054714527793

[60] DuPaul GJ, Cleminshaw CL. Principles and practices that promote positive guidance in early childhood. In: Alfonso VC, DuPaul GJ, editors. *Healthy Development in Young Children: Evidence-Based Interventions for Early Education*. American Psychological Association; 2020. pp. 193-210. DOI: 10.1037/0000197-010

[61] Matthys W, Cuperus JM, Van Engeland H. Deficient social problem-solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1999;**38**(3):311-321. DOI: 10.1097/00004583-199903000-00019

[62] Waschbusch DA. A meta-analytic examination of comorbid hyperactive-impulsive-attention problems and conduct problems. *Psychological Bulletin*. 2002;**128**(1):118. DOI: 10.1037/0033-2909.128.1.118

[63] Barkley RA, Fischer M, Smallish L, Fletcher K. Young adult outcome of hyperactive children: Adaptive functioning in major life activities. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2006;**45**(2):192-202. DOI: 10.1097/01.chi.0000189134.97436.e2

- [64] Molina BS, Flory K, Hinshaw SP, Greiner AR, Arnold LE, Swanson JM, et al. Delinquent behavior and emerging substance use in the MTA at 36 months: Prevalence, course, and treatment effects. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2007;**46**(8):1028-1040. DOI: 10.1097/chi.0b013e3180686d96
- [65] Molina BS, Smith BH, Pelham WE. Interactive effects of attention deficit hyperactivity disorder and conduct disorder on early adolescent substance use. *Psychology of Addictive Behaviors*. 1999;**13**(4):348. DOI: 10.1037/0893-164X.13.4.348
- [66] Farrell AD, Danish SJ. Peer drug associations and emotional restraint: Causes or consequences of adolescents' drug use? *Journal of Consulting and Clinical Psychology*. 1993;**61**(2):327. DOI: 10.1037/0022-006X.61.2.327
- [67] Bodalski EA, Knouse LE, Kovalev D. Adult ADHD, emotion dysregulation, and functional outcomes: Examining the role of emotion regulation strategies. *Journal of Psychopathology and Behavioral Assessment*. 2019;**41**:81-92. DOI: 10.1007/s10862-018-9695-1
- [68] Brod M, Pohlman B, Lasser R, Hodgkins P. Comparison of the burden of illness for adults with ADHD across seven countries: A qualitative study. *Health and Quality of Life Outcomes*. 2012;**10**:1-7. DOI: 10.1186/1477-7525-10-47
- [69] Pitts M, Mangle L, Asherson P. Impairments, diagnosis and treatments associated with attention-deficit/hyperactivity disorder (ADHD) in UK adults: Results from the lifetime impairment survey. *Archives of Psychiatric Nursing*. 2015;**29**(1):56-63. DOI: 10.1016/j.apnu.2014.10.001
- [70] Skirrow C, Asherson P. Emotional lability, comorbidity and impairment in adults with attention-deficit hyperactivity disorder. *Journal of Affective Disorders*. 2013;**147**(1-3):80-86. DOI: 10.1016/j.jad.2012.10.011
- [71] Michielsen M, Comijs HC, Aartsen MJ, Semeijn EJ, Beekman AT, Deeg DJ, et al. The relationships between ADHD and social functioning and participation in older adults in a population-based study. *Journal of Attention Disorders*. 2015;**19**(5):368-379. DOI: 10.1177/1087054713515748
- [72] Tani F, Pascuzzi D, Raffagnino R. Emotion regulation and quality of close relationship: The effects of emotion dysregulation processes on couple intimacy. *BPA-Applied Psychology Bulletin (Bollettino di Psicologia Applicata)*. 2015;**63**(272):3. ISSN: 0006-6761
- [73] Klein RG, Mannuzza S, Olazagasti MA, Roizen E, Hutchison JA, Lashua EC, et al. Clinical and functional outcome of childhood attention-deficit/hyperactivity disorder 33 years later. *Archives of General Psychiatry*. 2012;**69**(12):1295-1303. DOI: 10.1001/archgenpsychiatry.2012.271
- [74] Bruner MR, Kuryluk AD, Whitton SW. Attention-deficit/hyperactivity disorder symptom levels and romantic relationship quality in college students. *Journal of American College Health*. 2015;**63**(2):98-108. DOI: 10.1080/07448481.2014.975717
- [75] Safren SA, Sprich S, Chulvick S, Otto MW. Psychosocial treatments for adults with attention-deficit/hyperactivity disorder. *Psychiatric Clinics*. 2004;**27**(2):349-360. DOI: 10.1016/S0193-953X(03)00089-3

[76] Sánchez M, Lavigne R, Romero JF, Elósegui E. Emotion regulation in participants diagnosed with attention deficit hyperactivity disorder, before and after an emotion regulation intervention. *Frontiers in Psychology*. 2019;**10**:1092. DOI: 10.3389/fpsyg.2019.01092

[77] Mazzone L, Postorino V, Reale L, Guarnera M, Mannino V, Armando M, et al. Self-esteem evaluation in children and adolescents suffering from ADHD. *Clinical Practice and Epidemiology in Mental Health: CP & EMH*. 2013;**9**:96. DOI: 10.2174/1745017901309010096

[78] Ginapp CM, Greenberg NR, MacDonald-Gagnon G, Angarita GA, Bold KW, Potenza MN. “Dysregulated not deficit”: A qualitative study on symptomatology of ADHD in young adults. *PLoS One*. 2023;**18**(10):1-20. E0292721

[79] Anastopoulos AD, Smith TF, Garrett ME, Morrissey-Kane E, Schatz NK, Sommer JL, et al. Selfregulation of emotion, functional impairment, and comorbidity among children with AD/HD. *Journal of Attention Disorders*. 2011;**15**(7):583-592. DOI: 10.1177/1087054710370567

[80] Leaberry KD, Rosen PJ, Fogleman ND, Walerius DM, Slaughter KE. Comorbid internalizing and externalizing disorders predict lability of negative emotions among children with ADHD. *Journal of Attention Disorders*. 2020;**24**(14):1989-2001. DOI: 10.1177/1087054717734647

Chapter 4

Emotion Regulation in Individuals with ADHD: A Clinical Guide

Mahdavi Abed and Hejazi Elaheh

Abstract

Emotions play a vital and valuable role in human life because, in different ways, they affect people's behavior, thinking, and social interactions. Positive and negative emotions can both facilitate the process of progress and make the process difficult. Different people, especially those suffering from Attention-Deficit Hyperactivity Disorder (ADHD), resort to various strategies to regulate their emotions. Although several medicinal and psychotherapeutic methods have been introduced to help this spectrum of society, none of them have been able to solve psychosocial problems. Developmental studies and neuroimaging show that multiple cortical and subcortical regions in the brain regulate emotions, and with age, and effective psychotherapies, people's ability to do so improves. The present study examines issues, including ADHD, problems associated with emotion regulation in people with ADHD, emotion regulation strategies, parenting, and emotion regulation, and related neurological mechanisms, as well as offers some suggestions for the path forward in terms of clinical interventions.

Keywords: emotion regulation, ADHD, regulation strategies, neurocognitive mechanisms, self-regulation

1. Introduction

Attention-Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental disorders, characterized by disruptive symptoms, comprising hyperactivity, impulsivity, and inattention. To diagnose this psychiatric disorder, these triple symptoms must be present in two or more contexts for at least 6 months and have impaired a person's average performance [1–3]. The disorder persists at various times into adulthood [4]. Other secondary symptoms associated with the disorder may include learning, emotional, and social problems [5] and co-occurrence with psychiatric disorders, comprising disruptive behavioral disorders, depression, and severe anxiety disorders [6]. The prevalence of this disorder is estimated to be between 3 and 7% among children and adolescents and 3–5% in adults [7–10], and the prevalence is 2 to 9 times higher in boys than in girls [1, 11, 12]. Various studies show that people with ADHD have heterogeneous neuropsychological profiles and suffer from significant problems with executive functions, emotion regulation, and

social interactions [13–20]. According to Garcia et al.'s [21] findings, between 50 and 70% of children with ADHD have a predicament in social interaction with their peers and cannot inhibit their problematic behaviors. Incompatible communication patterns in people with ADHD lead to social unacceptance by peers and gradually cause emotional and behavioral confusion. Although many therapeutic interventions have been used to reduce the main symptoms of this disorder, their social and emotional problems persist [22]. Recent scientific reports on ADHD suggest that emotion regulation may be a fundamental factor in the development and continuation of this disorder [23]. Emotional instability, sudden and severe anger, intense emotional responses, confusion at work, instability in interpersonal relationships, job and academic failure, alcohol abuse, and unusual responses to psychotherapy are among the significant problems faced by people with ADHD [24]. Given the adaptive value of emotions, it can be said that emotions affect people's cognitive systems and help improve social functions in line with environmental requests [16, 25]. People need several effective strategies in emotion regulation to adjust their emotions and adapt to social situations [17]. The critical questions of the present study are, given the vital place of emotion regulation, is the problem of emotion regulation in people with ADHD just an essential symptom of this psychiatric disorder or a separate issue? Which brain structures is the emotion regulation process associated with, and what areas of the brain are involved in neurological problems in people with ADHD? What strategies do people with ADHD use to regulate emotion? What tools are used to measure emotion regulation in different approaches? In this study, we are trying to answer the above questions so that professionals and therapists can provide more valuable services to help this spectrum of society.

2. Emotion regulation and ADHD

Belief in the ability to change our emotions has a long history and has been explained in fundamental theoretical and experimental research under various titles, such as psychological defense and coping style [25–27]. In the 1990s, emotion regulation (ER) emerged as a distinct field of research [28–31]. Emotion regulation is the ability to generate, maintain, decrease, and increase the intensity or abundance of emotion [32, 33]. Emotion regulation involves strategies that modulate and maintain an emotion and cope with tense situations [34, 35]. Emotion regulation is associated with transforming and modulating executive functions, including inhibition, planning, and working memory [36, 37]. Although emotion regulation is often conscious, it can occur implicitly and unconsciously [38, 39]. The processing and regulation of emotions are closely related to individual transformation. They are influenced by the behaviors of caregivers in early childhood, but in later years, it is facilitated by innate processes, social, interpersonal, and cultural factors, and neurological advances [40–44]. In the adult period, neurocognitive processes are developed through the widespread application of cognitive-behavioral strategies, including cognitive reassessment and problem-solving [42, 44]. Although not a new phenomenon for researchers, emotion regulation has been the focus of attention in people with ADHD [45–47]. Studies have shown that executive functions and emotion regulation are related [45, 46]. According to Bailey and Jones views [48], regulating emotions, cognitive processes, and social interactions occurs based on the components of the brain's executive functions, including working memory, inhibition, attention, and displacement, and becomes complex. Problems associated with emotion regulation appear

much earlier in children with ADHD compared to other children with typical neurodevelopmental disorders [49]. In addition, the weaker the ability to regulate people's emotions, the greater the severity of the symptoms [50, 51]. Even though there is more evidence for children than adults in emotion regulation, the findings suggest that adults with ADHD use more incompatible emotion regulation strategies (such as suppression) [52, 53]. It should be noted that this finding has not been obtained by other researchers so far, and this lack of coordination can be caused by diagnostic tools or comorbidity of other disorders in adults [10, 20, 54–56]. The Shaw et al. [47] study of the overlap between ADHD and emotion regulation presented three models. In Model 1, emotion regulation and ADHD are wholly interconnected and intertwined. In other words, the inability to regulate emotion is the central core of ADHD symptoms. In this model, emotion regulation is the same as neurological disorders that underlie ADHD. Based on this model, it is valuable and necessary to teach emotion regulation strategies to help people with ADHD. In Model 2, emotion regulation and ADHD are separate and have different neurological and clinical etiologies. In Model 3, emotion regulation and ADHD are interconnected but completely independent. In this model, a moderate relationship between emotion regulation and ADHD is observed from early childhood to adulthood. The three models seem to gain a thorough understanding of the type of emotion regulation and ADHD association and address the genetic, neurological, and clinical characteristics pertaining to both of them. These three models also demonstrate the need for a hybrid pattern [51, 57–61].

3. Emotion regulation and parenting interactions

Parent-child interactions and emotional socialization may affect children's competence in the field of emotion regulation in a way that exacerbates children's ADHD symptoms, provides the basis for the development of these diseases, or disrupts the process of transferring self-regulatory skills [62]. However, coping with a child's negative emotions is essential for socialization and emotion regulation. Adopting unsupportive and inefficient strategies by parents aimed at controlling children's negative emotions may lead children to suppress negative emotions in later life. This repression is followed by cases such as negative emotional arousal and unregulated anxiety in people, and by internalizing negative emotions, emotional irregularities and less adapted behavioral responses are provided in the person [40, 63, 64]. Negative parental beliefs, conflicting family circumstances, and inefficient parenting styles are more common among families of children with ADHD than those of children without ADHD, and the educational style of these types of families causes behavioral problems and opposition of children with ADHD in the school context [65–67]. However, parental adaptation and social cohesion within families can act as a protective factor against behavioral problems in children with ADHD and improve their socialization process [68, 69]. The inability to regulate emotion during the early years of life may make the child susceptible to psychiatric disorders in subsequent periods of transformation. In line with mood characteristics in children with ADHD, the appearance of negative emotions in toddlers (frequent crying, inability to relieve themselves, or intolerance to failure) may be signs of impaired emotion regulation, perpetuating their behavioral problems and aggression in childhood and adolescence [70, 71]. As children grow older, they become more efficient in the field of emotion regulation through the development of brain executive functions and gradually learn to respond to life experiences in a socially acceptable and flexible

way [72]. As they enter adolescence, the process of emotion regulation appears more complex, so they also pay attention to the perspective of others in the field of emotional expression, adopt more adaptive strategies to deal with negative emotions (such as reassessing, gaining peer support or parenting, distracting attention, positive re-concentration, and so on...), use less repression, feel competent when others confirm their expression, interact with peers more desirably, and model as many successful and famous people as possible to mature [73–75]. Those who have experienced a restrictive parenting style in childhood may experience internal and external problems in adolescence, including poor self-control, inconsistency, breakdown of norms, intellectual rumination, destructive interactions, low resilience, and inefficient self-regulation [40, 72, 74, 76–79]. Subsequently, the occurrence of these multilateral problems by children and adolescents causes more severe reactions from parents, thus exacerbating their opposition and stubbornness [68, 80–84]. In addition, in the context of gender differences, boys may have fewer emotion regulation strategies, show more negative emotions than girls, and tend toward drug use or delinquent behavior. While girls may internalize symptoms and make them prone to depression in adolescence [1, 85, 86]. As described, emotional regulation skills develop during different developmental periods, especially childhood and adolescence, affect parental behaviors, and potentially protect or predispose people to problems. Therefore, parental education in the field of emotion regulation, healthy parenting, and ADHD-related behavior management can act as a shield against subsequent issues so that we do not witness unregulated emotions and comorbidity disorders.

4. Review of emotional regulation interventions

1. *Emotion regulation process model of Gross [87]*: James Gross is an emotion researcher who focuses on emotion regulation and develops the process model of emotion regulation. According to Gross, emotion regulation constitutes any effort to modify any emotional experience (positive and negative). It involves different processes such as: (1) selection of the situation, (2) modification of the situation, (3) attention to the situation, (4) change of thoughts regarding the situation, and (5) modulation of responses. The first four processes occur before an emotional reaction (antecedent-focused), and the last one, modulation of responses, is directly related to the emotional experience (response-focused). Antecedent-focused regulation occurs before the emotion is fully experienced or during the emotional experience, whereas response-focused regulation occurs after the emotion has wholly developed. Gross [88] believed that processes for regulating emotion can co-occur. An expanded model of Gross states that three valuation systems are involved in emotion regulation, distinguished by where they occur in the emotion regulation process. The first stage, identification, involves the detection of an emotion (perception), its evaluation as an experience that requires regulation (valuation), and a decision about whether regulation will begin (action). The second stage, selection, involves the identification of available emotion regulation strategies (perception), evaluation of whether specific strategies will be more or less successful depending on internal and external contextual factors (valuation), and making the choice to use a particular strategy (action). The third and final stage, implementation, involves translating a general emotion regulation strategy into specific behaviors that would be most

suitable for that specific situation (perception), evaluating the likely effectiveness or ineffectiveness of specific emotion regulation strategies (valuation), and choosing and implementing a specific emotion regulation strategy (action) [8, 16, 87, 89–91].

2. *Emotion regulation model of Allen et al. [92]*: In this model, which is based on eight principles, people are instructed to talk about positive emotions like happiness, pleasure, and love, as well as negative emotions like sadness, regret, and hatred, and to jot down any emotional state they experience and similar ones. This process is known as emotional labeling. Second, people are taught to identify and name emotions to distinguish between positive and negative emotions and to identify their psychological and physical effects. This is called emotional differentiation. Third, people are taught ways to increase positive experiences, including browsing, mental visualization of pleasant scenes, neglect of anxiety, cognitive consequences, etc. These are strategies for enhancing positive emotions. Self-regulation strategies, such as acceptance, positive re-concentration, positive re-planning, and evaluation, are also taught. These are techniques for managing emotions. Fourth, people are prepared to reduce their negative emotions by stopping mental eating, getting enough sleep, taking care of themselves, and correcting harmful thoughts. These are strategies for reducing negative emotions. Fifth, people either pay enough attention to their positive or negative emotions and accept them without judging the proper expression of emotion. This is known as emotional acceptance. Sixth, essential and notable points about how people are informed about the relationship between emotions and thoughts, how to reassess positive and negative emotions, pay attention to the consequences of each emotion, and express themselves healthily. This is known as emotional understanding. Seventh, it is taught theoretically and practically in changing negative emotions through action, unlike previously experienced emotions, such as fear, anxiety, anger, and stress. This is known as emotional change. Finally, there is a preliminary assessment of the goals' achievement level and a clear explanation of applying the skills gained in different environments, such as home and school [92, 93].
3. *Meta-Thinking Training Program Based on Mental-Brain Simulation (MTMBS)*: This treatment protocol was developed by Mahdavi et al. [94] with an emphasis on cognitive and neuropsychological principles, including eight sessions focused on the present moment and self-awareness. The MTMBS protocol encourages individuals to change thoughts and mental images based on meta-thinking styles, principles of mental imagery, mental simulation methods, and Default Mode Network (DMN) suppression techniques. Adopting a third-person view of life, deep self-understanding, controlled and favorable reactions in challenging interactions and situations, selective decision-making in various aspects of life, responsibility in choices, considering the consequences of actions, and developing a future mindset are benefits of participating in this treatment protocol. In addition, MTMBS enables people to perform their tasks and experience a sense of self-efficacy. People are taught to use dialectical thinking patterns to clarify different aspects of a particular concept and to overcome contradictions. Also, repeat the way a behavior or action is performed in the future, associate thoughts, emotions, and behaviors, notice their positive aspects, change their own beliefs and mental tendencies, understand the details of a particular

hypothetical or actual event, visualize a positive pattern of self-fulfilling work, prepare to deal with future stressful or uncomfortable events, identify potential challenges and problems, and understand how to elevate them. Targeted exercises, such as confronting stimulating situations, identifying unpleasant emotional experiences in different tissues (home, school, or neighborhood), and replacing them with pleasant and adaptable emotions in simulated situations, help them visualize and improve their sense of self-efficacy and human action and manipulate their situation or emotions, relying on reassessment, rather than being passive. To reduce internal tension and inspire calm, they are taught to imagine a successful and ideal future with challenges in their minds and to simulate an efficient model of themselves to convert cognitions into actions. In addition, we ask the clients in a state of relaxation to imagine two boards in their minds (A/B). In the A-board, all the disruptive things in the past are written and drawn along with the images related to them. On the B-board, he is asked to write and draw all the positive changes that want to happen in the behavioral, emotional, cognitive, and social fields. Then, it is necessary to put away A-board in his mind so far that it disappears, leaving no trace of it. Nevertheless, it makes the B-board significant so that it encompasses the whole space of her mind, and she finds herself/himself trying to do it [94].

4. *Emotion regulation model of Gratz and Gunderson [95]*: This emotion regulation model aims to explain how people regulate their emotions and manage emotional distress. The underlying idea of the Gratz and Gunderson model is that regulation of emotion as a complex process involves cognitive, emotional, and behavioral dimensions. Their emotion regulation model consists of three fundamental components: (A) Reappraisal: This component is considered the first stage of the emotional regulation process. At this stage, individuals assess the environment and the stimuli they encounter, and based on this assessment, they determine how they react, (B) Emotion generation: At this stage, the emotional reactions of the person (fear, anger, or grief) that result from initial evaluation, personal experiences, past trauma, and cultural norms are activated, and (C) Emotion regulation: At this point, a person employs various strategies, including reappraisal, suppression, avoidance, rumination, etc., to manage or regulate the emotional response. People in the field of emotion regulation have significant individual differences from each other, including emotion regulation, emotional responsiveness, and emotional resilience. Studies have shown that the emotion regulation model can help develop psychological interventions to treat mood and anxiety disorders, developing educational protocols to enhance emotional intelligence in people of different age groups, and building health-oriented programs for employee well-being. In general, this emotion regulation model provides a comprehensive framework for understanding emotions and how to regulate them, allowing the development of more effective interventions and strategies to promote emotional health [95–98].
5. *Emotion regulation techniques of Leahy et al. [99]*: The designers of this model have introduced a cognitive-behavioral model of emotion regulation. According to this model, people use specific cognitive and behavioral strategies that can be adaptive or non-adaptive to regulate their emotions. The model consists of four very important components, including cognitive assessment, emotion production, emotion regulation, and emotion expression. In Cognitive Assessment,

individuals engage in cognitive interpretation of the situation and determination of the importance of emotion. In line with the views of Leahy and colleagues, individuals use specific cognitive frameworks, including cognitive biases, to evaluate situational events. At the stage of emotion generation, people produce emotion in response to cognitive assessments, and this process is influenced by a variety of factors, such as past experiences, personality traits, and social learning. In the emotion regulation phase, people regulate emotion through cognitive-behavioral self-regulation strategies, such as avoidance, suppression, and reassessment. Finally, in the emotional expression section, people respond to the process of regulating various physical-behavioral reactions, such as crying, laughing, and extrusion. The theme of this model indicates that people use different ways to regulate their emotions, which can be consistent or inconsistent. For example, when a person uses avoidance or repression to regulate their emotion, it may lead to incompatible and undesirable consequences, for instance, increased anxiety or depression. In this model, therapists can use cognitive-behavioral techniques to help patients identify and challenge incompatible strategies and more effectively regulate their emotions [100].

6. *Reinforcement learning perspective*: The reinforcement learning perspective-based emotion regulation model is a dynamic decision-making process involving learning and adaptation. This model includes essential factors, including the emotional state of the individual (intensity, duration, and value of emotion), constructive action (emotion regulation strategies), reward (positive and negative consequences of emotion regulation strategies), and value (determination of the amount of value assigned to emotional state and consequences of emotion regulation). In this model, the learner adjusts his emotions through trial and error, associates some emotion regulation strategies with specific outcomes, and adjusts his behavior accordingly. In addition, things like a person's long-term goals, emotion modulation practices, reward performance, learning speed, exploratory learning, and benefiting from experiences help a person to perform the emotion regulation process more efficiently [101, 102]. Relying on this emotion regulation model, we can better understand how people learn the self-regulation process and adapt over time. In this approach, which emphasizes the development and validation of computational models of selective behavior, people continuously make choices based on predictions they make about the value of stimuli or "good for me–bad for me" actions. Value predictions depend on rewards or punishments that are considered guiding behavior in the future. Based on this approach, calculations that determine and execute the actions of the emotion regulator may occur consciously or unconsciously. Therefore, the discrepancy between the predicted emotional state and the actual emotion can be considered a predictive error, showing that the regulatory action has not achieved its expected result [103]. When emotion moves away from the emotional state of the goal, there is a negative prediction error. When emotion exceeds the emotional state of the goal, there is a positive prediction error. The reinforcement learning approach distinguishes between two types of decision control: model-free and model-based. Although model-free control has low flexibility, it is very efficient because its response to environmental events occurs in a limited set of potential stimuli and responses, and behavior is driven purely by predictive errors experienced. While model-based control is characterized by systematic decision-making and dynamic computing, it is less computationally

efficient than model-free control. In addition, using model-based control does not require new experiences to build a model, meaning that individuals can use their existing knowledge and understanding of the environment to regulate their emotions. Most people combine model-free control and model-based control to regulate emotions, but one may prevail and gain more weight than the other, or both may go parallel [101–103].

In general, these patterns provide a comprehensive framework of interventions that emphasize teaching cognitive, behavioral, and neurological aspects.

5. Neurocognitive mechanisms of emotion regulation

On the neurological level, the emotions engage the subcortical regions (amygdala, ventricular striatum, and periorbital gray) and the cortex (anterior insula and dorsal anterior cingulate) [103–106]. As you know, several strategies can regulate emotions. However, imaging studies have shown that the most widely used strategy is reappraisal, in which a person actively seeks to adjust purposefully the way of thinking about the meaning of a stimulus or emotional position [90, 107, 108]. Based on the findings of behavioral studies and neuroimaging, emotion regulation comprises two distinct types: explicit and implicit [107]. Explicit emotion regulation requires conscious effort and active monitoring and is associated with a level of insight and awareness (such as reappraisal) [109, 110]. At an unconscious and subcortical level, the implicit adjustment is triggered automatically by the stimulus itself without conscious supervision [107]. Regulating “explicit” emotions involves several brain regions, including the dorsolateral prefrontal cortex (dlPFC), ventrolateral prefrontal cortex (vlPFC), supplementary motor area (SMA), pre-supplementary motor area, and placental cortex. According to Etkin et al. [103], the regulation of “implicit” emotions involves the ventricular anterior cingulate cortex (vACC) and the ventromedial prefrontal cortex (vmPFC). Studies in recent years have shown that reassessment is compelling in organizing responses in systems associated with emotional response, especially the amygdala (reacting to the presence and encoding of emotion-related stimuli), insula (responding according to the reward value of stimuli), and the abdominal striatum (representing information about physical states associated with emotional responses) [107, 111, 112]. Reappraisal through a network of different brain regions including the ventrolateral prefrontal cortex (vlPFC), posterior medial prefrontal cortex (pmPFC), dorsolateral prefrontal cortex (dlPFC), posterior parietal cortex (PPC), and anterior cingulate cortex (ACC) that modulate cognitive functions affect areas related to emotion regulation [107, 109, 111–113]. Neurological research on emotion regulation suggests that the control areas of the forehead of the brain (dorsolateral prefrontal cortex and ventrolateral prefrontal cortex) have a slower rate of transformation than the areas of emotional response (amygdala and ventral striatum) and peak in adolescence and appear to be a convincing response to mood instability and excessive emotional responsiveness in this age group [114–116]. Adverse environmental events as a stressor can affect a person’s ability to regulate emotions. Although moderate stress levels improve the learning process through increased alertness and attention, severe stress (exam anxiety) and chronic stress (poverty) can cause irreparable damage to a person’s cognitive abilities [117–119]. Kim et al. [117] found that adults who experienced childhood poverty were more likely than adults who grew up in favorable economic conditions to experience chronic stress exposure impacting

neural activity, such as reduced activation of the lateral dorsal prefrontal cortex and lateral ventricular prefrontal cortex and increased amygdala activation. Experiencing more adversity in life is associated with a more fantastic neurological reaction to negative images in the amygdala and various activation patterns in the prefrontal cortex of the brain [120]. Some researchers believe positive emotions increase attention and concentration, accelerate learning, and empower memory [121]. For example, receiving positive feedback (getting rewarded for getting a grade in the exam) compared to negative feedback (being punished or rejected) can trigger a better emotional response and function and activate different neural circuits [122–124]. In addition, in the social regulation of emotions in children and adolescents, an adult caregiver can play an effective and decisive role in reducing emotional responses when there exist harmful stimuli, avoiding dangerous choices when deciding in sensitive situations, increasing activation in control areas including the ventrolateral prefrontal cortex and posterior medial prefrontal cortex, and reducing the activation of the ventral striatum and amygdala [125–127]. However, peers instead of adults may lead to impulsive decision-making and increased activation of the ventral striatum and ventrolateral prefrontal cortex [128, 129]. When children and adolescents are excluded from peers, increased activation of the anterior cingulate cortex and posterior medial prefrontal cortex is associated with symptoms of depressive disorder and social pain [128, 130].

6. Conclusion

The study attempted to present different approaches and models of emotion regulation. It was observed that, in some approaches, emotion regulation is emphasized as part of psychiatric disorders (such as ADHD and MDD (major depressive disorder)); in others, it is distinct and separate from disorders, and in other approaches, it is associated with disorders. The presentation of different patterns of intervention improving emotion regulation indicates a diversity of educational strategies on the one hand and brain-based intervention on the other. In a few studies, both aspects of emotion regulation have been considered. The present study showed that training and interventions when regulating emotion can help reduce psychological problems and improve the brain's executive functions. Accordingly, it seems that to reduce the adverse effects of ADHD, the use of a set of strategies can be more effective. According to existing research, emotion regulation affects people's mental health and quality of life. Although the ability to self-regulate emotions helps people achieve their goals in life with greater ease, any significant deficit in emotion regulation can make them vulnerable to psychosocial disorders. Parents and professionals can teach children and adolescents how to behave in exposure to positive and negative emotions, how to explain their emotional experiences in interaction with others, what strategies to use in response to complex situations to moderate emotions, play a more active role in various life situations, and express themselves more adaptable by being aware of the adverse consequences of negative emotions and the effectiveness of positive emotions. Since the human mind has very high flexibility and neuroplasticity in childhood and adolescence, educators and behavioral sciences professionals implement courses on self-reflective thinking, problem-solving, evidence-based decision-making, strengthening executive functions, coping with social damages, identification, secure attachment, socialization, and healthy resilience for parents, teachers, and students to take a practical step in prevention to remove the prevalence of this social-emotional disorder and its subsequent consequences at different levels of society and facilitate the flourishing of their talents.

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References

- [1] American Psychiatric Association, DSM-5 Task Force. In: Diagnostic and Statistical Manual of Mental Disorders DSM-5™. 5th ed. Arlington, VA: American Psychiatric Publishing Inc.; 2013. DOI: 10.1176/appi.books.9780890425596
- [2] García T, Rodríguez C. Sustained change in ADHD: Interventions and variables that Lead to durable improvements in symptoms and quality of life. *Sustainability*. 2021;**13**(24):13721
- [3] Sánchez M, Lavigne R, Romero JF, Elósegui E. Emotion regulation in participants diagnosed with attention deficit hyperactivity disorder, before and after an emotion regulation intervention. *Frontiers in Psychology*. 2019;**10**:1092. DOI: 10.3389/fpsyg.2019.01092
- [4] Loro-López M, Quintero J, García-Campos N, Jiménez-Gómez B, Pando F, Varela-Casal P, et al. Actualización en el tratamiento del trastorno por déficit de atención/hiperactividad (Update on attention-deficit/hyperactive disorder treatment). *Revista de Neurologia*. 2009;**49**(5):257-264
- [5] Wehmeier PM, Schacht A, Barkley RA. Social and emotional impairment in children and adolescents with ADHD and the impact on quality of life. *The Journal of Adolescent Health*. 2010;**46**(3):209-217. DOI: 10.1016/j.jadohealth.2009.09.009
- [6] Pliszka SR. Psychiatric comorbidities in children with attention deficit hyperactivity disorder: Implications for management. *Pediatric Drugs*. 2003;**5**(11):741-750. DOI: 10.2165/00148581-200305110-00003
- [7] Kessler RC, Adler L, Barkley R, Biederman J, Conners CK, Demler O, et al. The prevalence and correlates of adult ADHD in the United States: Results from the National Comorbidity Survey Replication. *The American Journal of Psychiatry*. 2006;**163**(4):716-723. DOI: 10.1176/ajp.2006.163.4.716
- [8] Ratcliffe M, Bortolan A. Emotion regulation in a disordered world: Understanding borderline personality disorder. In: Tewes C, Stanghellini G, editors. *Time and Body: Phenomenological and Psychopathological Approaches*. chapter, Cambridge: Cambridge University Press; 2020. pp. 177-200
- [9] Roberts W, Milich R, Barkley RA. Primary symptoms, diagnostic criteria, subtyping, and prevalence of ADHD. In: Barkley RA, editor. *Attention-Deficit Hyperactivity Disorder*. 4th ed. New York: Guilford Publication; 2015. pp. 51-80
- [10] Soler-Gutiérrez AM, Pérez-González JC, Mayas J. Evidence of emotion dysregulation as a core symptom of adult ADHD: A systematic review. *PLoS One*. 2023;**18**(1):e0280131. DOI: 10.1371/journal.pone.0280131
- [11] Ringer R. Living with ADHD: A meta-synthesis review of qualitative research on children's experiences and understanding of their ADHD. *International Journal of Disability, Development and Education*. 2019;**67**(2):208-224
- [12] Polanczyk G, Rohde LA. Epidemiology of attention-deficit/hyperactivity disorder across the lifespan. *Current Opinion in Psychiatry*. 2007;**20**(4):386-392. DOI: 10.1097/YCO.0b013e3 281568d7a

- [13] Barkley RA, Grodzinsky G, DuPaul GJ. Frontal lobe functions in attention deficit disorder with and without hyperactivity: A review and research report. *Journal of Abnormal Child Psychology*. 1992;**20**(2):163-188. DOI: 10.1007/BF00916547
- [14] Crisci G, Caviola S, Cardillo R, Mammarella IC. Executive functions in neurodevelopmental disorders: Comorbidity overlaps between attention deficit and hyperactivity disorder and specific learning disorders. *Frontiers in Human Neuroscience*. 2021;**15**:594234. DOI: 10.3389/fnhum.2021.594234
- [15] Faraone SV, Rostain AL, Blader J, Busch B, Childress AC, Connor DF, et al. Practitioner review: Emotional dysregulation in attention-deficit/hyperactivity disorder - implications for clinical recognition and intervention. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. 2019;**60**(2):133-150. DOI: 10.1111/jcpp.12899
- [16] Gross JJ. Emotion regulation: Past, present, future. *Cognition and Emotion*. 1999;**13**(5):551-573
- [17] Hervás G. Psicopatología de la regulación emocional: El papel de los déficit emocionales en los trastornos clínicos. *Behavioral Psychology= Psicología Conductual*. 2011;**19**(2):347
- [18] Pennington BF, Ozonoff S. Executive functions and developmental psychopathology. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. 1996;**37**(1):51-87. DOI: 10.1111/j.1469-7610.1996.tb01380.x
- [19] Sergeant JA, Geurts H, Oosterlaan J. How specific is a deficit of executive functioning for attention deficit/hyperactivity disorder? *Behavioral Brain Research*. 2002;**130**(1-2):3-28. DOI: 10.1016/s0166-4328(01)00430-2
- [20] Thorell LB, Tilling H, Sjöwall D. Emotion dysregulation in adult ADHD: Introducing the comprehensive emotion regulation inventory (CERI). *Journal of Clinical and Experimental Neuropsychology*. 2020;**42**(7):747-758. DOI: 10.1080/13803395.2020.1800595
- [21] García-Castellar R, Presentación-Herrero MJ, Siegenthaler-Hierro R, Miranda-Casas A. Estado sociométrico de los niños con trastorno por déficit de atención con hiperactividad subtipo Combinado (the sociometric status of children with the combined subtype of attention deficit hyperactivity disorder). *Revista de Neurología*. 2006;**42**(2):S13-S17
- [22] Mikami AY, Jia M, Na JJ. Social skills training. *Child and Adolescent Psychiatric Clinics of North America*. 2014;**23**(4):775-788. DOI: 10.1016/j.chc.2014.05.007
- [23] Graziano PA, Calkins SD, Keane SP. Sustained attention development during the toddlerhood to preschool period: Associations with Toddlers' emotion regulation strategies and maternal behavior. *Infant and Child Development*. 2011;**20**(6):389-408. DOI: 10.1002/icd.731
- [24] Haydicky J, Shecter C, Wiener J, Ducharme JM. Evaluation of MBCT for adolescents with ADHD and their parents: Impact on individual and family functioning. *Journal of Child and Family Studies*. 2015;**24**(1):76-94
- [25] Folkman S. Stress: Appraisal and coping. In: Gellman MD, Turner JR, editors. *Encyclopedia of Behavioral Medicine*. New York, NY: Springer; 2013. DOI: 10.1007/978-1-4419-1005-9_215

- [26] Freud A. The Ego and the Mechanisms of Defense (trans. Cecil Baines). New York, NY: Routledge; 1946
- [27] Grube GM, Reeve CDC. Plato's Republic. Indianapolis, IN: Hackett Publishing Company; 1974
- [28] Campos JJ, Campos RG, Barrett KC. Emergent themes in the study of emotional development and emotion regulation. *Developmental Psychology*. 1989;25:394
- [29] Gross JJ, Muñoz RF. Emotion regulation and mental health. *Clinical Psychology: Science and Practice*. 1995;2:151-164
- [30] Izard CE. Facial expressions and the regulation of emotions. *Journal of Personality and Social Psychology*. 1990;58(3):487-498. DOI: 10.1037//0022-3514.58.3.487
- [31] Thompson RA. Emotion regulation: A theme in search of definition. *Monographs of the Society for Research in Child Development*. 1994;59(2-3):25-52
- [32] Cole PM, Michel MK, Teti LO. The development of emotion regulation and dysregulation: A clinical perspective. *Monographs of the Society for Research in Child Development*. 1994;59(2-3):73-100
- [33] Gross JJ. The emerging field of emotion regulation: An integrative review. *Review of General Psychology*. 1998;2:271-299. DOI: 10.1037/1089-2680.2.3.271
- [34] Garnefski N, Kraaij V. Relationship between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality and Individual Differences*. 2006;40:1659-1669
- [35] Joormann J, Gotlib IH. Emotion regulation in depression: Relation to cognitive inhibition. *Cognition and Emotion*. 2010;24(2):281-298. DOI: 10.1080/02699930903407948
- [36] Hofmann W, Schmeichel BJ, Baddeley AD. Executive functions and self-regulation. *Trends in Cognitive Sciences*. 2012;16(3):174-180. DOI: 10.1016/j.tics.2012.01.006
- [37] Boehme, Stephanie B, Biehl SC, Mühlberger A. Effects of differential strategies of emotion regulation. *Brain Sciences*. 2019;9(9):225. DOI: 10.3390/brainsci9090225
- [38] Braunstein LM, Gross JJ, Ochsner KN. Explicit and implicit emotion regulation: A multi-level framework. *Social Cognitive and Affective Neuroscience*. 2017;12(10):1545-1557. DOI: 10.1093/scan/nsx096
- [39] Koole SL, Webb TL, Sheeran PL. Implicit emotion regulation: Feeling better without knowing why. *Current Opinion in Psychology*. 2015;3:6-10
- [40] Eisenberg N, Spinrad TL, Eggum ND. Emotion-related self-regulation and its relation to children's maladjustment. *Annual Review of Clinical Psychology*. 2010;6:495-525. DOI: 10.1146/annurev.clinpsy.121208.131208
- [41] Gross JJ. Emotion regulation: Taking stock and moving forward. *Emotion*. 2013;13(3):359-365. DOI: 10.1037/a0032135
- [42] Riediger M, Klipker K. Emotion regulation in adolescence. In: Gross JJ, editor. *Handbook of Emotion Regulation*. 2nd ed. New York, NY: Guilford Press; 2014. pp. 187-202

- [43] Stegge H, Meerum Terwogt M. Awareness and regulation of emotion in typical and atypical development. In: Gross JJ, editor. *Handbook of Emotion Regulation*. New York, NY: Guilford Press; 2007. pp. 269-286
- [44] Thompson RA, Goodman M. Development of emotion regulation: More than meets the eye. In: Kring AM, Sloan DM, editors. *Emotion Regulation and Psychopathology: A Transdiagnostic Approach to Etiology and Treatment*. New York, NY: The Guilford Press; 2010. pp. 38-58
- [45] Barkley RA. Emotional dysregulation is a core component of ADHD. In: Barkley RA, editor. *Attention Deficit Hyperactivity Disorder*. 4th ed. New York: Guilford Publication; 2015a. pp. 81-115
- [46] Barkley RA. Executive functioning and self-regulation are viewed as extended phenotype implications of the theory for ADHD and its treatment. In: Barkley RA, editor. *Attention-Deficit Hyperactivity Disorder*. 4th ed. New York: Guilford Publication; 2015b. pp. 405-434
- [47] Shaw P, Stringaris A, Nigg J, Leibenluft E. Emotion dysregulation in attention deficit hyperactivity disorder. *The American Journal of Psychiatry*. 2014;**171**(3):276-293. DOI: 10.1176/appi.ajp.2013.13070966
- [48] Bailey R, Jones SM. An integrated model of regulation for applied settings. *Clinical Child and Family Psychology Review*. 2019;**22**(1):2-23. DOI: 10.1007/s10567-019-00288-y
- [49] Sjöwall D, Thorell LB. A critical appraisal of the role of neuropsychological deficits in preschool ADHD. *Child Neuropsychology*. 2019;**25**(1):60-80. DOI: 10.1080/09297049.2018.1447096
- [50] Bunford N, Evans SW, Wymbs F. ADHD and emotion Dysregulation among children and adolescents. *Clinical Child and Family Psychology Review*. 2015;**18**(3):185-217. DOI: 10.1007/s10567-015-0187-5
- [51] Christiansen H, Hirsch O, Albrecht B, Chavanon ML. Attention-deficit/hyperactivity disorder (ADHD) and emotion regulation over the life span. *Current Psychiatry Reports*. 2019;**21**(3):17. DOI: 10.1007/s11920-019-1003-6
- [52] Materna L, Wiesner CD, Shushakova A, Trieloff J, Weber N, Engell A, et al. Adult patients with ADHD differ from healthy controls in implicit, but not explicit, emotion regulation. *Journal of Psychiatry and Neuroscience*. 2019;**44**(5):340-349. DOI: 10.1503/jpn.180139
- [53] Shushakova A, Ohrmann P, Pedersen A. Exploring deficient emotion regulation in adult ADHD: Electrophysiological evidence. *European Archives of Psychiatry and Clinical Neuroscience*. 2018;**268**(4):359-371. DOI: 10.1007/s00406-017-0826-6
- [54] Berking M, Wupperman P. Emotion regulation and mental health: Recent findings, current challenges, and future directions. *Current Opinion in Psychiatry*. 2012;**25**(2):128-134. DOI: 10.1097/YCO.0b013e3283503669
- [55] Friedman SR, Rapport LJ, Lumley M, Tzelepis A, Van Voorhis A, Stettner L, et al. Aspects of social and emotional competence in adult attention-deficit/hyperactivity disorder. *Neuropsychology*. 2003;**17**(1):50-58. DOI: 10.1037/0894-4105.17.1.50

- [56] Li H, Zhao Q, Huang F, Cao Q, Qian Q, Johnstone SJ, et al. Increased Beta activity links to impaired emotional control in ADHD adults with high IQ. *Journal of Attention Disorders*. 2019;**23**(7):754-764. DOI: 10.1177/1087054717739120
- [57] Barkley RA, Fischer M. The unique contribution of emotional impulsiveness to impairment in major life activities in hyperactive children as adults. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2010;**49**(5):503-513. DOI: 10.1097/00004583-201005000-00011
- [58] Biederman J, Spencer T, Lomedico A, Day H, Petty CR, Faraone SV. Deficient emotional self-regulation and pediatric attention deficit hyperactivity disorder: A family risk analysis. *Psychological Medicine*. 2012;**42**(3):639-646. DOI: 10.1017/S0033291711001644
- [59] Langner R, Leiberg S, Hoffstaedter F, Eickhoff SB. Towards a human self-regulation system: Common and distinct neural signatures of emotional and behavioral control. *Neuroscience and Biobehavioral Reviews*. 2018;**90**:400-410. DOI: 10.1016/j.neubiorev.2018.04.022
- [60] Shaw P, Sudre G, Wharton A, Weingart D, Sharp W, Sarlls J. White matter microstructure and the variable adult outcome of childhood attention deficit hyperactivity disorder. *Neuropsychopharmacology*. 2015;**40**(3):746-754. DOI: 10.1038/npp.2014.241
- [61] Surman CB, Biederman J, Spencer T, Yorks D, Miller CA, Petty CR, et al. Deficient emotional self-regulation and adult attention deficit hyperactivity disorder: A family risk analysis. *The American Journal of Psychiatry*. 2011;**168**(6):617-623. DOI: 10.1176/appi.ajp.2010.10081172
- [62] Spinrad TL, Stifter CA, Donelan-McCall N, Turner L. Mothers' regulation strategies in response to toddlers' affect: Links to later emotion self-regulation. *Social Development*. 2004;**13**(1):40-55. DOI: 10.1111/j.1467-9507.2004.00256.x
- [63] Buck R. *The Communication of Emotion*. New York: Guilford; 1984
- [64] Fabes RA, Leonard SA, Kupanoff K, Martin CL. Parental coping with children's negative emotions: Relations with children's emotional and social responding. *Child Development*. 2001;**72**(3):907-920. DOI: 10.1111/1467-8624.00323
- [65] Gadow KD, Drabick DA, Loney J, Sprafkin J, Salisbury H, Azizian A, et al. Comparison of ADHD symptom subtypes as source-specific syndromes. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. 2004;**45**(6):1135-1149. DOI: 10.1111/j.1469-7610.2004.00306.x
- [66] Hinshaw SP, Zupan BA, Simmel C, Nigg JT, Melnick S. Peer status in boys with and without attention-deficit hyperactivity disorder: Predictions from overt and covert antisocial behavior, social isolation, and authoritative parenting beliefs. *Child Development*. 1997;**68**(5):880-896
- [67] Steinberg EA, Drabick DAG. A developmental psychopathology perspective on ADHD and comorbid conditions: The role of emotion regulation. *Child Psychiatry and Human Development*. 2015;**46**:951-966. DOI: 10.1007/s10578-015-0534-2
- [68] Chronis AM, Lahey BB, Pelham WE Jr, Williams SH, Baumann BL, Kipp H, et al. Maternal depression and early positive parenting predict future conduct problems in young children with attention-deficit/

hyperactivity disorder. *Developmental Psychology*. 2007;**43**(1):70-82.
DOI: 10.1037/0012-1649.43.1.70

[69] Lanza HI, Drabick DA. Family routine moderates the relationship between child impulsivity and oppositional defiant disorder symptoms. *Journal of Abnormal Child Psychology*. 2011;**39**(1):83-94. DOI: 10.1007/s10802-010-9447-5

[70] Drabick DA, Kendall PC. Developmental psychopathology and the diagnosis of mental health problems among youth. *Clinical Psychology: Science and Practice*. 2010;**17**(4):272

[71] Stringaris A, Maughan B, Goodman R. What's in a disruptive disorder? Temperamental antecedents of oppositional defiant disorder: Findings from the Avon longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*. 2010;**49**(5):474-483. DOI: 10.1097/00004583-201005000-00008

[72] Frick PJ, Morris AS. Temperament and developmental pathways to conduct problems. *Journal of Clinical Child and Adolescent Psychology*. 2004;**33**(1):54-68. DOI: 10.1207/S15374424JCCP3301_6

[73] Drabick DA, Steinberg L. Developmental psychopathology. In: Brown B, Prinstein M, editors. *Encyclopedia of Adolescence*. Vol. 3. San Diego, CA: Academic Press; 2011. pp. 136-142

[74] Gullone E, Hughes EK, King NJ, Tonge B. The normative development of emotion regulation strategy use in children and adolescents: A 2-year follow-up study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*. 2010;**51**(5):567-574. DOI: 10.1111/j.1469-7610.2009.02183.x

[75] Jaffe M, Gullone E, Hughes EK. The roles of temperamental dispositions and perceived parenting behaviors in the use of two emotion regulation strategies in late childhood. *Journal of Applied Developmental Psychology*. 2010;**31**(1):47-59

[76] Hoza B. Peer functioning in children with ADHD. *Journal of Pediatric Psychology*. 2007;**32**(6):655-663. DOI: 10.1093/jpepsy/jsm024

[77] Mezulis AH, Hyde JS, Abramson LY. The developmental origins of cognitive vulnerability to depression: Temperament, parenting, and negative life events in childhood as contributors to negative cognitive style. *Developmental Psychology*. 2006;**42**(6):1012-1025. DOI: 10.1037/0012-1649.42.6.1012

[78] Yap MB, Allen NB, O'Shea M, di Parsia P, Simmons JG, Sheeber L. Early adolescents' temperament, emotion regulation during mother-child interactions, and depressive symptomatology. *Development and Psychopathology*. 2011;**23**(1):267-282. DOI: 10.1017/S0954579410000787

[79] Zeman J, Cassano M, Perry-Parrish C, Stegall S. Emotion regulation in children and adolescents. *Journal of Developmental and Behavioral Pediatrics*. 2006;**27**(2):155-168. DOI: 10.1097/00004703-200604000-00014

[80] August GJ, Realmuto GM, Joyce T, Hektner JM. Persistence and resistance of oppositional defiant disorder in a community sample of children with ADHD. *Journal of the American Academy of Child and Adolescent Psychiatry*. 1999;**38**(10):1262-1270. DOI: 10.1097/00004583-199910000-00015

[81] Barkley RA. Behavioral inhibition sustained attention, and executive

functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*. 1997;**121**(1):65-94. DOI: 10.1037/0033-2909.121.1.65

[82] Biederman J, Petty CR, Dolan C, Hughes S, Mick E, Monuteaux MC, et al. The long-term longitudinal course of oppositional defiant disorder and conduct disorder in ADHD boys: Findings from a controlled 10-year prospective longitudinal follow-up study. *Psychological Medicine*. 2008;**38**(7):1027-1036. DOI: 10.1017/S0033291707002668

[83] Derryberry D, Rothbart MK. Reactive and effortful processes in the organization of temperament. *Development and Psychopathology*. 1997;**9**(4):633-652. DOI: 10.1017/s0954579497001375

[84] Johnston C, Mash EJ. Families of children with attention-deficit/hyperactivity disorder: Review and recommendations for future research. *Clinical Child and Family Psychology Review*. 2001;**4**(3):183-207. DOI: 10.1023/a:1017592030434

[85] Cole PM, Martin SE, Dennis TA. Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*. 2004;**75**(2):317-333. DOI: 10.1111/j.1467-8624.2004.00673.x

[86] Costello EJ, Mustillo S, Erkanli A, Keeler G, Angold A. Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*. 2003;**60**(8):837-844. DOI: 10.1001/archpsyc.60.8.837

[87] Gross JJ. The extended process model of emotion regulation: Elaborations, applications, and future directions, psychological inquiry. *An International*

Journal for the Advancement of Psychological Theory. 2015;**26**(1):130-137. DOI: 10.1080/1047840X.2015.989751

[88] Gross JJ. Emotion regulation. In: Lewis M, Haviland-Jones JM, Barrett LF, editors. *Handbook of Emotions*. 3rd ed. New York: The Guilford Press; 2008. pp. 497-512

[89] Antúnez J. Circadian typology is related to emotion regulation, metacognitive beliefs and assertiveness in healthy adults. *PLoS One*. 2020;**15**(3):e0230169

[90] Gross JJ. Emotion regulation: Conceptual and empirical foundations. In: Gross JJ, editor. *Handbook of Emotion Regulation*. 2nd ed. New York: The Guilford Press; 2014. pp. 3-20

[91] Gross JJ, Thompson RA. Emotion regulation: Conceptual foundations. In: Gross JJ, editor. *Handbook of Emotion Regulation*. New York: The Guilford Press; 2007. pp. 3-24

[92] Allen LB, McHugh RK, Barlow DH. Emotional disorder: A unified protocol. In: Barlow DH, editor. *Clinical Handbook of Psychological Disorders: A Step-Step Treatment Manual*. 4th ed. New York: Guilford Press; 2009. pp. 216-249

[93] Zare M, Aghaziarti A, Malek Sheikhi S, Sharifi M. Effectiveness of mindfulness education compared to emotion regulation on adjustment of adolescent students with attention deficit/hyperactivity disorder. *Applied Psychology Quarterly*. 2018;**12**(2):203-222

[94] Mahdavi A, Mansureh HH, Masoud GL, Elaheh H, Mohammad-Hossein NHK, Yamin BD, et al. Construction of meta-thinking educational program based on mental-brain simulation (MTMBS)

and evaluating its effectiveness on executive functions, emotion regulation, and impulsivity in children with ADHD: A resting-state functional MRI study. *Journal of Attention Disorders*. 2023;**27**(11):1223-1251. DOI: 10.1177/10870547231155436

[95] Gratz KL, Gunderson JG. Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behavior Therapy*. 2006;**37**(1):25-35. DOI: 10.1016/j.beth.2005.03.002

[96] Ariapooran S, Abdolmaleki B, Sheybani H. Effectiveness of emotion regulation therapy on suicide ideation in mothers of children with intellectual disabilities during the COVID-19 outbreak. *International Journal of Applied Behavioral Sciences*. 2022;**9**(4):1-8

[97] Narimani M, Abolghasemi A, Ahadi B, Ariapooran S. Compare the effectiveness of mindfulness and emotional regulation training on mental health chemical warfare. *Journal of Clinical Psychology*. 2010;**2**(4):65-70

[98] Sattarpour F, Ahmadi E, Bafandeh Gharamaleki H. Effectiveness of emotion regulation training on reduction of symptoms depression students. *Shenakht Journal of Psychology and Psychiatry*. 2014;**1**(1):31-38

[99] Leahy RL, Dennis DT, Lisa AN. *Emotion Regulation in Psychotherapy: A practitioner's Guide*. New York: Guilford Press; 2012

[100] Mahboobi T, Salimi H, Hoseini SA, Mahboobi K. The effectiveness of emotional self-control training on reduction of the depression of students in Payame Noor University. *Research in School and Virtual Learning*. 2015;**3**(10):73-80

[101] Lerner JS, Li Y, Valdesolo P, Kassam K. Emotion and decision making. *Annual Review of Psychology*. 2015;**66**(1):799-823. DOI: 10.1146/annurev-psych-010213-115043

[102] Mao Y, Fan X, Fan Z, He W. Modeling group structures with emotion in crowd evacuation. *IEEE Access*. 2019;**7**:140010-140021. DOI: 10.1109/access.2019.2943603

[103] Etkin A, Büchel C, Gross JJ. The neural bases of emotion regulation. *Nature reviews. Neuroscience*. 2015;**16**(11):693-700. DOI: 10.1038/nrn4044

[104] Beissner F, Meissner K, Bär KJ, Napadow V. The autonomic brain: An activation likelihood estimation meta-analysis for central processing of autonomic function. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*. 2013;**33**(25):10503-10511. DOI: 10.1523/jneurosci.1103-13.2013

[105] Murphy FC, Nimmo-Smith I, Lawrence AD. Functional neuroanatomy of emotions: A meta-analysis. *Cognitive, Affective, & Behavioral Neuroscience*. 2003;**3**(3):207-233. DOI: 10.3758/cabn.3.3.207

[106] Sabatinelli D, Fortune EE, Li Q, Siddiqui A, Krafft C, Oliver WT, et al. Emotional perception: Meta-analyses of face and natural scene processing. *NeuroImage*. 2011;**54**(3):2524-2533. DOI: 10.1016/j.neuroimage.2010.10.011

[107] Gyurak A, Gross JJ, Etkin A. Explicit and implicit emotion regulation: A dual-process framework. *Cognition and Emotion*. 2011;**25**(3):400-412. DOI: 10.1080/02699931.2010.544160

[108] Ochsner KN, Silvers JA, Buhle JT. Functional imaging studies of emotion

regulation: A synthetic review and evolving model of the cognitive control of emotion. *Annals of the New York Academy of Sciences*. 2012;**1251**:E1-E24. DOI: 10.1111/j.1749-6632.2012.06751.x

[109] Buhle JT, Silvers JA, Wager TD, Lopez R, Onyemekwu C, Kober H, et al. Cognitive reappraisal of emotion: A meta-analysis of human neuroimaging studies. *Cerebral Cortex*. 2014;**24**(11):2981-2990. DOI: 10.1093/cercor/bht154

[110] Kohn N, Eickhoff SB, Scheller M, Laird AR, Fox PT, Habel U. The neural network of cognitive emotion regulation-an ALE meta-analysis and MACM analysis. *NeuroImage*. 2014;**87**:345-355. DOI: 10.1016/j.neuroimage.2013.11.001

[111] Haber SN, Knutson B. The reward circuit: Linking primate anatomy and human imaging. *Neuropsychopharmacology*. 2010;**35**(1):4-26. DOI: 10.1038/npp.2009.129

[112] Phelps EA, LeDoux JE. Contributions of the amygdala to emotion processing: From animal models to human behavior. *Neuron*. 2005;**48**(2):175-187. DOI: 10.1016/j.neuron.2005.09.025

[113] Uddin LQ, Kinnison J, Pessoa L, Anderson ML. Beyond the tripartite cognition-emotion-interoception model of the human insular cortex. *Journal of Cognitive Neuroscience*. 2014;**26**(1):16-27. DOI: 10.1162/jocn_a_00462

[114] Casey BJ. Beyond simple models of self-control to circuit-based accounts of adolescent behavior. *Annual Review of Psychology*. 2015;**66**:295-319. DOI: 10.1146/annurev-psych-010814-015156

[115] Gogtay N, Giedd JN, Lusk L, Hayashi KM, Greenstein D, Vaituzis AC,

et al. Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences of the United States of America*. 2004;**101**(21):8174-8179. DOI: 10.1073/pnas.040.2680101

[116] Tamnes CK, Walhovd KB, Dale AM, Østby Y, Grydeland H, Richardson G, et al. Brain development and aging: Overlapping and unique patterns of change. *NeuroImage*. 2013;**68**:63-74. DOI: 10.1016/j.neuroimage.2012.11.039

[117] Kim P, Evans GW, Angstadt M, Ho SS, Sripada CS, Swain JE, et al. Effects of childhood poverty and chronic stress on emotion regulatory brain function in adulthood. *Proceedings of the National Academy of Sciences of the United States of America*. 2013;**110**(46):18442-18447. DOI: 10.1073/pnas.1308240110

[118] Lupien SJ, McEwen BS, Gunnar MR, Heim C. Effects of stress throughout the lifespan on the brain, behavior, and cognition. *Nature Reviews. Neuroscience*. 2009;**10**(6):434-445. DOI: 10.1038/nrn2639

[119] Supekar K, Iuculano T, Chen L, Menon V. Remediation of childhood math anxiety and associated neural circuits through cognitive tutoring. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*. 2015;**35**(36):12574-12583. DOI: 10.1523/jneurosci.0786-15.2015

[120] Martin RE, Ochsner KN. The neuroscience of emotion regulation development: Implications for education. *Current Opinion in Behavioral Sciences*. 2016a;**10**:142-148. DOI: 10.1016/j.cobeha.2016.06.006

[121] Fredrickson BL, Branigan C. Positive emotions broaden the scope of

attention and thought-action repertoires. *Cognition and Emotion*. 2005;**19**(3):313-332. DOI: 10.1080/02699930441000238

[122] Moutsiana C, Garrett N, Clarke RC, Lotto RB, Blakemore SJ, Sharot T. Human development of the ability to learn from bad news. *Proceedings of the National Academy of Sciences of the United States of America*. 2013;**110**(41):16396-16401. DOI: 10.1073/pnas.1305631110

[123] Van Den Bos W, Güroğlu B, van den Bulk BG, Rombouts SA, Crone EA. Better than expected or as bad as you thought? The neurocognitive development of probabilistic feedback processing. *Frontiers in Human Neuroscience*. 2009;**3**:52. DOI: 10.3389/neuro.09.052.2009

[124] Van Duijvenvoorde AC, Zanolie K, Rombouts SA, Raijmakers ME, Crone EA. Evaluating the negative or valuing the positive? Neural mechanisms supporting feedback-based learning across development. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*. 2008;**28**(38):9495-9503. DOI: 10.1523/JNEUROSCI.1485-08.2008

[125] Callaghan BL, Tottenham N. The neuro-environmental loop of plasticity: A cross-species analysis of parental effects on emotion circuitry development following typical and adverse caregiving. *Neuropsychopharmacology*. 2016;**41**(1):163-176. DOI: 10.1038/npp.2015.204

[126] Gunnar MR, Donzella B. Social regulation of the cortisol levels in early human development. *Psychoneuroendocrinology*. 2002;**27**(1-2):199-220. DOI: 10.1016/S0306-4530(01)00045-2

[127] Telzer EH, Ichien NT, Qu Y. Mothers know best: Redirecting

adolescent reward sensitivity toward safe behavior during risk-taking. *Social Cognitive and Affective Neuroscience*. 2015;**10**(10):1383-1391. DOI: 10.1093/scan/nsv026

[128] Masten CL, Eisenberger NI, Borofsky LA, Pfeifer JH, McNealy K, Mazziotta JC, et al. Neural correlates of social exclusion during adolescence: Understanding the distress of peer rejection. *Social Cognitive and Affective Neuroscience*. 2009;**4**(2):143-157. DOI: 10.1093/scan/nsp007

[129] Smith AR, Steinberg L, Strang N, Chein J. Age differences in the impact of peers on adolescents and adults' neural response to reward. *Developmental Cognitive Neuroscience*. 2015;**11**:75-82. DOI: 10.1016/j.dcn.2014.08.010

[130] Peake SJ, Dishion TJ, Stormshak EA, Moore WE, Pfeifer JH. Risk-taking and social exclusion in adolescence: Neural mechanisms underlying peer influences on decision-making. *NeuroImage*. 2013;**82**:23-34. DOI: 10.1016/j.neuroimage.2013.05.061

Emotion Regulation through Cognitive Strategies

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Abstract

Emotions are fundamental to human experience, influencing perceptions, decisions, and interactions. This chapter explores the nature of emotions, including their physical, mental, and behavioral components, and their impact on thought, behavior, and social interaction. Emotions such as happiness, sadness, anger, fear, and surprise each have distinct physiological and psychological responses. Emotion regulation, the ability to manage emotional experiences, is crucial for mental health and interpersonal relationships. Various theories, including James-Lange, Cannon-Bard, and Schachter-Singer, offer insights into the origins and processes of emotions. Effective emotion regulation strategies, such as cognitive reappraisal, expressive suppression, and behavioral strategies, are essential for managing emotional responses. This chapter discusses cognitive techniques such as cognitive reappraisal, restructuring, thought challenging, and reality testing, which help individuals modify emotional responses to meet situational demands. Cognitive behavioral therapy (CBT) uses these techniques to treat mental health disorders, promoting healthier behaviors and reducing symptoms. Additional strategies, including metacognitive approaches, rumination, self-compassion, and cognitive fusion and defusion, are explored for their roles in emotional resilience and well-being. Cognitive bias modification (CBM) and acceptance-based strategies, rooted in mindfulness, also aid in regulating emotions, reducing anxiety and depression. Applying these techniques can significantly enhance emotional health and therapeutic outcomes.

Keywords: emotion, health promotion, emotion regulation, modal of model, process model, emotion dynamics, cognitive strategies, cognitive reappraisal techniques, cognitive restructuring, thought challenging and reality testing, metacognitive strategies, rumination and worry, self-compassion and positive affirmations, cognitive fusion and defusion, cognitive bias modification, acceptance-based strategies

1. Introduction

Emotions are an integral aspect of human experience, influencing our perceptions, decisions, and interactions with others. Emotion is a multifaceted phenomenon that encompasses physical, mental, and behavioral aspects, influenced by

neurophysiological changes. Emotions significantly affect our thoughts, feelings, and behaviors, shaping how we interact with the world.

1.1 Definition of emotion

Emotion is described as a complex state involving consciousness, sensation, and behavior, reflecting the personal significance of events or experiences. Emotions can be categorized into basic types, such as happiness, sadness, anger, fear, and surprise, each associated with distinct physiological and psychological responses.

Emotions play a crucial role in our lives, influencing decisions, actions, and social interactions. Positive emotions like happiness and love enhance well-being and social bonds, while negative emotions such as fear and anger can trigger defensive behaviors or stress responses. Managing emotions effectively is essential for mental health and can lead to improved resilience and better interpersonal relationships.

1.2 Importance of understanding emotions

Understanding emotions involves recognizing their complexity and their profound impact on our lives. By studying the various theories and acknowledging the role of emotions, we can better manage our emotional experiences, leading to healthier and more fulfilling lives. Several theories explain the nature and origin of emotions. The James-Lange theory suggests that emotions result from physiological reactions to events. For example, we feel sad because we cry. Conversely, the Cannon-Bard theory posits that we experience physiological reactions and emotions simultaneously. The Schachter-Singer theory introduces a cognitive aspect, proposing that emotion arises from physiological arousal followed by a cognitive interpretation of that arousal. While emotions can be adaptive and enriching, they can also pose challenges when they become overwhelming or dysregulated. Emotions promote goal achievement, facilitate interpersonal interactions, and guide behavior to enhance health promotion [1]. Understanding emotion helps the human regulate his/her emotions.

2. Emotion regulation

Emotion regulation refers to the ability to manage and modulate one's emotional experiences in order to achieve desired outcomes [2]. Cognitive strategies for emotion regulation involve the use of cognitive processes to influence the generation, intensity, and duration of emotional responses [3]. Thus, emotion regulation is concerned with how emotions themselves are regulated (regulation of emotions), rather than how emotions regulate something else (regulation by emotions). These strategies are rooted in theories of cognitive psychology and have been widely studied in the fields of psychology and psychiatry. Emotional regulation strategies include telling a child to stop acting like a baby, pounding your pillow when you are upset with your boss, picturing your audience naked when you are nervous about performing in a piano recital, picking up the phone to call a friend when you are feeling down, anticipating going to a fun party on the weekend to reenergize yourself midweek, going for a run after an upsetting fight with a friend, playing calming music after a long day at work, leaving a tense meeting early to cool down, and going to a club for a drink [4].

2.1 Core features of emotion regulation

The three core features of emotion regulation are: 1. activation of a goal to modify the emotion-generative process [5]; 2. engagement of the processes that are responsible for altering the emotion trajectory; and 3. its impact on emotion dynamics [6] or the latency, rise time, magnitude, duration, and offset of responses in experiential, behavioral, or physiological domains.

The activation of a goal to modify the emotion-generative process generally occurs in oneself due to intrinsic motivation and/or in someone else due to extrinsic motivation. Intrinsic motivation plays a major role in infants whereas extrinsic motivation plays a major role in adults. Emotion regulation is a complex process involving several strategies aimed at modifying the emotion-generative process. One key aspect is the activation of a goal to modify this process, which can occur through various strategies. Process Model of Emotion Regulation explains what distinguishes various methods of emotion management from one another [2]. According to the Modal Model of Emotion, emotions result from interactions between a person and a situation that require focus, are meaningful to someone regarding their ongoing objectives, and prompt synchronized but flexible responses across multiple systems. These responses significantly modify the ongoing interaction between the person and the situation.

This process begins with an event that matters psychologically. Often, this event can be described by elements in the environment, but it can also be something internal, like persistent self-doubt. These events are processed in various ways, leading to evaluations that reflect the individual's interpretation of the event in light of their goals, as noted by Ellsworth & Scherer in 2003 [7]. The emotional responses created by these unfolding judgments involve changes in experiential, behavioral, and neurobiological response systems. Emotional reactions frequently cause environmental shifts that affect the likelihood of experiencing that same emotion and others in the future (**Figure 1**).

This model for processing information begins with the standard framework (**Figure 1**), which outlines the series of processes that lead to the creation of emotions. The emotion regulation procedural model expands upon the modal model, considering each phase in the emotion-creation process outlined by the modal model as a possible point for regulatory intervention. In **Figure 2**, the process model is displayed, emphasizing five points where individuals have the ability to regulate their emotions. These five key areas symbolize five groups of processes for regulating emotions: Situation selection, situation modification, attentional deployment, cognitive change, and response modulation [2].

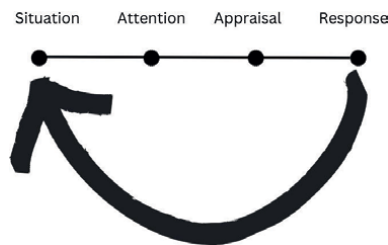


Figure 1.
The modal model of emotion.

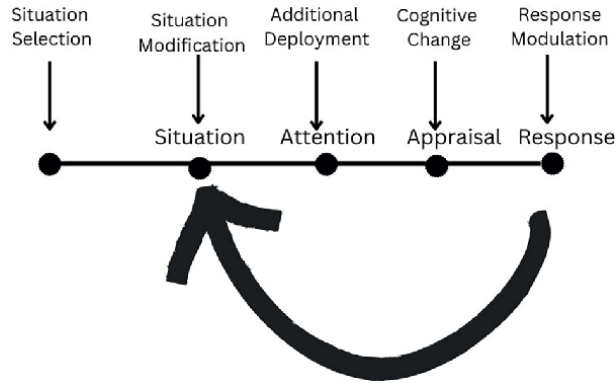


Figure 2.
The process model of emotion regulation.

2.2 Situation selection

It involves taking actions to place oneself in situations that are likely to give rise to desirable emotions and avoid those that might trigger unwanted emotions [8].

2.3 Situation modification strategy

It refers to altering a situation directly to change its emotional impact. For example, if a situation is stressful, one might change the environment to make it less so [8].

2.4 Attentional deployment

It involves directing attention toward or away from specific aspects of a situation to influence emotions. Techniques like distraction and concentration fall under this category [8].

2.5 Cognitive change strategy

It entails changing how one appraises a situation to alter its emotional significance. Reappraisal, a form of cognitive change, involves reinterpreting a situation to modify its emotional impact [9].

2.6 Response modulation

It involves influencing physiological, experiential, or behavioral responses directly. For instance, individuals might use relaxation techniques to reduce physiological arousal during a stressful event [10].

3. The process model of emotion regulation

In **Figure 2**, the progression from left to right symbolizes the passage of time, illustrating how a specific scenario is chosen, altered, focused on, evaluated, and

leads to a set of emotional reactions. Nonetheless, as highlighted in **Figure 1**, the creation of emotions is a continuous process that spans beyond an isolated event. The cyclical nature of emotions and their regulation is indicated by the feedback loop from the emotional outcome back to the situation in **Figure 2**, suggesting that multiple feedback interactions may occur. The impact of emotion regulation is crucial for psychological well-being as it helps individuals manage their emotional responses effectively, leading to better mental health and improved interpersonal relationships. It also aids in achieving long-term goals by enabling individuals to stay focused and resilient in the face of emotional challenges [11].

The engagement of the processes that are responsible for altering the emotion trajectory involves actively managing and modifying emotions to influence their intensity, duration, and expression. Emotion regulation encompasses a variety of strategies and mechanisms, both intrinsic and extrinsic, which can be consciously or unconsciously employed. Engaging in emotion regulation involves several key processes.

3.1 Identification and monitoring

Recognizing and understanding one's emotional responses is the first step in emotion regulation. This awareness allows individuals to monitor their emotional states and identify when regulation is needed [12].

3.2 Cognitive reappraisal

This strategy involves changing the way one thinks about a situation to alter its emotional impact. By reinterpreting the meaning of an event, individuals can reduce negative emotions and enhance positive ones [8].

3.3 Expressive suppression

Another common strategy is expressive suppression, where individuals inhibit the outward expression of their emotions. This can be useful in situations where showing emotions might be inappropriate or counterproductive [12].

3.4 Interpersonal emotion regulation

This refers to processes aimed at changing the emotional states of others. It involves interactions where individuals help each other manage and regulate emotions through social support, empathy, and communication [13].

3.5 Behavioral strategies

Actions such as exercise, relaxation techniques, and engaging in hobbies can help modulate emotional states. These behaviors provide alternative focuses and outlets for emotional energy [14].

Engaging effectively in emotion regulation is crucial for mental health, social functioning, and overall well-being. It allows individuals to maintain emotional balance, cope with stress, and adapt to changing circumstances. Proper engagement in these processes leads to better life outcomes, including improved relationships, higher academic and professional achievements, and enhanced quality of life [15].

3.6 Emotion dynamics

Emotion regulation significantly impacts emotion dynamics, which refers to the various parameters of emotional responses, including their latency, rise time, magnitude, duration, and offset. This feature of emotion regulation is crucial for understanding how emotions are managed and altered over time in different contexts. The key aspects of emotion dynamics are:

3.6.1 Latency

This is the delay between the stimulus and the emotional response. Effective emotion regulation can reduce the latency, helping individuals respond more promptly to emotional stimuli [16].

3.6.2 Rise time

This refers to how quickly the emotional response reaches its peak intensity. Regulating emotions can help manage the speed at which emotions escalate, preventing overwhelming responses [2].

3.6.3 Magnitude

The intensity of the emotional response is a critical component. Emotion regulation strategies, such as cognitive reappraisal or expressive suppression, can moderate the magnitude of emotions, making them more manageable [17].

3.6.4 Duration

This is the length of time the emotional response lasts. Effective regulation can shorten the duration of negative emotions, reducing their impact on well-being and functioning [17].

3.6.5 Offset

This refers to how quickly the emotional response diminishes after reaching its peak. Emotion regulation can facilitate a quicker return to baseline, helping individuals recover from emotional episodes more efficiently [18].

3.6.6 Impact on different domains

The impact on different domains is Experiential, Behavioral, and Physiological. Under Experiential domain, Emotion regulation influences how emotions are felt and experienced internally. Techniques such as mindfulness and reappraisal can change the subjective experience of emotions, making them less distressing [19]. Under the Behavioral domain, the outward expression of emotions is also affected. Regulation strategies can help individuals control their emotional expressions, leading to more appropriate and socially acceptable behavior [2]. Under Physiological domain, Emotion regulation impacts the body's physiological responses, such as heart rate and hormonal levels. Effective regulation can mitigate the physical stress responses associated with intense emotions [16]. Understanding and managing these dynamics

through emotion regulation is essential for maintaining emotional health and achieving personal and social well-being.

4. Emotion regulation: practical techniques across clinical settings

Emotion regulation involves managing and modifying emotional responses to adapt to situational demands and achieve personal goals. Effective emotion regulation is essential in clinical settings to improve mental health outcomes and enhance overall well-being. Some of the practical Cognitive techniques for emotion regulation across various clinical environments are:

- **Cognitive Reappraisal Techniques:** Exploring the process and effectiveness of reframing thoughts to regulate emotions.
- **Cognitive Restructuring:** Understanding how to identify and challenge negative thought patterns to manage emotions.
- **Thought Challenging and Reality Testing:** Techniques for examining the validity of cognitive distortions in emotion regulation.
- **Metacognitive Strategies:** Investigating methods for developing awareness and control over one's thought processes in regulating emotions.
- **Rumination and Worry:** Examining the role of persistent negative thinking in emotion dysregulation and strategies for breaking these patterns.
- **Self-Compassion and Positive Affirmations:** Exploring how self-talk and self-compassion can influence emotional states and well-being.
- **Cognitive Fusion and Defusion:** Understanding the impact of cognitive fusion (over-identification with thoughts) and defusion techniques in emotion regulation.
- **Cognitive Bias Modification:** Techniques aimed at altering cognitive biases to promote more adaptive emotional responses.
- **Acceptance-Based Strategies:** Investigating the role of acceptance and mindfulness in cognitive approaches to emotion regulation.

5. Cognitive reappraisal techniques

Emotions are an integral part of human experience, influencing our thoughts, behaviors, and interactions with others. While emotions can enrich our lives, they can also become overwhelming or dysregulated, leading to distress and dysfunction. Cognitive reappraisal techniques offer a way to manage and modulate our emotional experiences by changing the way we think about situations [2]. Cognitive reappraisal is rooted in the cognitive theory of emotion, which suggests that our emotions are influenced by how we interpret and appraise events [20]. According to this theory,

changing the meaning or interpretation of a situation can alter its emotional impact. Cognitive reappraisal techniques involve reframing the meaning of a situation in order to generate a different emotional response [3]. For example, individuals may reinterpret a stressful event as a challenge rather than a threat, thereby reducing feelings of anxiety or distress.

There are several strategies for implementing cognitive reappraisal in everyday life. One common technique is to reframe the situation by focusing on its positive aspects or potential benefits [21]. For instance, instead of dwelling on the challenges of a difficult task, individuals can focus on the opportunity for growth and learning. Another strategy is perspective-taking, which involves considering the situation from a different point of view [22]. By adopting a broader perspective, individuals can gain insight into the situation and reduce the intensity of their emotional response. Research has consistently demonstrated the effectiveness of cognitive reappraisal techniques in promoting emotional well-being and reducing psychological distress [23]. However, there is still much to learn about the mechanisms underlying these techniques and their optimal implementation. Future research could explore individual differences in the effectiveness of cognitive reappraisal, as well as the long-term outcomes of using these techniques in everyday life and therapeutic settings.

The cognitive reappraisal techniques offer valuable tools for managing emotions and promoting emotional well-being. By changing the way, we think about situations, we can alter our emotional responses and cultivate greater resilience in the face of adversity. These techniques have important implications for therapy, as well as for everyday life, and warrant further exploration and research.

5.1 Example

5.1.1 Day-to-day emotional problem

Feeling Overwhelmed by Work Deadlines.

5.1.2 Situation

You have multiple work deadlines approaching, and you feel stressed, anxious, and overwhelmed. Automatic Negative Thoughts: “I’ll never finish everything on time. I’m a failure.”

5.1.3 Solution using cognitive reappraisal

- Identify Distorted Thoughts- Recognize the catastrophizing (“I’ll never finish”) and all-or-nothing thinking (“I’m a failure”).
- Challenge Assumptions- Consider evidence supporting your automatic thoughts. Are there times when you have met deadlines successfully?
- Positive Reframing- Focus on the positive aspects. “I’ve handled tight deadlines before. I can break tasks into smaller steps.”
- Broaden Perspective- See the bigger picture. “This is a temporary challenge; it won’t define my entire career.”

- Learn from Experience- Reflect on what you have learned from past deadlines. “I can apply effective strategies.”

By reappraising the situation, you will feel less overwhelmed and better equipped to tackle your tasks.

6. Cognitive restructuring

Our thoughts have a significant impact on our emotions and behaviors. Sometimes, our thoughts can become distorted or irrational, leading to negative emotions and unhealthy behaviors. Cognitive restructuring is a technique that helps individuals identify and challenge these unhelpful thought patterns in order to alleviate emotional distress [24]. Cognitive restructuring is based on the cognitive theory of emotion, which suggests that our emotions are influenced by our thoughts and interpretations of events [24]. According to this theory, changing our thoughts can lead to changes in our emotions and behaviors. Cognitive restructuring techniques involve identifying and challenging cognitive distortions, or irrational thought patterns, in order to replace them with more rational and adaptive ones. By changing the way we think about situations, we can change the way we feel and behave.

There are several strategies for implementing cognitive restructuring in everyday life. One common technique is to identify cognitive distortions, such as black-and-white thinking, catastrophizing, or personalization [24]. Once these distortions are identified, individuals can challenge them by examining the evidence for and against their validity. Another strategy is to generate alternative perspectives or interpretations of a situation [24]. By considering different viewpoints, individuals can broaden their understanding of the situation and reduce the intensity of their emotional response. Research has shown that cognitive restructuring techniques are effective in reducing symptoms of depression and anxiety, as well as improving overall emotional well-being [25]. However, more research is needed to explore the mechanisms underlying these techniques and to identify factors that may influence their effectiveness. Future research could also investigate the long-term outcomes of cognitive restructuring interventions, as well as their potential applications in different populations and settings.

Cognitive restructuring is a valuable technique for managing and alleviating negative emotions. By challenging and changing unhelpful thought patterns, individuals can improve their emotional well-being and enhance their overall quality of life. These techniques have important implications for therapy, as well as for everyday life, and warrant further exploration and research.

6.1 Example

6.1.1 Day-to-day emotional problem

Overgeneralization.

6.1.2 Situation

Overgeneralization occurs when we draw broad conclusions based on limited evidence. For example, if someone experiences rejection in a social situation, they might

think, “I’m always rejected by everyone.” Negative Thought- “I’m unlikable because I got turned down for a date.” Cognitive Distortion- Overgeneralization (assuming one instance applies to all situations).

6.1.3 Solution using cognitive restructuring

- Identify Negative Thought- Recognize the automatic thought (“I’m unlikable”).
- Challenge the Thought- Ask yourself, “Is this thought accurate? Have I been rejected by everyone?” Consider evidence to the contrary.
- Develop Balanced Thoughts- Replace the negative thought with a more balanced one: “I was turned down for a date, but that doesn’t mean I’m unlikable. People have different preferences.”
- Implement and Practice- Remind yourself of the balanced thought whenever you feel rejected.
- By challenging and changing negative thoughts, cognitive restructuring helps regulate emotions, leading to reduced anxiety and depression symptoms.

7. Thought challenging and reality testing

Cognitive Behavioral Therapy (CBT) is widely used to treat various mental health disorders, including depression, anxiety, and psychosis. Central to CBT are techniques designed to alter distorted thinking patterns that contribute to emotional distress and maladaptive behaviors. Thought challenging and reality testing are two such techniques that help individuals question their negative thoughts and compare them to reality. Thought challenging is rooted in the cognitive model, which suggests that our thoughts, feelings, and behaviors are interconnected. Negative automatic thoughts often lead to emotional distress and maladaptive behaviors. Thought challenging involves a three-step process: 1. Identifying Negative Thoughts: Recognizing thoughts that cause distress. 2. Evaluating Evidence: Assessing the evidence supporting and refuting these thoughts. 3. Considering Alternatives: Formulating more balanced and realistic thoughts [26]. Reality testing, a concept originating from Freudian theory, involves distinguishing between internal perceptions and external reality. It is used to determine whether a person’s thoughts are grounded in reality or are influenced by internal biases and distortions. This technique helps individuals verify the accuracy of their thoughts by comparing them to real-world evidence.

Thought challenging and reality testing are applied in various therapeutic settings to help individuals manage their mental health: 1. Clinical Therapy: Therapists guide clients through the process of questioning and verifying their thoughts. 2. Self-Help Strategies: Individuals learn to apply these techniques independently to manage their mental health. For instance, a person with social anxiety might believe, “Everyone will think I’m foolish.” Through thought challenging, they can examine evidence from past social interactions and consider alternative perspectives. Reality testing involves observing social situations to verify if this belief holds true. Research supports the effectiveness of thought challenging and reality testing in reducing symptoms of depression, anxiety, and other mental health conditions. These techniques empower

individuals to develop healthier thinking patterns and behaviors. Studies have shown that individuals who regularly practice thought challenging and reality testing experience significant improvements in their mental health [27]. Future research may explore the integration of these techniques with digital tools, such as apps and online platforms, to enhance accessibility and efficacy. Additionally, investigating their application in diverse cultural contexts could provide insights into their universal applicability. Advancements in technology may also lead to the development of more personalized and adaptive interventions, further increasing the effectiveness of these techniques [28].

Thought challenging and reality testing are vital components of CBT, helping individuals to identify, question, and rectify distorted thoughts. By fostering more balanced and realistic perspectives, these techniques contribute to improved mental health and well-being. Ongoing research and technological advancements hold promise for further enhancing their effectiveness and accessibility. Understanding and applying these methods can significantly enhance therapeutic outcomes and empower individuals to take control of their mental health.

7.1 Example

7.1.1 Day-to-day emotional problem

Feeling Ignored by a Boss.

7.1.2 Situation

“I just said good morning to my boss, and she ignored me. She must be upset with me. Is she going to fire me?!” There are several possible explanations for her lack of response—perhaps she did not notice you, has a lot on her mind, or is simply in a bad mood. There is no reason to assume she will fire you based on this interaction.

7.1.3 Solution using thought challenging and reality testing

- Be Objective.
- Consider different angles- Avoid rushing to judgment and recognize that others have their own thoughts and feelings.
- Pause before reacting- Reflect on how you tend to react—too much or not enough?
- Notice patterns- Identify recurring themes and adjust if necessary.
- Seek Other Perspectives.
- Ask someone else- Consult a friend, family member, or co-worker for their perspective.
- Consider all outcomes- Do not jump to conclusions; explore various meanings.
- Fact-check- Verify your beliefs against reality.

- Pay Attention to Your Reactions.
- Be mindful of your thoughts and feelings.
- Navigate situations better by focusing on what matters.
- Remove yourself from unhelpful situations.
- Reality testing helps you see situations more accurately and react effectively.

8. Metacognitive strategies

Metacognition refers to the awareness and understanding of one's own cognitive processes. Metacognitive strategies are techniques that individuals use to monitor, control, and regulate their thinking in order to achieve specific goals. This chapter explores the theoretical foundations of metacognitive strategies, their practical applications, and their potential benefits for cognitive functioning and academic success. Metacognitive strategies are based on theories of metacognition, which suggest that individuals have the ability to reflect on and regulate their own thinking processes. According to these theories, metacognitive strategies involve both knowledge about one's own cognitive processes (metacognitive knowledge) and the ability to use this knowledge to control and regulate one's thinking (metacognitive control) [29]. Metacognitive strategies can include a range of activities, such as planning, monitoring, evaluating, and adjusting one's cognitive processes [30].

There are several strategies for implementing metacognitive strategies in everyday life and educational settings. One common technique is self-monitoring, which involves paying attention to one's own thinking processes and identifying areas for improvement. Another strategy is planning, which involves setting goals, identifying resources, and developing strategies for achieving those goals. Reflection is another important metacognitive strategy, which involves thinking critically about one's own thinking processes and evaluating the effectiveness of different strategies. Research has shown that metacognitive strategies are effective in improving cognitive functioning and academic performance. However, more research is needed to explore the specific mechanisms underlying these techniques and to identify factors that may influence their effectiveness. Future research could also investigate the role of metacognitive strategies in other domains, such as problem-solving, decision-making, and social cognition.

Metacognitive strategies are valuable tools for enhancing cognitive functioning and facilitating lifelong learning. By developing awareness of one's own thinking processes and using this knowledge to regulate and control one's thinking, individuals can improve their problem-solving abilities, decision-making skills, and academic performance. These strategies have important implications for education, as well as for everyday life, and warrant further exploration and research.

8.1 Example

8.1.1 Day-to-day emotional challenge

Feeling Stuck in Procrastination.

8.1.2 Situation

You often avoid starting tasks, leading to procrastination and stress.

8.1.3 Solution using metacognitive approach

- Step 1: Identify the Procrastination Triggers.
 - Reflect on the specific triggers (e.g., task difficulty, fear of failure) that lead to procrastination.
- Step 2: Break It Down.
 - Divide the task into smaller, manageable steps.
 - Set specific deadlines for each step.
- Step 3: Monitor Your Thoughts.
 - Pay attention to your self-talk. Are you telling yourself you will do it later?
 - Challenge this thought by asking: “Is this helpful? What’s the worst that can happen?”
- Step 4: Regulate Emotions.
 - Acknowledge the discomfort but commit to taking the first step.
 - Use positive self-talk: “I can start now. Progress matters.”
- Step 5: Adjust Strategies.
 - Regularly evaluate your progress and adjust your approach as needed.

Metacognition empowers you to overcome procrastination and achieve your goals!

9. Rumination and worry

Rumination and worry are common cognitive processes that involve dwelling on negative thoughts and feelings. While it is natural to reflect on past events or plan for the future, excessive rumination and worry can become problematic, leading to increased distress and impaired functioning. Rumination and worry are often rooted in the cognitive theory of emotion, which suggests that our emotions are influenced by our thoughts and interpretations of events. According to this theory, rumination involves repetitive and passive thinking about past failures, mistakes, or negative experiences, while worry involves repetitive and anxious thinking about future uncertainties or potential threats. These cognitive processes can become habitual and automatic, leading to increased emotional distress and difficulty in disengaging from negative thoughts.

Research has consistently shown that rumination and worry are associated with increased symptoms of depression, anxiety, and other mood disorders [31]. Individuals who engage in high levels of rumination or worry are more likely to experience persistent negative emotions, impaired problem-solving abilities, and reduced overall well-being. Additionally, rumination and worry have been linked to difficulties in interpersonal relationships, as individuals may become preoccupied with their own thoughts and less responsive to the needs of others. While rumination and worry can be difficult to overcome, there are several strategies that individuals can use to manage and reduce their impact. Cognitive behavioral therapy (CBT) has been shown to be effective in helping individuals identify and challenge negative thought patterns associated with rumination and worry [32]. Additionally, mindfulness-based interventions, such as mindfulness meditation and acceptance and commitment therapy (ACT), can help individuals develop greater awareness of their thoughts and emotions and cultivate a more accepting and non-judgmental attitude toward them.

Rumination and worry are common cognitive processes that can have significant implications for emotional well-being and mental health. By understanding the cognitive mechanisms underlying rumination and worry and implementing strategies to manage and reduce their impact, individuals can improve their overall emotional functioning and quality of life.

9.1 Example

9.1.1 Day-to-day emotional problem

Overthinking a Text Message.

9.1.2 Situation

Imagine receiving a text message from a friend expressing an opinion, but the rest of the conversation goes silent. You might start ruminating, wondering if your friends disagree with you, are upset with you, or if they have become preoccupied with something else. This ambiguous situation can trigger a cycle of repetitive negative thoughts and worries.

9.1.3 Solution using the breaking the cycle of rumination

Here are some strategies to break the cycle of rumination:

- **Awareness** - Pay attention to when rumination occurs. Notice when you find yourself dwelling on the same thoughts repeatedly. Identify triggers, such as specific situations, emotions, or thought patterns.
- **Set Boundaries**- Designate specific worry time (e.g., 10–15 minutes each day) to contain your concerns. Outside of this time, redirect your attention to the present moment and engage in activities that bring you joy.
- **Challenge Irrational Beliefs**- Use cognitive behavioral techniques to challenge irrational beliefs and cognitive distortions. Recognize when you are catastrophizing or assuming the worst.

- **Mindfulness-** Practice mindfulness to stay in the present moment without judgment. Mindfulness helps you detach from repetitive negative thoughts.

Rumination is often compared to a “mental treadmill” because it involves repeatedly going over the same thoughts without making progress toward resolving them. Like being stuck on a treadmill, ruminating can feel exhausting and unproductive. However, with practice and specific strategies, you can learn to step off this mental cycle and refocus on the present.

10. Self-compassion and positive affirmations

Self-compassion is based on the idea of treating oneself with the same kindness, care, and understanding that one would offer to a good friend [33]. It consists of three main components: self-kindness, common humanity, and mindfulness. Self-kindness involves being gentle and understanding toward oneself, especially in times of failure or difficulty. Common humanity involves recognizing that suffering and imperfection are part of the human experience and that we are not alone in our struggles. Mindfulness involves being present and aware of our thoughts, feelings, and experiences without judgment or criticism. There are several strategies for cultivating self-compassion in everyday life. One common technique is to practice self-kindness by speaking to oneself in a supportive and nurturing way, especially when facing challenges or setbacks. Another strategy is to remind oneself of our shared humanity by recognizing that everyone experiences suffering and imperfection. Additionally, practicing mindfulness can help us become more aware of our thoughts and feelings and cultivate a non-judgmental attitude toward ourselves.

Positive affirmations involve the practice of repeating positive statements or affirmations about oneself in order to promote self-esteem, self-confidence, and optimism [34]. For example, saying “I am worthy of love and belonging” or “I believe in my abilities and strengths” can help challenge negative self-talk and reinforce positive beliefs about oneself. Research has shown that self-compassion and positive affirmations are associated with various benefits for mental health, including reduced levels of anxiety, depression, and stress, as well as increased levels of well-being and resilience [34, 35]. However, more research is needed to explore the specific mechanisms underlying these techniques and to identify factors that may influence their effectiveness. Future research could also investigate the long-term effects of practicing self-compassion and positive affirmations, as well as their potential applications in different populations and settings.

Self-compassion and positive affirmations are powerful psychological practices that can help us develop a more positive self-image, enhance our emotional well-being, and build resilience in the face of adversity. By cultivating self-compassion and using positive affirmations, we can learn to treat ourselves with kindness, acceptance, and positivity, leading to a happier and more fulfilling life.

10.1 Example

10.1.1 Day-to-day emotional problem

Feeling Overwhelmed by Work Pressure.

10.1.2 Situation

Imagine you are juggling multiple tasks at work, deadlines are looming, and stress is mounting. You feel overwhelmed, anxious, and inadequate.

10.1.3 Solution using self-compassion and positive affirmations

- **Self-Kindness-** Instead of berating yourself for not being perfect or meeting all expectations, practice self-kindness. Remind yourself that it is okay to feel overwhelmed; everyone does at times. Say to yourself, “I’m doing my best, and that’s enough.”
- **Common Humanity-** Recognize that feeling overwhelmed is part of the human experience. You are not alone in this struggle. Others face similar challenges. Say, “I’m not the only one feeling this way.”
- **Mindfulness-** Be present with your emotions. Acknowledge the stress without judgment. Breathe deeply and say, “This moment is tough, but I can handle it.”
- **Positive Affirmations-** Repeat affirmations like: “I am capable and resilient.” “I can handle challenges.” “I deserve kindness and understanding.” “I am enough as I am.”

Self-Compassion and Positive Affirmations help you manage emotions effectively and promote emotional stability.

11. Cognitive fusion and defusion

Our thoughts have a powerful influence on our emotions and behaviors. Sometimes, we become so entangled with our thoughts that they begin to control us, leading to increased psychological distress and impaired functioning. Cognitive fusion and defusion are psychological concepts that describe the relationship between individuals and their thoughts. Cognitive fusion refers to the process of becoming entangled with our thoughts, such that we perceive them as true and accurate reflections of reality. When we are fused with our thoughts, we may experience them as overwhelming and uncontrollable, leading to increased anxiety, depression, and other forms of psychological distress. In contrast, cognitive defusion involves creating distance and flexibility from our thoughts, such that we can observe them without becoming entangled or overwhelmed by them.

There are several techniques for promoting cognitive defusion and reducing cognitive fusion in everyday life. One common technique is mindfulness, which involves paying attention to our thoughts, feelings, and sensations in the present moment without judgment or attachment. By practicing mindfulness, individuals can develop greater awareness of their thoughts and create space between themselves and their thoughts, allowing for greater flexibility and emotional resilience. Acceptance-based strategies, such as acceptance and commitment therapy (ACT), also promote cognitive defusion by encouraging individuals to accept their thoughts and feelings without trying to control or change them. By accepting our thoughts and feelings, we can reduce their power over us and engage more fully in the present moment. Research has shown that cognitive

defusion techniques, such as mindfulness and acceptance-based strategies, are effective in reducing symptoms of anxiety, depression, and other forms of psychological distress [36]. However, more research is needed to explore the specific mechanisms underlying these techniques and to identify factors that may influence their effectiveness. Future research could also investigate the long-term effects of practicing cognitive defusion, as well as its potential applications in different populations and settings.

Cognitive fusion and defusion are important concepts for understanding the relationship between individuals and their thoughts. By promoting cognitive defusion and reducing cognitive fusion, individuals can develop greater cognitive flexibility, emotional resilience, and psychological well-being. These techniques have important implications for therapy, as well as for everyday life, and warrant further exploration and research.

11.1 Example

11.1.1 Day-to-day emotional problem

Negative Self-Talk (Depression).

11.1.2 Situation

You make a mistake at work, and your inner critic says, “I’m useless,” “I always mess up,” or “I’ll never succeed.” Emotional Reaction- You feel defeated, hopeless, and worthless. Cognitive Fusion- You believe these self-critical thoughts are absolute truths.

11.1.3 Solution with cognitive defusion

- Step 1: Observe the Thoughts- Recognize them without getting entangled.
- Step 2- Label the Thoughts: Say, “I’m having the thought that I’m useless.”
- Step 3- Metaphor Technique: Imagine these thoughts as leaves floating down a stream. Let them pass.
- You can accept the thoughts without letting them define your worth.

Cognitive defusion helps you detach from thoughts, making emotional regulation more manageable.

12. Cognitive bias modification (CBM)

Our minds are prone to various cognitive biases, which can distort our perceptions of reality and contribute to negative emotions and behaviors. Cognitive Bias Modification (CBM) is a psychological technique aimed at identifying and modifying these biases to promote emotional well-being and mental health. CBM is based on the idea that cognitive biases, such as attentional bias, interpretation bias, and memory bias, play a significant role in the development and maintenance of psychological disorders [37]. For example, individuals with depression may have a tendency to selectively attend to negative information and interpret ambiguous stimuli in a negative way, which can perpetuate feelings of sadness and hopelessness. CBM techniques aim

to modify these biases by training individuals to attend to, interpret, and remember information in a more adaptive and balanced way.

There are several CBM techniques that have been developed to target specific cognitive biases. Attention training tasks involve repeatedly directing attention toward positive or neutral stimuli while ignoring negative stimuli [38]. Interpretation training tasks involve modifying individuals' interpretations of ambiguous stimuli to promote more positive and adaptive interpretations [39]. Memory training tasks involve training individuals to recall positive or neutral memories more readily than negative memories [40]. Research has shown that CBM techniques can be effective in reducing cognitive biases and improving emotional outcomes in various populations [41]. However, more research is needed to explore the specific mechanisms underlying these techniques and to identify factors that may influence their effectiveness. Future research could also investigate the long-term effects of CBM interventions, as well as their potential applications in different populations and settings.

Cognitive Bias Modification is a promising psychological technique for promoting emotional well-being and mental health by targeting and modifying cognitive biases. By training individuals to attend to, interpret, and remember information in a more balanced and adaptive way, CBM techniques can help reduce negative emotions and improve psychological resilience. These techniques have important implications for therapy, as well as for everyday life, and warrant further exploration and research.

12.1 Example

12.1.1 Day-to-day emotional problem

“Negative Interpretation Bias”.

12.1.2 Situation

Consider someone who habitually interprets ambiguous social cues as negative. For instance, they might perceive a friend's delayed response to a text message as a sign of rejection or disinterest. This cognitive bias can lead to unnecessary distress and strained relationships.

12.1.3 Solution using CBM

To address this, we can apply Cognitive Bias Modification for Interpretation (CBM-I):

- **Training Task-** The individual repeatedly practices interpreting ambiguous scenarios (e.g., social cues, messages) in a positive or neutral light. For instance, they learn to interpret the delayed response as due to a busy schedule rather than personal rejection.
- **Computer-Based Practice-** CBM-I involves short computer sessions where the person responds to scenarios, reinforcing positive interpretations. Correct responses are highlighted, encouraging healthier thinking patterns.
- **Automatic Change-** Over time, this practice helps modify biased interpretation patterns, reducing the tendency to jump to negative conclusions.

CBM interventions are accessible, scalable, and can complement traditional therapies.

13. Acceptance-based strategies

In our daily lives, we often encounter challenging thoughts, emotions, and situations. Acceptance-based strategies offer a way to cope with these difficulties by encouraging us to accept our experiences rather than struggling against them. Acceptance-based strategies are psychological techniques that encourage individuals to accept their thoughts, feelings, and experiences without judgment or resistance. Acceptance-based strategies are rooted in the principles of mindfulness and acceptance, which emphasize non-judgmental awareness of our thoughts, feelings, and experiences [42]. According to this approach, attempting to control or suppress our thoughts and emotions can actually exacerbate psychological distress. Instead, acceptance-based strategies encourage individuals to accept their experiences as they are, without trying to change or avoid them.

There are several acceptance-based approaches that have been developed to help individuals cope with difficult thoughts and emotions. Acceptance and Commitment Therapy (ACT) is one such approach that combines acceptance and mindfulness techniques with commitment and behavior change strategies [43]. Mindfulness-based interventions, such as mindfulness meditation and Mindfulness-Based Stress Reduction (MBSR), also promote acceptance and non-judgmental awareness of our experiences [44]. Research has shown that acceptance-based strategies can be effective in reducing symptoms of anxiety, depression, and other forms of psychological distress [42]. These techniques have been associated with improvements in psychological flexibility, emotional regulation, and overall well-being. However, more research is needed to explore the specific mechanisms underlying these strategies and to identify factors that may influence their effectiveness. Future research could also investigate the long-term effects of practicing acceptance-based strategies, as well as their potential applications in different populations and settings.

Acceptance-based strategies offer valuable tools for coping with difficult thoughts and emotions and promoting psychological well-being. By learning to accept our experiences without judgment or resistance, we can cultivate greater emotional resilience, flexibility, and overall well-being. These techniques have important implications for therapy, as well as for everyday life, and warrant further exploration and research.

13.1 Example

13.1.1 Emotional problem

Persistent Pain Agony.

13.1.2 Situation

Imagine you are dealing with chronic pain due to a medical condition. The pain is persistent, affecting your daily life and mood.

13.1.3 Acceptance-based solution

- Instead of resisting the pain or feeling frustrated, practice acceptance.
- Acknowledge that pain is a part of your reality right now.

- Allow yourself to feel it without judgment.
- Remind yourself that it is okay to experience discomfort, and by accepting it, you can focus on managing it effectively.
- Consider mindfulness techniques or pain management strategies to cope better.

Acceptance does not mean you are giving up; it means you are allowing yourself to adapt and find ways to live well despite the challenges.

14. Conclusion

Effective emotion regulation is crucial in clinical settings to enhance mental health outcomes and improve patients' quality of life. In conclusion, cognitive strategies for emotion regulation offer practical tools for managing and modulating our emotional experiences. By applying these strategies in everyday life, individuals can enhance their emotional regulation skills and improve their overall well-being. By understanding the theoretical frameworks and practical applications of these strategies, individuals can develop greater emotional regulation skills and improve their overall well-being. By integrating these strategies into clinical practice, healthcare providers can offer comprehensive support to individuals struggling with emotional dysregulation.

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References

- [1] Verzeletti C, Zammuner VL, Galli C, Agnoli S, Duregger C. Emotion regulation strategies and psychosocial well-being in adolescence. *Cogent Psychology*. 2016;**3**(1):15. DOI: 10.1080/23311908.2016.1199294
- [2] Gross JJ. The emerging field of emotion regulation: An integrative review. *Review of General Psychology*. 1998;**2**(3):271-299. DOI: 10.1037/1089-2680.2.3.271
- [3] Gross JJ. Emotion regulation: Current status and future prospects. *Psychological Inquiry*. 2015;**26**(1):1-26
- [4] Gross JJ. *Handbook of Emotion Regulation*. 2nd ed. New York: The Guilford Press; 2014
- [5] Gross JJ, Sheppes G, Urry HL. Emotion generation and emotion regulation: A distinction we should make (carefully). *Cognition and Emotion*. 2011;**25**:765-781. DOI: 10.1080/02699931.2011.555753
- [6] Thompson RA. Emotion and self-regulation. In: *Socioemotional Development: Nebraska Symposium on Motivation*. Vol. 36. Lincoln: University of Nebraska Press; 1990. pp. 367-467
- [7] Ellsworth PC, Scherer KR. Appraisal processes in emotion. In: Davidson RJ, Scherer KR, Goldsmith HH, editors. *Handbook of Affective Sciences*. New York: Oxford University Press; 2003
- [8] Stanley JT, Villalba A. Age and emotion. In: *Encyclopedia of Mental Health*. 3rd edition. Elsevier; 2023. Hardback ISBN: 9780323914970; eBook ISBN: 9780323914987
- [9] Gross JJ, Barrett LF. Emotion generation and emotion regulation: One or two depends on your point of view. *Emotion Review*. 2011;**3**(1):8-16. DOI: 10.1177/1754073910380974
- [10] Koch SBJ, Mars RB, Toni I, Roelofs K. Emotional control, reappraised. *Neuroscience Biobehavioral Reviews*. 2018;**95**:528-534
- [11] Peña-Sarrionandia A, Mikolajczak M, Gross JJ. Integrating emotion regulation and emotional intelligence traditions: A meta-analysis. *Frontiers in Psychology*. 2015;**24**(6):160. DOI: 10.3389/fpsyg.2015.00160. Erratum in: *Frontiers in Psychology*. 2019;**27**(10)2610. DOI: 10.3389/fpsyg.2019.02610
- [12] Xiao H, Double KS, Walker SA, Kunst H, MacCann C. Emotionally intelligent people use more high-engagement and less low-engagement processes to regulate others. *Emotions Journal of Intelligence*. 2022;**10**(4):76. DOI: 10.3390/jintelligence10040076
- [13] Nozaki Y, Mikolajczak M. Extrinsic emotion regulation. *Emotion*. 2020;**20**(1):10-15. DOI: 10.1037/emo0000636
- [14] Gross JJ. The extended process model of emotion regulation: Elaborations, applications, and future directions. *Psychological Inquiry*. 2015;**26**(1):130-137
- [15] Martin RE, Ochsner KN. The neuroscience of emotion regulation development: Implications for education. *Current Opinion in Behavioral Sciences*. 2016;**10**:142-148. DOI: 10.1016/j.cobeha.2016.06.006
- [16] Tanrıverdi C. *Emotion Regulation*. Available from: <https://www.linkedin.com/pulse/emotion-regulation-%C3%A7a%C4%9Fla-tanr%C4%B1verdi-txcaf/>

- [17] Waugh CE, Zarolia P, Mauss IB, Lumian DS, Ford BQ, Davis TS, et al. Emotion regulation changes the duration of the BOLD response to emotional stimuli. *Social Cognitive and Affective Neuroscience*. 2016;**11**(10):1550-1559. DOI: 10.1093/scan/nsw067. Epub 2016 May 19
- [18] Paz AW. Emotion regulation and goal-directedness teorema. *Revista Internacional de Filosofia*. 2018;**37**(2):75-92
- [19] Gross JJ. Emotion Regulation: Affective, Cognitive, and Social Consequences Psychophysiology. Vol. 39. UK: Cambridge University Press; 2002. pp. 281-291. DOI: 10.1017/S0048577201393198
- [20] Lazarus RS. Emotion and Adaptation. New York, NY: Oxford University Press; 1991
- [21] Troy AS, Wilhelm FH, Shallcross AJ, Mauss IB. Seeing the silver lining: Cognitive reappraisal ability moderates the relationship between stress and depressive symptoms. *Emotion*. 2010;**10**(6):783-795
- [22] Kross E, Ayduk O. Facilitating adaptive emotional analysis: Distinguishing distanced-analysis of depressive experiences from immersed-analysis and distraction. *Personality and Social Psychology Bulletin*. 2008;**34**(7):924-938
- [23] Gross JJ, John OP. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*. 2003;**85**(2):348-362
- [24] Beck AT. Cognitive Therapy and the Emotional Disorders. New York, NY: Penguin; 1979
- [25] Beck AT, Rush AJ, Shaw BF, Emery G. Cognitive Therapy of Depression. New York, NY: Guilford Press; 1979
- [26] Longmore RJ, Worrell M. Do we need to challenge thoughts in cognitive behavior therapy? *Clinical Psychology Review*. 2007;**27**(2):173-187. DOI: 10.1016/j.cpr.2006.08.0015
- [27] Narayan AJ, Allen TA, Cullen KR, Klimes-Dougan B. Disturbances in reality testing as markers of risk in offspring of parents with bipolar disorder: A systematic review from a developmental psychopathology perspective. *Bipolar Disorders*. 2013;**15**(7):723-740. DOI: 10.1111/bdi.12115. Epub 2013 Sep 6
- [28] Sorter MT, Vogel DA. Chapter 37 - Psychotic Disorders Adolescent Medicine. Philadelphia, PA: Elsevier Inc; 2008. pp. 291-296
- [29] Flavell JH. Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*. 1979;**34**(10):906-911
- [30] Schraw G, Dennison RS. Assessing metacognitive awareness. *Contemporary Educational Psychology*. 1994;**19**(4):460-475
- [31] Nolen-Hoeksema S. The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*. 2000;**109**(3):504-511
- [32] Hirsch CR, Hayes S, Mathews A. Looking on the bright side: Accessing benign meanings reduces worry. *Journal of Abnormal Psychology*. 2011;**120**(1):210-216
- [33] Neff KD. Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*. 2003;**2**(2):85-101

- [34] Wood JV, Perunovic WQE, Lee JW. Positive self-statements: Power for some, peril for others. *Psychological Science*. 2009;**20**(7):860-866
- [35] Neff KD, Germer CK. A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology*. 2013;**69**(1):28-44
- [36] Hayes SC, Strosahl KD, Wilson KG. *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change*. New York, NY: Guilford Press; 2006
- [37] Mathews A, Mackintosh B. Induced emotional interpretation bias and anxiety. *Journal of Abnormal Psychology*. 2000;**109**(4):602-615
- [38] MacLeod C, Mathews A, Tata P. Attentional bias in emotional disorders. *Journal of Abnormal Psychology*. 1986;**95**(1):15-20
- [39] Hirsch CR, Mathews A, Clark DM. Inducing an interpretation bias changes self-imagery: A preliminary investigation. *Behaviour Research and Therapy*. 2006;**44**(11):1531-1539
- [40] Holmes EA, Lang TJ, Shah DM. Developing interpretation bias modification as a 'cognitive vaccine' for depressed mood: Imagining positive events makes you feel better than thinking about them verbally. *Journal of Abnormal Psychology*. 2009;**118**(1):76-88
- [41] Mogg K, Bradley BP. Attentional bias in generalized anxiety disorder versus depressive disorder. *Cognitive Therapy and Research*. 2005;**29**(1):29-45
- [42] Hayes SC, Strosahl KD, Wilson KG. *Acceptance and Commitment Therapy: The Process and Practice of Mindful Change*. New York, NY: Guilford Press; 2011
- [43] Hayes SC, Strosahl KD, Wilson KG. *Acceptance and Commitment Therapy: An Experiential Approach to Behavior Change*. New York, NY: Guilford Press; 1999
- [44] Kabat-Zinn J. Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*. 2003;**10**(2):144-156

Chapter 6

Emotion Regulation across the Lifespan: Adapting Interventions for Children, Adults, and Older Adults

Anteneh T. Asmamaw

Abstract

Emotional regulation not only contributes to developmental change, but is itself a developmental process. Emotion regulation strategies, application, and effectiveness also vary across age groups. Interventions to improve emotion regulation must be tailored to the unique needs of children, adults, and older adults. Therefore, understanding its life cycle development is of utmost importance. However, to date, developmental studies have largely focused on specific life stages, and research across different age groups speaks little. This chapter aims to synthesize the available evidence from lifespan perspective moving from childhood through adolescence to adulthood and old age. It reviews key findings on how individuals at different developmental stages have specific needs and limitations related to emotion regulation, and how clinicians might use evidence-based therapy approaches to effectively address these diverse age groups. In childhood, emotion regulation skills are just emerging, and interventions should focus on building foundational abilities such as recognizing emotions and using simple strategies. For adults, interventions can target more complex regulation skills to manage intense emotions and maladaptive patterns. Older adulthood brings changes in cognition, physical health, and social context that require adapting emotion regulation approaches. By aligning interventions with age-related emotional and cognitive changes, clinical therapists can help individuals to adaptively manage their feelings across all stages of life.

Keywords: emotion regulation, lifespan development, intervention adaptation, age-specific needs, therapeutic modalities

1. Introduction

Emotion regulation is a fundamental human capacity that allows us to navigate the ups and downs of daily life. The ability to recognize, understand, and adaptively manage our emotions is critical for mental health, well-being, and successful functioning across all stages of the lifespan [1]. However, many individuals struggle with emotion dysregulation, which can lead to a host of personal and interpersonal problems. Emotion regulation difficulties are a core feature of many psychological disorders,

including anxiety, depression, and substance abuse [2]. As such, there is growing interest in developing and refining emotion regulation interventions to promote healthy emotional functioning across different developmental stages.

Fortunately, there is a growing body of research demonstrating the efficacy of interventions designed to enhance emotion regulation skills. However, these programs must be tailored to the unique developmental needs and challenges faced by different age groups. Children are just beginning to develop emotion regulation capacities and require foundational skill training. Adults may need to address more complex patterns of emotional reactivity and maladaptive coping. Older adults encounter age-related changes in cognitive, physical, and social domains that necessitate adapted approaches.

This timely chapter provides a comprehensive review of emotion regulation interventions customized for children, adults, and older adults. The author systematically analyzes the evidence supporting various therapeutic approaches, such as cognitive-behavioral therapy, mindfulness-based practices, and social-emotional learning curricula. By aligning these interventions with the developmental trajectory of emotion regulation, we can empower individuals to better manage their feelings and improve their overall health and well-being. The insights gleaned from this chapter will be invaluable for clinicians, educators, and researchers seeking to design and implement effective emotion regulation programs. It is an essential read for anyone invested in cultivating the emotional competence necessary for thriving across the lifespan.

1.1 Definition and importance of emotion regulation

Emotion regulation refers to the ability to comprehend and manage one's emotional experiences and expressions [1]. This broad conceptualization encompasses various strategies that individuals employ to control their emotional experiences and responses, including attentional deployment, cognitive reappraisal, and response modulation [3]. Effective emotion regulation is critical for adaptive functioning across the lifespan. At the most basic level, the ability to flexibly and appropriately regulate emotions allows individuals to maintain emotional balance, avoid dysregulated emotional states, and engage productively with their environment [4]. From a developmental perspective, the acquisition of emotion regulation skills in childhood lays the foundation for a variety of positive outcomes, including the following:

- **Social competence:** Children who can recognize, understand, and manage their emotions tend to have stronger social skills and form higher-quality relationships with peers and adults [5].
- **Academic achievement:** Emotion regulation capacities are linked to enhanced focus, persistence, and learning in academic settings [6].
- **Psychological well-being:** Difficulties with emotion regulation have been implicated in the development of internalizing and externalizing psychopathology, including anxiety, depression, and conduct problems [4].
- **Physical health:** Effective emotion regulation skills can promote healthier physiological functioning and reduce the risk of stress-related physical ailments [7].

In sum, the ability to skillfully regulate one's emotions is a crucial developmental milestone that supports adaptive functioning across multiple domains.

Understanding the processes and mechanisms underlying emotion regulation, as well as identifying risk factors for emotion dysregulation, is an important area of research with significant clinical and applied implications.

1.2 Developmental trajectory of emotion regulation skills

The development of effective emotion regulation skills is a gradual process that unfolds over the course of childhood and adolescence. Factors such as neurocognitive maturation, socialization experiences, and environmental influences shape the emergence and refinement of these capacities over time. Researchers have identified several key milestones in the ontogeny of emotion regulation abilities [1–4].

1.2.1 Infancy and early childhood

In the first years of life, infants rely primarily on external sources of emotion regulation, such as caregiver soothing and distraction [8]. Through responsive and sensitive caregiving, infants begin to internalize simple self-regulation strategies, such as sucking, grasping, and self-comforting behaviors. By the end of the second year, toddlers demonstrate more advanced emotion regulation skills, including the ability to modulate their emotional expression and use rudimentary cognitive strategies, such as shifting attention [3].

1.2.2 Preschool and early elementary school

As children transition to the preschool and early elementary school years, their emotion regulation capacities become increasingly sophisticated. They develop a greater understanding of emotions, can label their own and others' affective states, and start to use more complex cognitive strategies, such as reappraisal and problem-solving, to manage their emotions. Parental scaffolding and modeling of emotion regulation continue to play a crucial role during this period [5].

1.2.3 Middle childhood and adolescence

Throughout middle childhood and adolescence, emotion regulation becomes more internalized and flexible. Children gradually acquire the meta-cognitive skills to monitor, evaluate, and modify their emotional experiences independently [3]. They also begin to utilize a wider array of regulatory strategies, including cognitive reappraisal, distraction, and response modulation [7]. Peer relationships and social-cognitive processing also become increasingly important for emotion regulation during this developmental stage [9, 10]. Despite this general trajectory, the development of emotion regulation varies significantly among individuals. Factors such as temperament, parenting styles, and exposure to adversity can influence and shape the development and consolidation of emotion regulation skills [4]. Understanding developmental pathways and early risk factors is crucial for effective interventions.

2. Methodology

This chapter reviews the empirical literature on emotion regulation interventions tailored for children, adults, and older adults. A comprehensive search was conducted

on PsycINFO, MEDLINE, SCOPUS, and CINAHL databases to locate peer-reviewed articles relevant to the topic under investigation. The search term encompassed “emotion regulation,” “intervention,” and various variations of “child,” “adult,” and “older adult.” Studies were included if they satisfy the following criteria: (1) evaluated an intervention program designed to improve emotion regulation skills, (2) focused on a specific age group (children, adults, or older adults), and (3) reported quantitative outcomes related to emotion regulation or associated factors (e.g., well-being, psychopathology). Articles were excluded if they did not use an experimental or quasi-experimental design, or not published in English.

The initial search yielded 614 articles. After screening titles, abstracts, and full-texts, 74 studies were selected for inclusion in the review. Data was extracted based on study characteristics (e.g., sample size, age range), intervention components, outcome measures, and key findings. Given the heterogeneity of interventions and outcome assessments, the narrative synthesis approach was employed to summarize and compare evidence across various lifespan age groups. The methodological quality of included studies was assessed using the Effective Public Health Practice Project (EPHPP) quality assessment tool. This tool evaluates studies on six domains: selection bias, study design, confounders, blinding, data collection methods, and withdrawals/dropouts. Each domain is rated as strong, moderate, or weak, and an overall global rating is assigned. By systematically reviewing the empirical literature, this chapter aims to provide an in-depth understanding of how emotion regulation interventions can be tailored for different developmental stages to maximize their effectiveness.

3. Emotion regulation in childhood

3.1 Rationale for targeting emotion regulation in childhood

Childhood represents a critical period for cultivating emotion regulation skills. By intervening during this developmental window, we can provide children with the necessary tools to navigate the emotional challenges they will face throughout their lives. Emotion regulation skills begin to emerge in early childhood, as young children develop the ability to identify, express, and modulate their emotional experiences [8]. This development is shaped by a variety of factors, including temperament, parenting practices, and the emergence of cognitive control abilities [5]. Effective emotion regulation in childhood is associated with a host of positive outcomes, including better social competence, academic achievement, and mental health [7]. Conversely, emotion regulation difficulties in childhood have been linked to the development of internalizing and externalizing disorders [11].

Emotion regulation interventions for children typically focus on building awareness of emotions, teaching adaptive emotion regulation strategies (e.g., deep breathing, cognitive reappraisal), and fostering supportive parent-child relationships [12]. These interventions have demonstrated efficacy in improving emotion regulation skills and reducing emotional and behavioral problems in youth [13]. During early childhood, caregivers play a crucial role in socializing emotion regulation strategies for their children [7]. Through modeling, scaffolding, and contingent responding, parents teach young children how to attend to, understand, and modulate their emotional experiences. Parents who provide sensitive and responsive care to their children tend to foster a greater range of adaptive emotion regulation skills, including cognitive reappraisal and problem-solving [5, 10].

As children transition to middle childhood and adolescence, they gradually internalize these emotion regulation strategies and become more independent in managing their own affective states. However, some children struggle to develop effective emotion regulation abilities, often due to factors such as temperamental vulnerabilities, exposure to trauma or adversity, or deficits in social-cognitive processing [3, 14]. Difficulties with emotion regulation in childhood have been linked to a variety of maladaptive outcomes, including externalizing behavior problems, internalizing psychopathology, and poor social competence [7, 13]. Therefore, understanding the developmental trajectory of emotion regulation and identifying early risk factors is crucial for designing targeted interventions to support children's emotional well-being and healthy psychosocial adjustment.

3.2 Review of intervention programs for children

Developing and implementing effective intervention programs for children is a crucial endeavor in promoting positive developmental trajectories and addressing various forms of childhood psychopathology. Over the past several decades, a wide range of intervention programs have been designed and evaluated, targeting diverse domains of child functioning. This section provides an overview of some of the key intervention programs for children, highlighting their core components, target outcomes, and empirical support.

3.2.1 Social-emotional learning (SEL) programs

Comprehensive school-based programs that integrate social-emotional learning (SEL) components have demonstrated efficacy in enhancing children's emotion regulation capacities. These curricula often incorporate interactive lessons, modeling, and opportunities for practice. Social-emotional learning (SEL) programs aim to foster the development of core competencies, such as self-awareness, social awareness, self-management, relationship skills, and responsible decision-making [14]. Examples of well-established SEL programs include Promoting Alternative Thinking Strategies (PATHS), Recognizing, Understanding, Labeling, Expressing, and Regulating Emotions (RULER), and the Collaborative for Academic, Social, and Emotional Learning (CASEL) approaches. These programs have demonstrated positive impacts on children's social-emotional skills, behavior, and academic achievement [15, 16].

3.2.2 Cognitive-behavioral therapy (CBT) interventions

Cognitive-behavioral therapy (CBT) specifically tailored for children and their families can help to effectively address emotion regulation difficulties. These interventions target maladaptive behaviors, thought patterns, and emotional responses, and family dynamics that contribute to emotion dysregulation. This helps children in developing more adaptive coping strategies [1, 3]. CBT-based programs such as Coping Cat and CBIT effectively reduce anxiety, depression, and other mental health issues in children and adolescents [11, 17].

3.2.3 Parent-focused interventions

Parent-focused interventions recognize the critical role of the family environment in shaping child development and adjustment. These programs, such as the Incredible

Years and Triple P (Positive Parenting Program), aim to enhance parenting skills, improve parent-child interactions, and promote effective discipline strategies [18, 19]. Such interventions have demonstrated positive impacts on child behavioral problems, emotion regulation, and overall family functioning.

3.2.4 Mindfulness-based interventions

Mindfulness-based and acceptance-focused programs have shown promise in improving emotion regulation skills in children. These approaches cultivate present-moment awareness, acceptance of emotional experiences, and adaptive coping strategies. Mindfulness-based interventions for children, such as Mindfulness-Based Stress Reduction (MBSR) and Mindful Schools, teach children and adolescents strategies for present-moment awareness, acceptance, and emotion regulation [20]. These programs have been associated with improvements in attention, emotional well-being, and stress management among youth [21].

3.2.5 Multi-tiered system of supports (MTSS)

The Multi-Tiered System of Supports (MTSS) framework integrates universal, targeted, and intensive interventions to address the diverse needs of all children within a school setting [22]. MTSS programs, such as Positive Behavioral Interventions and Supports (PBIS), combine school-wide behavioral expectations, targeted group interventions, and individualized supports to promote positive school climate and student outcomes. Overall, these intervention programs, among others, have demonstrated the potential to foster positive developmental outcomes, address various forms of childhood psychopathology, and support the well-being of children and their families. Ongoing research and evaluation are crucial to refining and expanding the evidence base for effective intervention approaches.

3.3 Tailoring interventions to the developmental needs of children

Effective intervention programs for children must be tailored to their unique developmental needs, taking into account the cognitive, social, emotional, and physical changes that occur across childhood and adolescence. Failing to consider developmental factors can limit the impact and effectiveness of interventions. This discussion explores key principles for tailoring interventions to the developmental needs of children.

3.3.1 Cognitive development

Interventions should be designed with an understanding of children's cognitive developmental trajectories. For example, younger children may benefit from more concrete, hands-on learning activities, while older children may be better equipped for abstract reasoning and problem-solving approaches [23]. Interventions should also align with children's attention spans, memory capacities, and language skills at different ages [24].

3.3.2 Social-emotional development

Interventions should address the evolving social and emotional needs of children. Younger children may require more support in developing foundational social skills

and emotion regulation, while older children and adolescents may benefit from interventions that target peer relationships, identity formation, and coping with complex emotions [16, 25]. Interventions should also consider the influence of family, school, and community contexts on children's social-emotional development.

3.3.3 Physical development

Physical development, including motor skills, puberty, and overall health, can impact children's engagement and responsiveness to interventions. Interventions should be tailored to account for children's physical capabilities, energy levels, and any special physical needs or limitations [26]. This may involve modifying the physical demands of an intervention or integrating physical activity in a developmentally appropriate manner.

3.3.4 Individual differences

Alongside general developmental trajectories, interventions should also consider individual differences among children, such as temperament, learning styles, and any special needs or disabilities [27]. Individualizing interventions to match the unique characteristics of each child can enhance engagement, motivation, and the likelihood of positive outcomes.

3.3.5 Developmental timing

The timing of interventions is crucial, as certain developmental periods may be more sensitive or receptive to specific types of interventions. For example, early childhood may be an optimal time for interventions targeting social-emotional skills, while adolescence may be a critical period for interventions addressing identity formation and self-regulation [28].

3.3.6 Developmental transitions

Interventions should also address the challenges and opportunities associated with major developmental transitions, such as the transition to elementary school, middle school, or high school. These transitions can disrupt existing routines and coping mechanisms, necessitating tailored support to help children navigate these changes successfully [29]. By tailoring interventions to the specific developmental needs of children, researchers and practitioners can maximize the effectiveness and impact of these programs, ultimately supporting the healthy growth and well-being of children across diverse domains of functioning.

4. Emotion regulation in adulthood

Legal adulthood is reached between the ages of 18 and 21 in most countries. However, financial independence and the assumption of adult responsibility may occur later, as economic conditions and cultural norms in many developed countries encourage a research and education phase in the early twenties [30]. Emotion regulation abilities continue to develop and mature throughout adulthood, as individuals gain greater cognitive control, experience, and life skills [3, 31]. Effective emotion regulation in adulthood is associated with successful romantic and work relationships, physical and mental health,

and overall well-being [32]. Emotion regulation interventions for adults often draw from cognitive-behavioral therapy (CBT) and mindfulness-based approaches, targeting maladaptive patterns of thinking, feeling, and behaving [33]. These interventions have been shown to improve emotion regulation skills and reduce symptoms of various mental health conditions, including depression, anxiety, and borderline personality disorder [34]. One key consideration for adult emotion regulation interventions is the need to address unique challenges and stressors faced by this population, such as work-life balance, parenting responsibilities, and financial concerns. Tailoring interventions to these contextual factors can enhance their relevance and effectiveness.

4.1 Emotion regulation challenges in adulthood

Emotion regulation is a critical skill that continues to develop and evolve throughout the lifespan. Adults face distinct emotion regulation challenges shaped by the increasing complexity of their personal, professional, and relational lives [2, 3]. These may include managing work-life balance, navigating intimate relationships, and coping with major life transitions. While emotion regulation in childhood and adolescence is widely studied, adulthood also presents unique challenges and considerations when it comes to effectively managing one's emotions. This discussion will delve into some of the key challenges in emotion regulation that arise in adulthood.

4.1.1 Increased responsibilities and competing demands

As individuals transition into adulthood, they often face a greater number of responsibilities across domains such as work, family, and personal life. Balancing these competing demands can strain one's emotional resources and make it more difficult to regulate emotions effectively [35]. Adults must develop sophisticated strategies to navigate complex emotional landscapes while fulfilling a wide range of obligations.

4.1.2 Changing relationships and social contexts

The social context of adulthood undergoes significant changes, with shifts in peer groups, romantic relationships, and family dynamics. Navigating these evolving social landscapes requires flexibility in emotion regulation, as adults must adapt their strategies to fit new relational contexts [36]. Breakups, divorces, and the loss of loved ones can also present unique emotional challenges for adults.

4.1.3 Emotional responses to major life transitions

Adulthood is marked by significant life transitions, such as starting a career, getting married, having children, or experiencing retirement. These transitions can trigger heightened emotional reactions as individuals grapple with change, uncertainty, and the need to adjust to new roles and responsibilities [37]. Effective emotion regulation is crucial for navigating these major life events.

4.1.4 Emotion regulation and physical health

As adults age, physical health concerns and changes become more prevalent, which can significantly impact their emotional well-being. Chronic illnesses, physical

disabilities, and the natural aging process can all present unique emotion regulation challenges, as adults must cope with the physical and psychological consequences of these experiences [2, 37].

4.1.5 Emotion regulation and cognitive functioning

Cognitive changes that come with adulthood, such as declines in working memory, processing speed, and executive functioning, can also have an impact on an individual's capacity to control their emotions [38, 39]. Adults may need to adapt their emotion regulation strategies to accommodate these cognitive shifts and maintain effective emotional control.

4.1.6 Cultural and societal expectations

Cultural and societal norms and expectations surrounding emotional expression and regulation can pose unique challenges for adults. Individuals may feel pressure to conform to certain emotional display rules or manage their emotions in ways that align with societal expectations, which can be psychologically taxing [38, 39]. Researchers and practitioners can create focused therapies and support systems to assist people in navigating the challenging emotional terrain of adulthood by having a thorough understanding of the particular emotion regulation issues that adults encounter. Promoting effective emotion regulation skills in adulthood can contribute to overall well-being, healthy relationships, and successful life transitions.

4.2 Intervention programs for adults

Emotion regulation is a crucial skill for maintaining mental health and well-being, particularly as adults encounter a range of challenges throughout their lives. As adults navigate the distinct challenges and transitions of adulthood, several intervention programs can be developed to support their emotional, cognitive, and behavioral well-being. This discussion will review some key intervention programs designed for adults to address the specific challenges they face during adulthood.

4.2.1 Cognitive-behavioral therapy (CBT) for adults

As adults age, they often encounter cognitive decline, which can hinder their ability to process and regulate emotions effectively. This impairment may result in increased feelings of frustration, anxiety, and depression. To address these challenges, cognitive behavioral therapy (CBT) can be particularly beneficial, as it helps older adults identify and modify unhelpful thinking patterns that contribute to difficulties such as depression, anxiety, and stress [40]. Research has shown CBT to be effective in reducing symptoms and improving overall functioning in adults [41]. Research has shown CBT to be effective in reducing symptoms and improving overall functioning in adults [41]. By challenging negative thoughts that contribute to emotional distress, individuals can enhance their emotional resilience. Additionally, mindfulness-based interventions promote emotional awareness and acceptance, allowing older adults to respond to their emotions more adaptively rather than reactively.

4.2.2 Mindfulness-based interventions for adults

Mindfulness-based interventions (MBIs) are particularly effective for adults who encounter stress, anxiety, and emotional dysregulation in their daily lives. As adults juggle various responsibilities—such as work, family, and personal commitments—they often experience overwhelming emotions that can lead to burnout. MBIs teach individuals to cultivate present-moment awareness and acceptance, enabling them to observe their thoughts and feelings without judgment [42]. Studies have demonstrated the benefits of mindfulness-based interventions for reducing stress, anxiety, and depression in adult populations [43]. This practice helps reduce rumination and enhances emotional regulation, allowing adults to respond to stressors more calmly and effectively, ultimately fostering a greater sense of well-being.

4.2.3 Dialectical behavior therapy (DBT) for adults

Dialectical behavior therapy (DBT) is especially beneficial for adults struggling with intense emotional responses and interpersonal conflicts, often exacerbated by conditions such as borderline personality disorder or PTSD [44]. Many adults face challenges in managing their emotions, which can lead to impulsive behaviors and strained relationships. Research has shown DBT to be effective in helping adults improve their ability to manage intense emotions and engage in more adaptive behaviors [44]. DBT equips individuals with practical skills in emotional regulation, distress tolerance, and effective communication, helping them navigate difficult emotions and improve their relationships [3]. By integrating acceptance with change strategies, DBT empowers adults to develop healthier coping mechanisms and enhance their emotional resilience in the face of life's challenges.

4.2.4 Acceptance and commitment therapy (ACT) for adults

Acceptance and commitment therapy (ACT) is a cognitive-behavioral therapy that encourages adults to embrace their experiences, commit to values-based actions, and develop psychological flexibility. ACT offers valuable strategies for adults grappling with life transitions, such as career changes or personal loss, which can evoke feelings of uncertainty and anxiety [45]. During these periods, individuals may struggle with avoidance behaviors and negative thought patterns that hinder their emotional well-being. ACT encourages individuals to accept their emotions rather than fight against them, promoting psychological flexibility and commitment to values-based actions. Research has demonstrated that ACT is beneficial in treating a variety of mental health conditions in adult populations, such as anxiety, sadness, and chronic pain [46]. By fostering acceptance and mindfulness, ACT helps adults navigate life's challenges with greater clarity and purpose, ultimately leading to improved emotional regulation and life satisfaction.

4.2.5 Lifestyle intervention programs for adults

In addition to mental health-focused interventions, there are also lifestyle-oriented programs designed to promote individuals' general well-being. These could include exercise programs, nutrition, stress management workshops, and weight-management plans, and sleep hygiene education. Research has shown that modifying

one's lifestyle can yield favorable results for both mental and physical well-being in adult populations [47]. Lifestyle intervention programs address the multifaceted challenges that adults face, including sedentary behavior, poor nutrition, and stress-related health issues. These factors can significantly impact emotional regulation and overall mental health, leading to increased anxiety and depressive symptoms. By promoting physical activity, healthy eating, and stress management techniques, these programs empower adults to take control of their health and well-being [33]. Regular exercise, for instance, has been shown to boost mood and enhance emotional resilience, while nutrition plays a crucial role in brain health. Through lifestyle changes, adults can improve their emotional regulation, reduce stress levels, and cultivate a more balanced and fulfilling life [1].

4.3 Adapting interventions to the needs of diverse adult populations

As the adult population becomes increasingly diverse in terms of age, cultural background, socioeconomic status, and other individual factors, it is essential that intervention programs be designed and implemented with the unique needs of diverse adults in mind. This discussion will explore key considerations for adapting interventions to better serve the diverse needs of adult populations.

4.3.1 Cultural responsiveness

Culturally responsive interventions recognize and incorporate the target population's cultural values, beliefs, and practices [48]. For example, when working with immigrant or minority adult populations, understanding and integrating their cultural perspectives on mental health, help-seeking behaviors, and conceptualizations of wellness is crucial. Culturally adapted interventions have been proven to enhance engagement, satisfaction, and outcomes among diverse adult groups [49].

4.3.2 Developmental appropriateness

Intervention programs must also be developmentally appropriate for the specific life stage and needs of the adult population being served. Interventions for young adults may focus on issues related to identity formation, career development, and relationship building, while programs for middle-aged or older adults may emphasize topics such as work-life balance, care giving, and retirement planning [50, 51]. Tailoring the content, format, and delivery of interventions to the developmental stage of the target adult population can enhance the relevance and effectiveness of the program.

4.3.3 Addressing social determinants of health

Many adult populations often grapple with issues related to social determinants of health, including socioeconomic status, education, employment, and healthcare access [52]. Intervention programs that incorporate strategies to address these social and environmental factors can have a more comprehensive and sustainable impact on the well-being of diverse adult populations. For example, programs that provide job training, financial education, or connect adults to community resources may be particularly beneficial.

4.3.4 Incorporating diverse perspectives and lived experiences

Involving diverse adult stakeholders in the design, implementation, and evaluation of intervention programs can help ensure that the programs are responsive to the unique needs and perspectives of the target population. This may include incorporating the input and feedback of adults from various cultural backgrounds, socioeconomic statuses, and life experiences [53]. Actively including the voices of the intended participants can enhance the relevance, acceptability, and effectiveness of the interventions.

4.3.5 Flexible and accessible delivery formats

Providing intervention programs in a variety of formats, such as in-person, online, or mobile-based, can improve accessibility and accommodate the diverse needs and preferences of adult participants. Additionally, offering flexible scheduling, childcare, and transportation support can help remove logistical barriers and increase engagement among adults with competing demands and responsibilities [54]. By incorporating these key considerations into the design and implementation of intervention programs, researchers, practitioners, and policymakers can better meet the diverse needs of adult populations and promote more equitable and effective outcomes.

5. Emotion regulation in older adulthood

As individuals age, emotion regulation abilities often become more stable and adaptive, with older adults generally experiencing fewer negative emotions and better emotional well-being compared to younger adults [3, 36]. This may be due to a combination of factors, including increased emotional expertise, cognitive control, and motivational shifts toward emotion-focused goals [2, 37]. However, older adults may also face unique challenges to emotion regulation, such as age-related cognitive decline, increased physical health problems, and the loss of loved ones. Emotion regulation interventions for older adults should consider these factors and focus on building resilience, fostering social connections, and promoting adaptive coping strategies [37].

Mindfulness-based interventions, in particular, have shown promise for improving emotion regulation in older adults, as they can help individuals become more aware of and accept their emotional experiences [55]. Additionally, interventions that incorporate physical activity, social engagement, and cognitive stimulation may be especially beneficial for this population [56].

5.1 Age-related changes in emotion regulation

Emotion regulation, the capacity to modulate one's emotional experiences and expressions, is a vital skill that evolves across the lifespan. As individuals age, they undergo physiological, cognitive, and social changes that can impact their emotion regulation abilities and strategies. This discussion will delve into the key changes in emotion regulation that occur with age.

5.1.1 Socio-emotional selectivity theory

The socio-emotional selectivity theory [40] posits that as people age, they shift their focus from pursuing knowledge and new experiences to prioritizing

emotion-related goals, such as maintaining close relationships and deriving meaning from life. This shift in motivational priorities can lead to age-related changes in emotion regulation strategies.

5.1.2 Improved emotion regulation abilities

Older adults often demonstrate enhanced emotion regulation abilities compared to younger adults. Existing research suggests that older adults are better able to use cognitive reappraisal, a strategy that involves reinterpreting the meaning of an emotional situation to modify its emotional impact [31]. Older adults also tend to experience fewer negative emotions and report greater emotional well-being, a phenomenon known as the “positivity effect” [57].

5.1.3 Increased use of passive regulation strategies

As people age, they may rely more on passive emotion regulation strategies, such as avoiding or disengaging from emotionally challenging situations, rather than actively engaging in effortful regulation strategies [58]. This shift may be due to age-related declines in cognitive resources, physical energy, or motivation to actively engage in emotion regulation.

5.1.4 Changes in neural mechanisms

Neuroimaging studies have shown that the neural mechanisms underlying emotion regulation evolve with age. Older adults tend to exhibit increased activation in prefrontal regions, which are associated with cognitive control and emotion regulation, and decreased activation in limbic regions, which are involved in emotional processing [59]. These neural changes may contribute to the improved emotion regulation abilities observed in older adults.

5.1.5 Contextual and individual factors

The age-related changes in emotion regulation are not uniform across all individuals. Factors such as individual differences in personality, cognitive abilities, social support, and cultural background can influence the specific emotion regulation strategies employed by older adults [60]. Additionally, the context in which emotion regulation occurs, such as the nature of the emotional stimulus or the social environment, can also shape the age-related patterns in emotion regulation. Overall, understanding the age-related changes in emotion regulation is crucial for developing targeted interventions and support systems to help older adults maintain emotional well-being and adapt to the challenges associated with the aging process. By acknowledging the unique strengths and limitations of emotion regulation in later life, researchers and clinicians can design a more successful plan to support healthy aging and improve the quality of life for senior citizens.

5.2 Review of intervention programs for older adults

As the global population continues to age, there is a growing demand for effective intervention programs to support the health, well-being, and independence of senior citizens. This discussion will explore various intervention programs aimed at improving the lives of older individuals.

5.2.1 Physical activity interventions

Regular physical activity, including aerobic, strength, and balance training programs, is essential for maintaining physical and cognitive function in older adults, reducing falls risk, and delaying cognitive decline [61]. These programs often involve group-based activities or individualized exercise plans tailored to the needs and abilities of older adults.

5.2.2 Cognitive stimulation interventions

Cognitive stimulation interventions aim to improve cognitive abilities and prevent or slow down age-related cognitive decline. These programs may involve activities such as memory training, problem-solving exercises, and engagement in intellectually challenging hobbies. Research has proven the potential of these interventions to improve cognitive function, social engagement, and quality of life among older adults [62].

5.2.3 Psychosocial interventions

Psychosocial interventions focus on addressing the emotional and social needs of older adults. These programs may include support groups, reminiscence therapy, and life review exercises, which can help reduce loneliness, depression, and anxiety, and promote a sense of purpose and well-being [63]. Such interventions are particularly important for older adults who are at risk of social isolation or mental health issues.

5.2.4 Caregiver support interventions

Care giving for older adults can be physically, emotionally, and financially demanding. Caregiver support interventions, such as educational programs, respite care services, and counseling, aim to improve the well-being and coping abilities of caregivers, which in turn can positively impact the care recipients [64]. These interventions can help reduce caregiver burden and prevent burnout.

5.2.5 Integrated and multidisciplinary approaches

Increasingly, researchers and healthcare providers are recognizing the value of integrated and multidisciplinary intervention programs that combine various components, such as physical activity, cognitive stimulation, and psychosocial support [58]. These holistic approaches can address the diverse needs of older adults and promote more comprehensive and effective outcomes. Effective implementation and evaluation of these intervention programs requires consideration of factors such as participant characteristics, program delivery methods, and long-term sustainability. Ongoing research and collaboration between researchers, healthcare professionals, and community organizations are essential for developing and refining evidence-based interventions that can enhance the quality of life for older adults.

5.3 Considerations for implementing interventions in later life

As the world's population continues to age, the need for effective interventions to support older adults has become increasingly important. Implementing such interventions, however, requires careful consideration of various factors to ensure their

success and sustainability. This discussion will explore some key considerations for implementing interventions in later life.

5.3.1 Tailored approach

Older adults are a heterogeneous population with diverse needs, abilities, and preferences. Interventions must be tailored to the unique characteristics and preferences of the target population [65]. This may involve incorporating individual assessments, flexible program design, and opportunities for personalization to meet the unique needs of each participant.

5.3.2 Accessibility and inclusivity

Interventions must be designed with accessibility and inclusivity in mind to ensure that they are accessible to older adults from various socioeconomic, cultural, and ability backgrounds [66]. This may include considerations such as transportation, location, language, and physical/cognitive accommodations to remove barriers to participation.

5.3.3 Engagement and motivation

Maintaining older adults' engagement and motivation is crucial for the success of any intervention. Strategies such as fostering social connections, providing meaningful activities, and incorporating elements of enjoyment and personal relevance can help to enhance participant engagement and adherence [67].

5.3.4 Caregiver involvement

Many senior citizens rely on the support of caregivers, whether they are family members, friends, or professional caregivers. Involving caregivers in the implementation of interventions can improve their effectiveness by offering additional support, education, and coordination of care [8, 9].

5.3.5 Interdisciplinary collaboration

Implementing effective interventions for older adults often requires the expertise and collaboration of professionals from various disciplines, such as healthcare, social services, and community organizations [68]. Fostering interdisciplinary collaboration can ensure a comprehensive and coordinated approach to intervention delivery.

5.3.6 Sustainability and scalability

Ensuring the long-term sustainability and scalability of interventions is essential for their lasting impact. This may involve considerations such as securing stable funding, developing training programs for staff, and establishing partnerships with community organizations to maintain and expand the reach of the interventions over time [68].

5.3.7 Evaluation and continuous improvement

Ongoing evaluation and monitoring of intervention outcomes are crucial for understanding their effectiveness, identifying areas for improvement, and informing

future program development. Incorporating feedback from participants, caregivers, and stakeholders can also contribute to the continuous improvement of interventions [69]. Overall, by addressing these key considerations, researchers, healthcare providers, and community organizations can create effective, sustainable interventions to enhance the health, well-being, and independence of older adults by considering key considerations.

6. Application of emotion regulation in clinical settings

The application of emotion regulation strategies in clinical settings is vital for effectively addressing the diverse emotional needs of patients across various life stages. This section provides a detailed discussion on the application of emotional regulation in clinical settings, outlining where life trajectory-based interventions can be implemented. It emphasizes the roles of therapists, program managers, and mental health workers in these contexts.

6.1 Children

In pediatric clinics, therapists can implement play-based interventions that align with children's natural learning processes. Techniques such as storytelling, role-playing, and interactive games help children recognize and articulate their emotions, laying a strong foundation for healthy emotional development [3, 8]. Therapists/clinicians can also work with parents and caregivers to reinforce these skills at home, creating a supportive environment for emotional growth [70]. By creating a supportive environment, mental health workers can ensure that children feel safe to explore and express their feelings, fostering emotional growth.

6.2 Adults

In community mental health centers, case managers and therapists can implement interventions such as cognitive behavioral therapy (CBT) and mindfulness practices tailored to adults facing complex emotional challenges related to work, relationships, and life transitions [1]. For instance, therapists can conduct group therapy sessions that focus on stress management and emotional regulation techniques [71]. Program managers can oversee the development of structured workshops that teach practical skills, such as emotion identification and coping strategies [23]. This collaborative approach empowers adults to navigate their emotional landscapes effectively, improving overall well-being.

In workplace settings, mental health professionals can integrate emotion regulation strategies into employee assistance programs (EAPs). Here, program managers can develop training sessions focused on emotional intelligence, stress management, and resilience-building [68]. Mental health workers can facilitate these sessions, providing employees with tools to manage workplace stressors and enhance communication skills [23, 42]. By fostering a supportive work environment, organizations can promote mental health and reduce the risk of burnout among employees.

6.3 Older adults

In geriatric care facilities, clinicians must consider the unique challenges faced by older adults, such as loss, grief, and social isolation. Therapists can implement

reminiscence therapy to help older adults process their life experiences and emotions [72]. Additionally, social engagement initiatives, such as group activities and support circles, can be facilitated by mental health workers to reduce feelings of loneliness [63]. These sessions create a platform for older adults to share their experiences and support one another emotionally, enhancing their emotional resilience.

In hospice and palliative care settings, therapists and case managers can provide targeted emotion regulation interventions for patients and their families dealing with end-of-life issues. Interventions may include mindfulness practices and grief counseling [33, 55], designed to help individuals cope with the emotional challenges of impending loss. Mental health workers can support families in navigating their grief, providing resources and a compassionate presence during this difficult time [45, 46].

7. Conclusion

Emotion regulation is a critical skill that evolves across the lifespan. As individuals progress from childhood to adulthood and into older age, the specific challenges and needs related to emotion regulation also shift. Tailoring emotion regulation interventions to the unique developmental context of each life stage is essential for maximizing their effectiveness and ensuring that individuals are equipped with the necessary skills to navigate the emotional experiences that arise at different points in their lives. Implementing tailored interventions in clinical settings not only addresses immediate emotional concerns but also fosters long-term emotional health. By continuously evaluating the effectiveness of these strategies through ongoing assessments and patient feedback, therapists, program managers, and mental health workers can refine their approaches to meet the evolving needs of their patients. Ultimately, recognizing the distinct emotional challenges faced by different age groups and adapting interventions accordingly significantly enhances the quality of care and supports resilience across the lifespan.

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References

- [1] Gross JJ. Emotion regulation: Current status and future prospects. *Psychological Inquiry*. 2015;**26**(1):1-26. DOI: 10.1080/1047840X.2014.940781
- [2] Allen V, Windsor T. Age differences in the use of emotion regulation strategies derived from the process model of emotion regulation: A systematic review. *Aging and Mental Health*. 2019;**23**(1):1-14. DOI: 10.1080/13607863.2017.1396575
- [3] Riediger M, Bellingtier JA. *Emotion Regulation across the Lifespan*. Germany: Department of Developmental Psychology, University of Jena; 2020
- [4] Aldao A, Nolen-Hoeksema S, Schweizer S. Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*. 2010;**30**(2):217-237. DOI: 10.1016/j.cpr.2009.11.004
- [5] Cooke JE, Kochendorfer LB, Stuart-Parrigon KL, Koehn AJ, Kerns KA. Parent-child attachment and children's experience and regulation of emotion: A metaanalytic review. *Emotion*. 2019;**19**(6):1103-1126. DOI: 10.1037/emo0000504
- [6] Graziano PA, Reavis RD, Keane SP, Calkins SD. The role of emotion regulation in children's early academic success. *Journal of School Psychology*. 2007;**45**(1):3-19. DOI: 10.1016/j.jsp.2006.09.002
- [7] Kraft L, Ebner C, Leo K, Lindenberg K. Emotion regulation strategies and symptoms of depression, anxiety, aggression, and addiction in children and adolescents: A meta-analysis and systematic review. *Clinical Psychology: Science and Practice*. 2023;**30**(4):485-502. DOI: 10.1037/cps0000156
- [8] Atkinson NH, Jean ADL, Stack DM. Emotion regulation from infancy to toddlerhood: Individual and group trajectories of full-term and very-low-birthweight preterm infants. *Infancy*. 2021;**26**(4):570-595. DOI: 10.1111/infa.12405
- [9] Calkins SD, Hill A. Caregiver influences on emerging emotion regulation: Biological and environmental transactions in early development. In: Gross JJ, editor. *Handbook of Emotion Regulation*. New York, NY: Guilford Press; 2007. pp. 229-248. Available from: <https://www.scirp.org/reference/referencespapers?referenceid=1159874>
- [10] Silk JS, Steinberg L, Morris A. Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*. 2003;**74**:1869-1880. DOI: 10.1046/j.1467-8624.2003.00643.x
- [11] Bariola E, Gullone E, Hughes EK. Child and adolescent emotion regulation: The role of parental emotion regulation and expression. *Clinical Child and Family Psychology Review*. 2011;**14**(2):198-212. DOI: 10.1007/s10567-011-0092-5
- [12] Suveg C, Sood E, Barmish A, Tiwari S, Hudson JL, Kendall PC. "I'd rather not talk about it": Emotion parenting in families of children with an anxiety disorder. *Journal of Family Psychology*. 2008;**22**(6):875884. DOI: 10.1037/a0012861
- [13] Merry SN, Hetrick SE, Cox GR, Brudevold-Iversen T, Bir JJ, McDowell H. Psychological and educational

interventions for preventing depression in children and adolescents. Evidence-Based Child Health: A Cochrane Review Journal. 2012;7(5):1409-1685. DOI: 10.1002/14651858.CD003380.pub3

[14] Durlak JA, Weissberg RP, Dymnicki AB, Taylor RD, Schellinger KB. The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. Child Development. 2011;82(1):405-432. DOI: 10.1111/j.1467-8624.2010.01564.x

[15] Morris AS, Criss MM, Silk JS, Houlberg BJ. The impact of parenting on emotion regulation during childhood and adolescence. Child Development Perspectives. 2017;11(4):233-238. DOI: 10.1111/cdep.12238

[16] Weissberg RP, Durlak JA, Domitrovich CE, Gullotta TP, editors. Social and Emotional Learning: Past, Present, and Future. New York City, New York: Guilford Publications; 2015

[17] McGuire JF, Piacentini J, Brennan EA, Delucchi KL, Gulisano M, Eichstadt SR, et al. A meta-analysis of behavior therapy for Tourette syndrome. Journal of the American Academy of Child and Adolescent Psychiatry. 2015;54(2):92-103. DOI: 10.1016/j.jpsychores.2013.12.009

[18] Furlong M, McGilloway S, Bywater T, Hutchings J, Smith SM, Donnelly M. Behavioural and cognitive-behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years. Cochrane Database of Systematic Reviews. 2012;2:CD008225. DOI: 10.1002/14651858.CD008225.pub2

[19] Sanders MR, Kirby JN, Tellegen CL, Day JJ. The triple P-positive parenting program: A systematic review and meta-analysis of a multi-level system of parenting support. Clinical

Psychology Review. 2014;34(4):337-357. DOI: 10.1016/j.cpr.2014.04.003

[20] Zenner C, Herrnleben-Kurz S, Walach H. Mindfulness-based interventions in schools—A systematic review and meta-analysis. Frontiers in Psychology. 2014;5:603. DOI: 10.3389/fpsyg.2014.00603

[21] Felver JC, Celis-de Hoyos CE, Tezanos K, Singh NN. A systematic review of mindfulness-based interventions for youth in school settings. Mindfulness. 2016;7(1):34-45. DOI: 10.1007/s12671-015-0389-4

[22] Sugai G, Horner RR. Responsiveness-to-intervention and school-wide positive behavior supports: Integration of multi-tiered system approaches. Exceptionality. 2009;17(4):223-237. DOI: 10.1080/09362830903235375

[23] Zimmer-Gembeck MJ, Skinner EA. The development of coping: Implications for psychopathology and resilience. In: Cicchetti D, editor. Developmental Psychopathology Volume 4: Risk, Resilience, and Intervention. 3rd ed. Wiley; 2016. pp. 485-545. DOI: 10.1002/9781119125556.devpsy410

[24] Bjorklund DF, Causey KB. Children's Thinking: Cognitive Development and Individual Differences. 6th ed. Los Angeles, CA: SAGE; 2017. Available from: <https://www.scirp.org/reference/referenc espapers?referenceid=2963619>

[25] Steinberg L. Age of Opportunity: Lessons from the New Science of Adolescence. Boston, USA: Houghton Mifflin Harcourt; 2014. Available from: <https://www.scirp.org/reference/referenc espapers?referenceid=2970973>

[26] Gallahue DL, Ozmun JC, Goodway JD. Understanding Motor Development: Infants, Children,

Adolescents, Adults. New York, USA: McGraw-Hill; 2012. Available from: <https://www.scirp.org/reference/referencespapers?referenceid=19245>

[27] Rothbart MK, Bates JE. Temperament in children's development. In: Damon W, Lerner R, Eisenberg N, editors. *Handbook of Child Psychology*. 6th ed. Vol. 3. New York City, New York: John Wiley & Sons; 2007

[28] Crone EA, Dahl RE. Understanding adolescence as a period of social-affective engagement and goal flexibility. *Nature Reviews Neuroscience*. 2012;**13**(9):636-650. DOI: 10.1038/nrn3313

[29] Eccles JS, Roeser RW. Schools as developmental contexts during adolescence. *Journal of Research on Adolescence*. 2011;**21**(1):225-241. DOI: 10.1111/j.1532-7795.2010.00725.x

[30] Arnett JJ. *Emerging Adulthood: The Winding Road from the Late Teens through the Twenties*. 2nd ed. New York, USA: Oxford University Press; 2015. DOI: 10.1093/acprof:oso/9780195309379.001.0001

[31] Gross JJ, Jazaieri H. Emotion, emotion regulation, and psychopathology: An affective science perspective. *Clinical Psychological Science*. 2014;**2**(4):387-401. DOI: 10.1177/2167702614536164

[32] Niven K, Hughes DJ, Tan KJ, Wicket R. Individual differences in interpersonal emotion regulation: What makes some people more (or less) successful than others? *Social and Personality Psychology Compass*. 2024, 2024;**e12951**:1-14. DOI: 10.1111/spc3.12951

[33] Saccaro LF, Giff A, Menduni M, De Rossi MM, Piguët C. Interventions targeting emotion regulation:

A systematic umbrella review. *Journal of Psychiatric Research*. 2024;**174**(2024):263-264. DOI: 10.1016/j.jpsychires.2024.04.025

[34] Berking M, Wupperman P, Reichardt A, Pejic T, Dippel A, Znoj H. Emotion-regulation skills as a treatment target in psychotherapy. *Behavior Research and Therapy*. 2008;**46**(11):1230-1237. DOI: 10.1016/j.brat.2008.08.005

[35] Birditt KS, Fingerman KL, Almeida DM. Age differences in exposure and reactions to interpersonal tensions: A daily diary study. *Psychology and Aging*. 2005;**20**(2):330-340. DOI: 10.1037/0882-7974.20.2.330

[36] Carstensen LL. The influence of a sense of time on human development. *Science*. 2006;**312**(5782):1913-1915. DOI: 10.1126/science.1127488

[37] Urry HL, Gross JJ. Emotion regulation in older age. *Current Directions in Psychological Science*. 2010;**19**(6):352-357. DOI: 10.1177/0963721410388395

[38] Knight BG, Durbin K. Aging and the effects of emotion on cognition: Implications for psychological interventions for depression and anxiety. *Psychological Journal*. 2015;**4**(1):11-19. DOI: 10.1002/pchj.84

[39] Salthouse TA. Selective review of cognitive aging. *The Journal of International Neuropsychological Society*. 2010;**16**(5):754-760. DOI: 10.1017/S1355617710000706

[40] Beck JS. *Cognitive Behaviour Therapy: Basics and Beyond*. 2nd ed. New York City, New York: The Guilford Press; 2011. Available from: <https://www.scirp.org/reference/referencespapers?referenceid=1902770>

- [41] Butler AC, Chapman JE, Forman EM, Beck AT. The empirical status of cognitive-behavioral therapy: A review of meta-analyses. *Clinical Psychology Review*. 2006;**26**(1):17-31. DOI: 10.1016/j.cpr.2005.07.003
- [42] Kabat-Zinn J. Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*. 2003;**10**(2):144-156. DOI: 10.1093/clipsy.bpg016
- [43] Grossman P, Niemann L, Schmidt S, Walach H. Mindfulness-based stress reduction and health benefits: A meta-analysis. *Journal of Psychosomatic Research*. 2004;**57**(1):35-43. DOI: 10.1016/S0022-3999(03)00573-7
- [44] Kliem S, Kröger C, Kosfelder J. Dialectical behavior therapy for borderline personality disorder: A meta-analysis using mixed-effects modeling. *Journal of Consulting and Clinical Psychology*. 2010;**78**(6):936-951. DOI: 10.1037/a0021015
- [45] Hayes SC, Luoma JB, Bond FW, Masuda A, Lillis J. Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*. 2006;**44**(1):1-25. DOI: 10.1016/j.brat.2005.06.006
- [46] Hacker T, Stone P, Mac Beth A. Acceptance and commitment therapy—Do we know enough? Cumulative and sequential meta-analyses of randomized controlled trials. *Journal of Affective Disorders*. 2016;**190**:551-565. DOI: 10.1016/j.jad.2015.10.053
- [47] Schuch FB, Vancampfort D. Physical activity, exercise, and mental disorders: It is time to move on. *Trends in Psychiatry and Psychotherapy*. 2021;**43**(3):177-184. DOI: 10.47626/2237-6089-2021-0237
- [48] Nagayama Hall GC, Hong JJ, Zane NW, Meyer OL. Culturally competent treatments for Asian Americans: The relevance of mindfulness and acceptance-based psychotherapies. *Clinical Psychology: Science and Practice*. 2011;**18**(3):215-231. DOI: 10.1111/j.1468-2850.2011.01253.x
- [49] Griner D, Smith TB. Culturally adapted mental health interventions: A meta-analytic review. *Psychotherapy: Theory, Research, Practice, Training*. 2006;**43**(4):531-548. DOI: 10.1037/0033-3204.43.4.531
- [50] Zacher H, Schmitt A. Work characteristics and occupational well-being: The role of age. *Frontiers in Psychology*. 2016;**7**:1411. DOI: 10.3389/fpsyg.2016.01411
- [51] Beier ME, Torres WJ, Fisher GG, Wallace LE. Age and job fit: The relationship between demands-ability fit and retirement and health. *Journal of Occupational Health Psychology*. Aug 2020;**25**(4):227-243. DOI: 10.1037/ocp0000164. Epub 2019 Aug 12
- [52] Braveman P, Gottlieb L. The social determinants of health: It's time to consider the causes of the causes. *Public Health Reports*. 2014;**129**(1 Suppl. 2):19-31. DOI: 10.1177/00333549141291S206
- [53] Maurer M, Mangrum R, Hilliard-Boone T, Amolegbe A, Carman KL, Forsythe L, et al. Understanding the influence and impact of stakeholder engagement in patient-centered outcomes research: A qualitative study. *Journal of General Internal Medicine*. 2022;**37**(Suppl. 1):6-13. DOI: 10.1007/s11606-021-07104-w
- [54] McCarthy MJ, Wicker A, Roddy J, Remiker M, Roy I, McCoy M, et al. Feasibility and utility of mobile health interventions for depression and anxiety in rural populations: A scoping review.

Internet Interventions. 2024;**35**:100724.
 DOI: 10.1016/j.invent.2024.100724

[55] Geiger PJ, Boggero IA, Brake CA, Caldera CA, Combs HL, Peters JR, et al. Mindfulness-based interventions for older adults: A review of the effects on physical and emotional well-being. *Mindfulness*. 2016;**7**(2):296-307.
 DOI: 10.1007/s12671-015-0444-1

[56] Mirabito G, Verhaeghen P. The effects of mindfulness interventions on older adults' cognition: A meta-analysis. *Journals of Gerontology: Psychological Sciences*. 2023;**78**(3):394-408.
 DOI: 10.1093/geronb/gbac14 3

[57] Carstensen LL, Mikels JA. At the intersection of emotion and cognition: Aging and the positivity effect. *Current Directions in Psychological Science*. 2005;**14**(3):117-121.
 DOI: 10.1111/j.0963-7214.2005.00348.x

[58] Beswick AD, Rees K, Dieppe P, Ayis S, Gooberman-Hill R, Horwood J, et al. Complex interventions to improve physical function and maintain independent living in elderly people: A systematic review and meta-analysis. *The Lancet*. 2008;**371**(9614):725-735.
 DOI: 10.1016/S0140-6736(08)60342-6

[59] Scheibe S, Blanchard-Fields F. Effects of regulating emotions on cognitive performance: What is costly for young adults is not so costly for older adults. *Psychology and Aging*. 2009;**24**(1):217.
 DOI: 10.1037/a0013807

[60] Blanchard-Fields F. Everyday problem solving and emotion: An adult developmental perspective. *Current Directions in Psychological Science*. 2007;**16**(1):26-31.
 DOI: 10.1111/j.1467-8721.2007.00469.x

[61] Pahor M, Guralnik JM, Ambrosius WT, Blair S, Bonds DE,

Church TS, et al. Effect of structured physical activity on prevention of major mobility disability in older adults: The LIFE study randomized clinical trial. *JAMA*. 2014;**311**(23):2387-2396.
 DOI: 10.1001/jama.2014.5616

[62] Tardif S, Simard M. Cognitive stimulation programs in healthy elderly: A review. *International Journal of Alzheimer's Disease*. 2011;**2011**:378934.
 DOI: 10.4061/2011/378934. Epub 2011 Aug 15

[63] Gardiner C, Geldenhuys G, Gott M. Interventions to reduce social isolation and loneliness among older people: An integrative review. *Health and Social Care in the Community*. 2018;**26**(2):147-157. DOI: 10.1111/hsc.12367

[64] Laver K, Dyer S, Whitehead C, Clemson L, Crotty M. Interventions to delay functional decline in people with dementia: A systematic review of systematic reviews. *BMJ Open*. 2016;**6**(4):e010767. DOI: 10.1136/bmjopen-2015-010767

[65] Ma JK, Floegel TA, Li LC, Leese J, De Vera MA, Beauchamp MR, et al. Tailored physical activity behavior change interventions: Challenges and opportunities. *Translational Behavioral Medicine*. 2021;**11**(12):2174-2181.
 DOI: 10.1093/tbm/ibab106

[66] Gomes M, Figueiredo D, Teixeira L, Poveda V, Paúl C, Santos-Silva A, et al. Physical inactivity among older adults across Europe based on the SHARE database. *Age and Ageing*. 2017;**46**(1):71-77. DOI: 10.1093/ageing/afw165

[67] Baert V, Gorus E, Mets T, Geerts C, Bautmans I. Motivators and barriers for physical activity in the oldest old: A systematic review. *Ageing Research Reviews*. 2011;**10**(4):464-474.
 DOI: 10.1016/j.arr.2011.04.001

- [68] Reeves S, Pelone F, Harrison R, Goldman J, Zwarenstein M. Interprofessional collaboration to improve professional practice and healthcare outcomes. Cochrane Database of Systematic Reviews. 2017;**6**(6):CD000072. DOI: 10.1002/14651858.CD000072.pub3
- [69] Clarke GM, Conti S, Wolters AT, Steventon A. Evaluating the impact of healthcare interventions using routine data. *BMJ*. 2019;**365**:l2239. DOI: 10.1136/bmj.l2239
- [70] Singh GKS, Ngadni I. Exploring preschool parents' understanding of play-based learning and its importance in early childhood education. *International Journal of Academic Research in Progressive Education and Development*. 2023;**12**(2):1782-1804. DOI: 10.6007/IJARPED/v12-i2/17546
- [71] Keng SL, Smoski MJ, Robins CJ. Effects of mindfulness on psychological health: A review of empirical studies. *Clinical Psychology Review*. 2011;**31**(6):1041-1056. DOI: 10.1016/j.cpr.2011.04.006
- [72] Woods B, O'Philbin L, Farrell EM, Spector AE, Orrell M. Reminiscence therapy for dementia. Cochrane Database of Systematic Reviews. 2018;**3**(3):CD001120. DOI: 10.1002/14651858.CD001120.pub3

Applying Emotional Regulation Strategies to Manage Climate Distress

Maliha Ibrahim

Abstract

Ecological distress significantly impacts mental health, leading to heightened stress, anxiety, depression, and, in severe cases, post-traumatic stress disorder (PTSD). As climate change intensifies, addressing these psychological impacts becomes increasingly urgent. Despite recognizing ecological distress as a critical issue, there is limited evidence of evidence-based, scalable interventions to mitigate its effects. This lack is especially concerning for children and youth, older adults or marginalized groups who are more vulnerable to climate change impacts due to health conditions and social isolation. This chapter reviews the mental health repercussions of climate change, defining and highlighting the prevalence of climate anxiety, followed by a description of impacts on various individuals, families and community groups as well as the generational or lifespan perspectives involved. Coping mechanisms and adaptive responses to the climate crisis, particularly the role of emotional regulation is reviewed. Various interventions are discussed aligning with treating climate distress and the role of a climate-aware therapist is highlighted. Climate Cafés, as a unique and safe space for expressing climate-related emotions is also described.

Keywords: climate change, climate distress, emotional regulation, climate café, mental health, coping

1. Introduction

Climate change is a fast-evolving, observable phenomenon and feature of our daily living, particularly apparent in the last few decades with tangible changes in seasonal temperatures, more frequent flooding, hurricanes, the melting of ice caps, a creation of heat domes, abundant forest fires in dry regions and other such ecological changes [1, 2]. These trends also result in localized or multi-site global emergencies causing site evacuations and resettlements, polluted soil and water conditions, destruction of ecology and so on [1, 3].

Climate change and the subsequent adverse environmental impact also influences communities in terms of livelihoods, social connections, socio-economic capital, practice of culture and cultural legacy [1, 4, 5]. Increasingly, these environmental impacts

require redressal from public health efforts, through increased awareness in civil society, increased governmental support, ongoing research and innovation as well as radical changes to public policy. Simultaneously, climate emergencies or changes in climate can also lead to burdensome emotional impacts such as uncertainty over the future, climate related mental health conditions, along with interpersonal changes, as well as socio-economic stressors associated with poorer mental health as well as life functioning [3, 4].

The aim of this review chapter is to highlight the mental health aspects and repercussions of climate change, particularly on various sections of society and the human population. Coping mechanisms and adaptive responses to the climate crisis, will be synthesized, along with the scope for clinical interventions, therapist and therapeutic formats. This chapter would contribute to the limited existing literature in this domain by collating knowledge in the field of addressing climate related mental health and by suggesting possible applications in clinical settings.

This chapter reviews the empirical literature on climate change as a key determinant of mental health and explains psychological impact on various sections of the global population, alongside emotion regulation interventions tailored for children, adults, and older adults. While serving as a theoretical paper, a comprehensive search was conducted on PsycINFO, MEDLINE, SCOPUS, and CINAHL databases to locate peer-reviewed articles relevant to the topic with key word searches including “climate,” “emotional regulation,” “climate mental health,” “climate change + psychology,” “climate disaster+ mental health,” “climate +mental health interventions,” “climate therapy” and so on. Furthermore, gray literature was collected and synthesized from web reports, working papers and organizational internal reports.

Studies were included if they satisfied the following criteria: 1) discussed the intersection of climate change and mental health, 2) focused on one or more specific groups (children, adults, older adults, marginalized groups, indigenous groups, individuals with chronic mental health issues), and 3) discussed psychological impacts of climate change or provided intervention guidance, research priorities or policy guidelines. Articles were excluded if they did not address these intersections or were not published in English.

1.1 Climate change as a determinant of mental health

The impacts of climate change on mental health are becoming increasingly evident, manifesting through a spectrum of psychological responses ranging from mild stress or irritability to more severe mental health concerns such as anxiety, depression, panic attacks, post-traumatic stress disorder (PTSD), and risk for suicide [4]. Maladaptive coping strategies are also an important corollary with increases in intimate partner violence, difficulties with anger management or problem solving and substance misuse associated with climate distress [6]. Physiological symptoms can also include a loss of appetite, weakness and sleeplessness. Another feature is the experience of solastalgia- also known as the melancholia or homesickness experienced by individuals when separated from a loved home, or the distress that is produced by environmental change impacting people’s lived culture and home environment [7].

As extreme weather events and environmental transformations escalate, so do the psychological burdens on individuals and communities worldwide [3, 4]. Addressing the mental health impacts of climate change is paramount not only for the wellbeing of affected populations and communities made vulnerable due to systemic marginalization, but also for enhancing resilience and adaptive capacities in the face of ongoing environmental changes [8]. Recognizing and responding to these psychological

effects is a critical component of comprehensive climate change mitigation and adaptation strategies, ensuring that mental health considerations are integrated into public health and policy responses to the climate crisis. Addressing mental health is crucial in fostering climate resilience, with targeted approaches aimed at supporting individuals and communities to cope with and engage effectively in climate action [9].

While the environment as a social determinant of mental health has been studied to a reasonable extent, climate change and its specific impact on mental health outcomes are yet to be linked with hard evidence [10]. While anecdotal examples may exist in terms of how climate distress can further exacerbate mental health conditions, data on the pathways through which these changes occur as well as studies on managing emotional distress from climate change, is limited (citation) Already, mental health clinicians are likely to see more and more cases of climate related distress such as eco-grief, climate anxiety, climate related depression and so on [4]. This will increase in coming years with widespread impact on more and more people of instances such as the creation of heat domes, frequent flooding, rising sea temperatures and global warming, along with the awareness of the scarcity of fossil fuels and the need for sourcing as well as harnessing renewable energy [3, 4]. Research suggests that indirect factors that also contribute to mental-emotional wellness in the face of climate change, include decision making around where to live, type of livelihoods to sustain and whether to reproduce offspring [6, 7].

1.2 Climate anxiety

Climate anxiety refers to the emotional distress caused by perceived threats associated with climate change. It encompasses feelings of fear, helplessness, and grief about the potential future impacts on our planet and well-being. In terms of prevalence, google searches for “climate anxiety” soared by 565 percent in 2021, with a sharp rise in prevalence from pre to post of the Covid-19 pandemic [4]. While a global pandemic was no doubt destabilizing and a widespread change in daily living for human beings globally, it is not an isolated incident of environmental change. Environment destruction in terms of ongoing warfare, public health emergencies, uncontrolled urbanization and infrastructure development also have secondary effects of climate anxiety and other mental health concerns. Understanding the psychological dimensions of climate anxiety is crucial for addressing the mental health consequences of environmental threats [6]. A survey of 10,000 young people across 10 countries (high and low-middle income) found that more than 50% reported feeling sad, anxious, angry, powerless, helpless, and guilty [5]. Seventy five percent said that they think the future is frightening and 83% said that they think people have failed to take care of the planet [4].

While these aspects may be seen as doomsaying or negative thinking, current research indicates the grave deleterious impact on some populations much more than others and the need for customized interventions, particularly focused on emotional regulation and resilience building [11].

2. Impact of climate change on different communities and populations

2.1 Young people

Youth aged 18–25 years are among the global majority and by 2050, the age group 18–45 will be close to 70% of the world’s population [12]. With this in mind, young

people's well being is most affected directly or indirectly by climate change in terms of career options or personal decision making, stressors due to environmental factors and the lack of sustainable or environmentally-centric regional policies across countries [13]. Various data from global sources, indicate that via self report, youth endorse a high number of symptoms and climate event related distress [4]. At the same time, youth groups also mobilize to raise climate awareness, work with local bodies and provide psychoeducation to the masses on climate change [4]. The impact of youth leadership and advocacy could be studied further as an important catalyst in the fight for climate justice.

2.2 The elderly

Although there is a significant population of elderly individuals (aged 65+) in most countries in the world, there is limited understanding about the impact of climate change on this population and their involvement in climate justice efforts [12]. In older adults, climate change impacts on health are visible due to poorer air quality or pollutants causing chronic respiratory or skin health conditions, financial unaffordability in rapidly developing urban spaces or degradation of community landscapes, ongoing risk to the environmental topography and a sense of increased isolation with family members dispersed across regions [12]. Witnessing these effects decade after decade, adversely impacts their mental health [14]. Many older adults are typically localized in a particular community for several years at a time and express concerns about the legacy being left to generations to follow [12, 14].

2.3 Marginalized communities

Certain individuals, cultural groups and communities are particularly vulnerable to climate change related events. These may be due to socio-economic hardships in agrarian, indentured laborers or fishing communities, lack of social or financial capital and agency in political systems. Indigenous groups have witnessed a degradation of their resources, culture and way of life world over for many generations due to colonization, imperialism, the misuse of natural resources and displacement [15, 16]. For many communities, especially indigenous groups, nature is intrinsically tied to their daily functioning and well being. For example, Inuit communities in the northern regions of Canada experience a loss of oral tradition, livelihood and cultural symbols due to industrialization, loss of Arctic icescapes and so on [17]. Similarly low caste and social class communities in the Sunderbans in the east of India, experience threat due to frequent floods as well as a loss of traditional practices as or livelihoods due to chemical refuse, toxicity or pollution in the water and so on [13].

2.4 Communities impacted by war and socio-political unrest

Communities in war torn areas or impacted by geopolitical stress are also likely to witness the detrimental impacts of climate change on their day to day living. For example, due to ethnic cleansing, genocide and increased militarization, residents in countries like Ukraine, Afghanistan, Palestine, Sudan, Yemen are more likely to incur climate change related challenges including drought, famine, unsanitary soil and water, which also impact mental health and well-being [18]. Regions where nuclear plants exist or where nuclear testing is being conducted, are also grossly impacted [19, 20].

2.5 Climate distress as an additional stressor for existing mental health conditions

The impact of distressing climate events on mental health can exacerbate for persons with existing mental health conditions [3, 21]. For example, youth living with depression were faced with greater severity of symptoms on account of having fears or imminent threats about climate change related to their geographical locations and living conditions, fears for self and loved ones coming in harms way as well as destruction of nature- all facing cumulative struggles on account of environmental changes [22, 23]. Individuals experiencing sub-threshold and diagnosable levels of generalized anxiety, also experience climate and extreme weather events as additional risk factors [23].

3. Confronting the psychological impact of climate change

While many individuals or communities develop adaptive responses that are positive and proactive, it is crucial to acknowledge that people also experience a range of impacts and complex reactions as they confront the realities of climate change – and these effects have the potential to have profound impacts on the health, functioning, and wellbeing of individuals and communities [24–26]. Healthcare providers are already beginning to see impacts on service users, and it is anticipated that these impacts will grow worse with increased frequency and intensity of climate changes [27–29].

Risk perception is a key determinant in individualized responses [3]. Disengagement and denial are common coping responses, where individuals, overwhelmed by the magnitude of the problem, ignore or minimize its importance [30, 31]. This form of psychological distancing can temporarily reduce anxiety but may ultimately hinder constructive action and awareness-building [32–38]. Alongside these reactions, a growing number of people are experiencing eco-anxiety and ecological grief or hopelessness as they mourn the loss of natural landscapes, biodiverse species, and detriment to the planet's future [39, 40]. Such feelings can be intensified by a loss of faith in institutions, as governmental and corporate entities often appear slow to enact the necessary environmental policies or do not invest in sustainable practices, leaving individuals feeling powerless and disillusioned [41]. Additionally, the concept of ecoparalysis, where awareness and concern for the environmental crisis freeze individuals into inaction because the problem feels too vast to tackle, is becoming increasingly recognized as a significant cognitive bias that halts momentum towards climate change efforts [42, 43]. These psychological barriers not only affect personal wellbeing but also impact the collective effort needed to address climate change effectively [44].

Emotional responses to climate change cover varied, and sometimes conflicting, positive and negative emotional responses like worry, concern, fear; stress, anxiety, trauma, panic; sadness, grief, loss; guilt, regret, shame; frustration anger, isolation, loneliness, alienation; powerlessness, apathy, and pessimism are all common [45–57]. These feelings that arise from both the slow moving and acute effects of climate change on weather patterns and other natural events [58]. Within these categories, individuals experience a wide range of clinical, sub-clinical, and non-clinical severities that have varied impact on their quality of life, and they may have difficulty articulating or differentiating these experiences [59].

Impacts of this distress include emotional, physiological, cognitive and daily functioning impairments (e.g., lack of focus, poor sleep, lack of motivation, reduced appetite, rumination, not doing work or school, avoidance of tasks, less life satisfaction) as well as social reactions and consequences (e.g., conflicts and disagreements, existential disconnection from others and so on) [60]. Such effects have considerable potential to increase psychopathologies in children and other populations – undermining our capacity to prevent, mitigate, and adapt to climate change [61–63].

3.1 Individual-level impacts

3.1.1 Physical health and development

The most obvious way that climate emotions impact health is through the wear and tear they cause on our physiology. Indeed, decades of studies now highlight the profound impact that emotions can have on our minds and bodies. The logic for these impacts is clear: our brains have evolved to help us navigate threats. When we experience distress, our brains mobilize our bodily resources into action. This may occur repeatedly, placing strain on the neurological and endocrinal systems. These processes have physical costs – particularly when individuals are repeatedly exposed to unresolved, and repetitive stressors [64].

While these responses are to be expected and natural, the emotional distress they cause can have profound influences on the body [7]. For example, in the context of climate anxiety and risk perceptions, the body's response to perceived stress through the activation of the Autonomic Nervous System (ANS) and the Hypothalamic-Pituitary-Adrenal (HPA) axis unfolds in a nuanced, multi-step process [65, 66]. Initially, the brain, particularly the amygdala, identifies the existential threat posed by climate change, triggering a distress signal to the hypothalamus [65]. This leads to the activation of the sympathetic branch of the ANS, mobilizing a “fight or flight” response characterized by the release of adrenaline and noradrenaline from the adrenal medulla [66]. These hormones prepare the body for immediate action by increasing heart rate, blood pressure, and redirecting blood towards muscles. Concurrently, the hypothalamus releases corticotropin-releasing hormone (CRH), prompting the pituitary gland to secrete adrenocorticotrophic hormone (ACTH), which in turn stimulates the release of cortisol from the adrenal cortex [65, 66]. Cortisol, the body's primary stress hormone, mobilizes glucose for energy, suppresses the immune system, and sharpens alertness, while also initiating a feedback loop to modulate the stress response [67, 68].

Under normal conditions, the abundance of circulating cortisol causes a reduction in HPA axis activity [69]. The parasympathetic nervous system would then promote relaxation and recovery, restoring physiological balance [64]. However, when the stressors are not removed and individuals are exposed chronically to it, the system eventually becomes dysregulated, resulting in sustained cortisol production and prolonged sympathetic activity without adequate parasympathetic counterbalance [67]. This imbalance exacerbates health issues associated with chronic stress, including cardiovascular diseases, digestive issues and compromised immune function as well as accelerated biological aging and alterations to the brain and other bodily processes [70–75].

3.1.2 Social and community impacts

The psychological toll of climate change extends far beyond the individual, seeping into the fabric of families and personal relationships in profound ways.

As individuals grapple with the mental health challenges posed by ecological distress, the repercussions often manifest in emotional and behavioral changes that can alter family dynamics and personal well-being [76].

At the heart of the familial consequences is the emotional contagion of climate-related anxiety and distress. When one family member is deeply affected by climate anxiety, their heightened state of worry and despair can influence the emotional climate of the entire household [77, 78]. Children, highly sensitive to the emotions of caregivers, may mirror these anxieties, even without fully understanding their source. This shared emotional burden can strain familial bonds, with hyper-activated and emotionally dysregulated members struggling to cope, along with other members feeling helpless or frustrated in their attempts to provide meaningful understanding or support [78]. Moreover, the pervasive nature of climate anxiety can lead to a chronic state of stress within the household, potentially exacerbating existing familial tensions [78]. The constant undercurrent of worry about future calamities—ranging from extreme weather events to concerns about resource scarcity—can make everyday stressors more difficult to manage.

The impact of climate-related mental health problems on individual behavior can have significant implications for personal and familial life. For some, coping mechanisms may manifest as withdrawal from social or occupational activities, a retreat that can isolate individuals from their support networks at a time when they need it most and also cause financial uncertainty or strain [79]. Studies also highlight the link between climate change and increased marital conflict as well as interpersonal violence or intimate partner violence [6, 8].

Climate anxiety and related mental health challenges can profoundly affect how individuals engage with their communities. Indeed, the constant undercurrent of anxiety can make it difficult for community members to participate in social activities or engage in civic duties with the same level of enthusiasm and energy, potentially leading to a decline in community participation and civic engagement. Individuals may also experience role confusion while juggling many of life's demands. Moreover, disagreements over how to respond to climate challenges—ranging from local environmental initiatives to community-wide adaptation strategies—can create divisions within communities, further eroding social cohesion [80, 81].

3.2 Impact on public health and healthcare systems

The psychological toll of climate change, manifesting through various mental health issues like climate anxiety, eco-grief, and solastalgia, places an increasing demand on public health and healthcare systems worldwide [4, 7]. These systems, already stretched in many regions due to a range of health crises, face additional challenges in addressing the nuanced and growing need for climate-related mental health services.

The rising prevalence of climate-related mental health problems presents a significant public health challenge, requiring systems to adapt to the growing demand for mental health services. In regions directly affected by climate disasters—such as floods, wildfires, and hurricanes—the immediate and long-term psychological impact on affected populations can overwhelm local mental health services. The need for crisis approach, long-term psychological support, and trauma counseling increases sharply, often outstripping available resources and services [82].

Moreover, the indirect effects of climate change, such as economic instability and displacement, contribute to overall stress levels within communities, further

increasing the demand for mental health support and placing pressure on community resources. Public health systems must navigate these complex, intertwined challenges, balancing the need for immediate disaster response with the requirement for long-term mental health strategies.

Furthermore, the healthcare workforce itself is not immune to the impacts of climate change. Healthcare professionals may experience increased stress and burn-out as they deal with the dual pressures of their work and their personal responses to climate change. Ensuring the well-being of healthcare providers is essential for maintaining the capacity and quality of healthcare services, especially in times of increased demand.

4. Adaptive and maladaptive emotional responses to climate change

Given the multifaceted threats posed by climate change, individuals and communities across the globe must grapple with the realities of this unfolding crisis. In response, they exhibit a wide variety of adaptation and mitigation strategies aimed at safeguarding their health and wellbeing [83, 84]. On an individual level, actions range from adopting sustainable living practices, such as reducing waste and conserving water, to therapy, advocacy and public education efforts. Communities are coming together to develop resilience plans that address the unique environmental challenges they face, whether it's investing in green infrastructure to combat urban heat islands or implementing early warning systems for extreme weather events [12, 85–87].

As exemplified by the range of climate emotions summarized earlier in the chapter, people experience a wide range of feelings in response to climate change [88]. In describing these feelings, it is tempting to describe some as “good” or “positive” and others as “bad” or “negative.” However, we must move past such categories and instead consider whether the emotions are “adaptive” or “maladaptive.”

Climate worries and emotional responses are natural and understandable responses to the increasing awareness of global environmental changes and their potential impacts on our planet and future generations [7, 47, 89, 90]. For example, worry can even be helpful in promoting action to protect the environment. Indeed, these emotional reactions stem from a deep care for the environment and a recognition of the challenges that climate change presents to our way of life, natural habitats, and the global ecosystem at large. Acknowledging these feelings as valid and natural is a crucial first step in addressing the broader issue. It's important to understand that these responses are not only normal but also a sign of a healthy engagement with the world around us, reflecting a collective conscience about the environment and its preservation [91].

At the same time, there may be some responses which are very emotionally distressing or dysregulated. These responses can show up as people experiencing panic, aggression or reacting interpersonally with others. The goal in addressing the harmful negative health effects of climate worries is not to eliminate these concerns but to manage them in a way that fosters greater action and resilience while supporting a sense of wellbeing. As such, it may be necessary to determine which emotions help people adapt and which ones hinder adaptation [47, 92, 93]. Anxiety and worry, while natural, can impair an individual's ability to function effectively if left unchecked. Excessive anxiety can lead to feelings of helplessness, fatigue, and disengagement, hindering our capacity to take constructive action towards mitigating climate change. Therefore, the aim of mental health approaches and support mechanisms is to build

emotional regulation skills that can help transform these worries into energy that motivates action, assists with coping rather than debilitates individuals. By doing so, individuals can move from a state of anxiety to one of empowered action, contributing positively to climate solutions, self-care or community support [94].

Fostering resilience in the face of climate concerns involves building a toolkit of coping strategies that enhance one's ability to adapt to stressors while maintaining psychological wellbeing. This includes developing a supportive community that shares concerns and goals, engaging in meaningful actions that align with one's values, and cultivating a mindset that emphasizes problem-solving and adaptability [95]. Such strategies enable individuals to navigate their anxieties more effectively, channeling their concerns into actions to reinforce their sense of agency and purpose [96].

Interestingly, as highlighted above, emotional regulation and emotion management strategies may be the core mechanism in this capacity building for individuals, and social groups, thus worth exploring further [97].

5. Emotional regulation and emotional processing interventions for promoting climate related mental health

5.1 Individual and family therapies

At the individual level, addressing the psychological impacts of climate change involves a multifaceted approach that combines behavioral, cognitive, and emotional coping strategies to foster resilience, highlight sustainable activism, and enhance personal well-being [88]. Behavioral approaches emphasize active participation in environmental actions and sustainable lifestyle choices, helping individuals feel empowered and reducing eco-anxiety [96, 98]. This includes taking deliberate breaks from climate information to avoid overload, engaging in positive, fun social activities to boost morale, maintaining healthy routines, and concentrating efforts on specific issues to enhance engagement and minimize stress. Cognitive strategies focus on shifting mindsets towards resilience and constructive engagement, including reducing self-judgment, reframing setbacks as growth opportunities, setting realistic goals, and cultivating hope and optimism [99, 100].

5.1.1 Psychoeducation

Psychoeducation serves as a foundational approach, aiming to inform individuals about the nature of trauma and stress responses, helping them recognize their own reactions and understand that such responses are common after experiencing climate-related disasters [101, 102]. This knowledge empowers individuals, enabling them to identify strategies for coping and when to seek further help, thus demystifying the process of facing trauma and trauma recovery and facilitating a sense of control over one's recovery journey.

5.1.2 Emotion-focused coping

In the context of climate change, emotion-focused coping involves managing the emotional distress caused by the awareness of and impacts felt from climate change, rather than trying to directly change the climate-related problems themselves which may be beyond one's control [103]. This strategy is crucial because individuals often

feel overwhelmed by the magnitude of climate issues, feeling helpless about their ability to effect change on a global scale. Emotion-focused coping helps by allowing individuals to deal with feelings of anxiety, sadness, and anger that arise from witnessing the effects of climate change and worrying about the future. This approach encourages acceptance of the things we cannot immediately change, while fostering a sense of personal empowerment and emotional resilience through meaningful self care. By nurturing a positive emotional state, individuals are better equipped to engage in meaningful actions within their own spheres of influence, contributing to collective efforts on climate change [104]. Emotional coping techniques involve developing a deeper connection with one's feelings, using practices like body scanning meditation to enhance emotional awareness, expressing heavy emotions such as sadness, practicing self-compassion, labeling emotions, and recognizing shared feelings of distress over environmental issues to combat isolation [105]. Together, these strategies promote a holistic approach to navigating the emotional and psychological challenges posed by climate change, enhancing individuals' capacity to contribute effectively to environmental solutions while maintaining their mental and emotional health. Importantly, individual-level approaches have leveraged a wide variety of formats, including digital and online tools, worksheets and workbooks, therapies, and group programs.

5.1.3 Cognitive behavioral therapy for acute stress disorder or post-disaster distress (CBT for ASD/PDD)

These therapies are specifically designed to address the symptoms of acute stress disorder that may arise following direct exposure to traumatic events, including those related to climate change, such as natural disasters. This therapeutic approach involves helping individuals process their trauma, manage their symptoms of stress, and prevent the development of PTSD. Through techniques such as cognitive restructuring and exposure therapy, individuals learn to cope with their memories and reactions to the traumatic event, reducing symptoms of ASD and improving overall functioning [106]. This form of therapy focuses on identifying and altering negative thought patterns and behaviors that contribute to ongoing distress post-disaster [106]. In the context of climate change, CBT-PDD is particularly relevant for those who have lived through extreme weather events or environmental catastrophes. The therapy aids individuals in coping with the immediate psychological aftermath of such events and in building long-term strategies for dealing with the ongoing threat of climate change. CBT-PDD helps individuals to regain a sense of control over their lives through practical coping strategies and cognitive restructuring, enabling them to adapt more healthily to their changed realities [107].

Cognitive-Behavioral Therapy for Eco-Anxiety targets the maladaptive thought patterns contributing to anxiety and distress related to environmental concerns. By challenging catastrophic thinking and promoting problem-solving skills, therapy helps individuals reframe their relationship with environmental issues, reducing feelings of helplessness and promoting proactive engagement with climate solutions. The psychological mechanism at work is the restructuring of thought processes, leading to improved emotional regulation and adaptive behavior [88].

5.1.4 Acceptance and commitment therapy (ACT)

These programs offer a powerful framework for addressing the mental health impacts of climate change by promoting psychological flexibility [108]. ACT

encourages individuals to accept their reactions and be present with what life brings, teaching them to move towards their values rather than escaping or avoiding unpleasant situations. In the context of climate change, ACT programs help individuals confront the complex emotions associated with environmental crises, such as eco-anxiety, grief, and helplessness, without becoming overwhelmed. Through ACT, people learn to acknowledge these feelings without judgment, understand their values related to environmental stewardship, and commit to taking action that aligns with these values. This approach not only aids in coping with the emotional distress caused by climate change but also empowers individuals to engage in meaningful, values-driven actions towards sustainability and environmental protection, fostering a sense of purpose and agency. ACT can also be delivered in a group format, encouraging participants to reflect together on radical acceptance principles [108].

5.1.5 Healing after trauma skills (HATS)

This is an approach aimed at providing individuals with practical skills and strategies to recover from trauma [109]. HATS focuses on enhancing emotional regulation, developing healthy coping mechanisms, and building resilience. In communities affected by climate-related disasters, HATS can offer a framework for individuals and groups to navigate their emotional responses to trauma, fostering a sense of empowerment and promoting healing. The skills learned through HATS are vital for both immediate and long-term recovery, helping communities to adapt and thrive in the face of ongoing environmental challenges.

5.1.6 Support for students exposed to trauma (SSET)

This is a school-based program designed to help students who have been exposed to traumatic events. This approach provides a structured yet flexible series of lessons that teach emotional coping skills and resilience-building strategies [110, 111]. SSET is particularly relevant in the context of climate change, as it can address the trauma and anxiety that children and adolescents may experience due to witnessing or learning about climate-related disasters and their impacts. By providing support within the school environment, SSET helps normalize students' experiences, reduce stigma around seeking help, and build a supportive community for young people navigating these challenges.

5.1.7 Worksheet-based self-reflection approaches

These workbook approaches and self-help format tools offer individuals a structured format to explore their feelings, thoughts, and responses to climate change on a personal level [112, 113]. Participants are guided through a series of introspective questions and activities designed to help them identify and articulate their eco-anxiety, recognize its impact on their daily lives, and brainstorm actionable steps towards meaningful engagement with environmental issues, while practicing emotional regulation.

5.1.8 Digital mental health approaches

These utilize technology platforms, such as apps and websites, to deliver psychological support and resources to individuals experiencing eco-anxiety and

climate-related distress. For example, *Hold* is a self-guided website designed to help individuals reflect on their emotional responses to climate change. These approaches provide accessible, scalable, and personalized mental health care options, including self-guided therapy modules, virtual support groups, and informational resources on coping strategies [114]. Digital approaches emphasize the importance of accessibility and anonymity in reducing barriers to seeking help, with the aim of broadening the reach of mental health support to include those who might not engage with traditional therapeutic settings. By offering tools for self-management of symptoms and facilitating connections with others facing similar challenges, digital approaches aim to empower individuals with knowledge, support, and community, enhancing resilience to the psychological impacts of climate change.

Multidimensional family therapy (MDFT) emerges as a particularly effective approach in addressing the psychological aftermath of natural disasters related to climate change, targeting the complex interplay between individual trauma and family dynamics [115, 116]. This therapeutic model recognizes that natural disasters disrupt not only the lives of individuals but also the structural and functional integrity of families, which can exacerbate stress and hinder recovery. By focusing on multiple dimensions, including the individual's emotional and psychological needs, family interactions, and the broader social and environmental context, MDFT helps families navigate the challenges posed by climate-related disasters.

5.2 Group therapies

5.2.1 Psychological first aid (PFA)

This is a form of Mental Health First Aid (MHFA) which has been implemented following many climate-related distress events. It encompasses a range of approaches designed to reduce the initial distress caused by traumatic events and to foster short- and long-term adaptive functioning. Models such as the Johns Hopkins RAPID (Reflective Listening, Assessment of Needs, Prioritization, Approach, and Disposition); Listen, Protect, Connect; and Nebraska Psychological First Aid, provide immediate, compassionate support and are adaptable to various situations, including climate-related disasters [117–120]. PFA aims to create a safe environment, facilitate debriefing, offer practical assistance, and connect individuals with additional support resources. “Psychological first-aid involves practical, concrete help for immediate needs, including strategies for individuals and families to regain a sense of control over their lives.

Critical incident stress management (CISM) is a structured approach for dealing with the immediate aftermath of a traumatic event. It includes a range of techniques such as debriefings and defusing designed to prevent the development of PTSD [121]. By addressing the stress that results from critical incidents, such as natural disasters exacerbated by climate change, CISM helps individuals and groups process their experiences, reducing the intensity of their emotional reactions and promoting recovery. Psychological Debriefing is a specific type of approach aimed at discussing the event soon after it occurs, allowing individuals to express their feelings and thoughts in a safe, structured environment [122]. Although its effectiveness has been debated, the intention behind psychological debriefing is to mitigate the adverse effects of trauma by providing a forum for emotional catharsis and normalization of responses following a disaster [121, 122].

5.2.2 Skills for psychological recovery (SPR)

This is an approach designed to help individuals and their families/community gain skills in coping with the after-effects of PTSD and ongoing adversity [123]. SPR is particularly well-suited for the aftermath of climate-related disasters, providing practical strategies to manage distress, enhance problem-solving, and promote healthy coping mechanisms. The approach is flexible and can be tailored to the needs of individuals or communities, making it an effective tool for first responders, mental health professionals, and community leaders seeking to support recovery in the wake of environmental disasters.

5.2.3 Peer support workshops and groups

These focus on harnessing local strengths and resources to prepare for climate-related challenges. Through collective planning, skill-building, and group therapy, these groups enhance community cohesion and empower residents to take actionable steps towards resilience. The logic model here emphasizes the power of collective efficacy—when communities recognize their shared capacities, they are more likely to undertake effective action against common threats [8, 82, 85]. In doing so, these approaches strengthen social networks and encourage active participation in community life as buffers against the mental health impacts of climate change. These programs promote a sense of belonging and support, reducing isolation and facilitating collective coping strategies. This is based on social support theory, which posits that strong social ties are essential for psychological resilience (citation). Research has supported the importance of connections with others – both for promoting individual health and wellbeing, but also for motivating appropriate climate actions.

5.2.4 Climate resilience groups (see MHCCA)

These approaches focus on empowering young people and environmental stewards like indigenous community members to become leaders in climate resilience and mental health advocacy [124–126]. Programs train youth and other community members in understanding the psychological dimensions of climate change, equipping them with the skills to facilitate workshops, lead community initiatives, and serve as consultants or speakers on eco-anxiety and climate resilience. The logic model for these approaches emphasizes the dual benefits of empowerment and community impact; by nurturing leadership skills and providing a platform for marginalized groups. These programs aim to build self-efficacy for healthy and sustainable climate leadership while also creating a ripple effect of awareness, action, and psychological resilience across communities and generations.

5.3 Alternative treatments and interventions

5.3.1 Arts-based and creative approaches

Such interventions encompass musical, lyrical, poetry, artistic and other expressions, offering a unique avenue for addressing the mental health impacts associated with climate change. These approaches harness the power of creativity to process complex emotions and experiences that the climate crisis evokes, such as anxiety, grief, and a sense of overwhelm. Engaging in artistic activities provides individuals

with a non-verbal language through which they can express concerns, fears, and hopes about the environment and their future in it. Music and poetry, for example, can capture the deep emotional responses to environmental degradation and loss, offering both a cathartic release and a means to communicate these feelings to a broader audience [127, 128]. Creative expression also fosters a sense of connection and solidarity among those feeling isolated by their environmental concerns, building communities that share and understand these profound emotions. Through art, people can visualize a more sustainable world, inspiring action and change. Additionally, participating in or experiencing art that addresses climate change can raise awareness and encourage reflection on personal and collective environmental impacts, promoting a more mindful and sustainable way of living. These approaches not only help individuals manage the psychological stress of climate change but also mobilize emotional engagement and creativity as powerful tools for environmental advocacy and social change. By integrating the arts into mental health and environmental efforts, there's an opportunity to cultivate resilience, foster hope, and drive meaningful action in the face of the climate crisis, making arts-based and creative approaches a vital component in navigating the emotional terrain of today's environmental challenges.

5.3.2 Ecotherapy

This is therapeutic practice that aims to strengthen the emotional bond between humans and nature through immersive experiences. The objectives are to improve mental health, foster well-being and alleviate climate anxiety. Some developments in this area include nature-based interventions such as forest bathing, ecotherapy and art-based modalities. These interventions are based on the Biophilia Hypothesis which proposes that humans have an inherent connection and need for nature or nature affiliation [129]. Ecotherapy and nature-based therapies tap into the human-nature connection, offering therapeutic activities in natural settings to improve mental health [126]. Whether through gardening, guided nature walks, or wilderness therapy, ecotherapy provides a restorative environment that reduces stress, improves mood, and fosters a sense of belonging in the natural world [127–129]. The underlying rationale for these approaches is that direct interaction with nature facilitates a deep connection to the external environment, which in turn promotes psychological healing and emotional balance. Evidence also suggests that connection to the environment plays an important role in facilitating pro-environmental behaviors [127]. Participants engage in guided activities in natural settings, fostering mindfulness, relaxation, and a sense of belonging to the larger ecosystem. This approach supports the idea that human health is closely linked to the health of our natural surroundings, encouraging sustainable behaviors and environmental stewardship as part of the healing process. Importantly, however, connectedness to nature can also be a risk factor for the mental health effects – such as anxiety and grief – and as such it is important to ensure that such feelings are appropriately managed throughout the therapeutic process.

5.3.3 Mindfulness-based stress reduction (MBSR)

These are approaches that combine mindfulness practices with cognitive therapy techniques to help individuals better manage stress, anxiety, and depression. These feature practices such as meditation and yoga and aim to cultivate

mindfulness—a non-judgmental awareness of the present moment. These therapies teach individuals to focus on the present moment and observe their thoughts and feelings without judgment. In the face of climate change, MBSR can offer valuable tools for dealing with the pervasive sense of worry and existential dread that often accompanies concerns about the environment. By promoting mindfulness and acceptance, these therapies can help individuals reduce stress, enhance emotional regulation, and foster a greater sense of well-being despite the ongoing environmental crises [130]. These programs could be particularly effective in mitigating the effects of climate change anxiety, including tendencies towards rumination (repetitive, solitary contemplation of stressors) and co-rumination (excessively discussing problems without seeking solutions), and in navigating the challenges posed by disturbing media consumption. In an era where media content often exacerbates mental health issues by continuously highlighting environmental crises, maintaining a healthy media diet becomes crucial. By promoting mindfulness, individuals learn to engage with their thoughts and emotions in a more detached manner, reducing the inclination to ruminate or co-ruminate, leading to a more balanced emotional state.

6. Climate mental health assessments

In addition to the need for additional research, there is also a need to improve and standardize existing research to allow for a more systematic understanding of climate emotions, their impacts on health and wellbeing, and what can be done to minimize negative impacts while maximizing positive impacts.

Given the field's infancy, researchers are still grappling with this challenge in assessment. Despite this there are several tools and scales that are beginning to emerge which could be leveraged across studies including:

- Climate Change Perceptions Scale [97]
- Climate Change Skepticism Questionnaire [131]
- Cognitive Avoidance Questionnaire [132]
- Six Americas Super Short Survey [133]
- Inventory of Climate Emotions [134]
- The Emotional Climate Scale [135]
- Climate Change Worry Scale [136]
- Climate change distress and impairment scale [137]
- Climate Change Anxiety Scale (CCAS) [60]
- Hogg Eco-Anxiety Scale [61]
- Scale of Solastalgia (SOS) [138]

- Brief Solastalgia Scale [139]
- The Eco-Guilt Questionnaire (EPiQ-11) [52]
- Ecological Grief Questionnaire (EGriQ-6) [52]
- Eco-Paralysis Scale [140]
- Climate Change Hope Scale [141]
- Pro-Environmental Behavior Scale (PEBS) [142]

6.1 The role of climate cafes

Climate cafes, originating in 2015 in rural Scotland, serve the purpose of fostering an open dialog around climate issues, increasing attunement to distressing climate emotions, facilitating discussion about climate change with peers or other stakeholders and ventilation about troubling consequences of climate change within a safe, reflective space. Card et al. [143] noted that the social connection offered by climate cafes and involvement with invested others, might offset feelings of loneliness, isolation and social disconnection, while empowering individuals to action as well as creating resilience. Climate Cafés, offer safe and supportive spaces for individuals to openly share their feelings, fears, and hopes regarding climate change [144]. By facilitating collective discussion and action, these approaches aim to reduce feelings of isolation and helplessness, fostering a sense of empowerment and community solidarity. Participants are encouraged to engage in meaningful dialog, share personal experiences, and explore collective strategies for climate action, thereby enhancing community resilience and emotional well-being.

The underlying logic is that by bringing personal and often taboo topics into a community setting, individuals can find solidarity, understanding, and perhaps clarity in their personal decisions, reducing feelings of isolation and anxiety. Some meetings target professionals in the psychotherapeutic and psycho-spiritual domains, offering a space to reflect on the impact of climate change on their professional identities and practices. These meetings aim to integrate an understanding of ecological grief and anxiety into therapeutic practices, enhancing the capacity of mental health professionals to support clients navigating eco-distress and learning emotional regulation skills. The rationale here is that by acknowledging and addressing the psycho-emotional dimensions of climate change within therapeutic contexts, practitioners can foster greater resilience and healing, both for individuals and communities.

Some climate cafes and facilitator trainings particularly target the stages of emotional regulation in terms of identifying, labeling and ventilating feelings. Some approaches have utilized the speaker-witness model to build a sense of co-regulation in emotions. One aspect to consider is that emotional upheaval in these scenarios may or may not stem from direct environmental exposure or difficult interactions with other people, organizations and governmental policies as in other forms of interpersonal conflict. This is because climate related distress can be intrapsychic in nature and can be exacerbated by social or interpersonal factors. People also experience difficult emotions and process thoughts from lived experiences in dream states. As a result, emotional management may be a function of conscious emotional regulation

and self-management or more subconscious regulation in terms of building resilience, distress tolerance and capacity building around emotional management.

6.2 Therapist role in addressing climate anxiety

Therapists serve a crucial role in terms of normalizing and supporting the expression of climate distress associated with climate change. If increasingly, climate and environmental factors can be seen as an important determinant of mental health, the necessary consideration to the client-therapist relationships and therapeutic aspects, might come about. For example, therapist training and capacity building on these topics can be increased, such as attending climate café facilitator training or attending climate change education workshops or specialized climate therapy courses to increase the knowledge base. There are also emerging efforts to create assessment tools to measure and monitor climate distress so therapists can become comfortable making assessments [52]. This can help tailor appropriate treatment plans and along with modifications to treatment protocols, may provide clients more holistic mental healthcare.

The therapist's role in addressing climate anxiety or other mental health symptoms, may be multi-fold in (1) creating a safe space, thus establishing trust and providing a non-judgmental environment, (2) validating emotions by acknowledging and normalizing clients' anxiety and concerns, and (3) teaching coping strategies-equipping clients with tools to manage anxiety and build resilience.

Emotional regulation may thus be a key strategy determining how people process climate related distress. Clinicians taking climate café facilitator trainings may be better equipped to facilitate clinical conversations with individuals, couples/families as well as in groups.

There is an important aspect of therapist self-care that is also essential to consider. As therapists work with clients on these difficult topics, it may raise their own uncomfortable emotions or distress associated with climate change. Furthermore, the impact of working with clients who divulge climate anxiety or climate distress symptoms may be felt in terms of emotional heaviness and compassion fatigue, requiring therapists to engage in effective strategies to emotionally regulate themselves, seek therapy of their own and supervisory consultation or peer consultations with others experienced in the field of climate therapy.

7. Conclusion

As reviewed in this paper, climate change interventions are likely the need of the hour. Whether offered as prevention and psychoeducation, individualized treatments, in combination with other modalities or through psychoeducation and group formats like climate cafes, these aspects will be crucial to mental health coping in the years to come.

In terms of mechanisms, emotional regulation is at the helm of these processes. Particularly the role of ventilation of emotions around climate fears, lived experiences and anticipation for the future is important. Furthermore, skill building and sharing with one another in socially connected spaces might provide some tangible change, including impetus to climate action and increased social cohesion.

An important aspect of research moving forward, might be to evaluate the role of these interventions in impacting mental health outcomes, assessment of climate

distress and mental health symptoms as well as some metrics around resilience and improved functioning. As the science behind climate change psychology strengthens, it will likely draw more attention not only from mental health associations or organizations but also from governmental bodies, civil society and the world at large.

Given climate mental health is still an emerging area of interest, the limitations of this chapter and scope for further research includes (1) the lack of measurement and outcomes studies with real-world research participants on climate emotions and mental health which could be included in future research endeavors, (2) the lack of infrastructure to conduct a thorough systematic review on the topic, (3) the lack of critical methodology in the space of climate mental health measurement and evaluation, (4) the lack of external funding for this project. Therefore, further research grants are needed along with capacity building and collaboration of research teams to undertake projects in the afore-mentioned areas.

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References

- [1] Forster PM, Smith CJ, Walsh T, Lamb WF, Lamboll R, Hauser M, et al. Indicators of global climate change 2022: Annual update of large-scale indicators of the state of the climate system and human influence. *Earth System Science Data*. 2023;**15**(6):2295-2327
- [2] Esperon-Rodriguez M, Tjoelker MG, Lenoir J, et al. Climate change increases global risk to urban forests. *Nature Climate Change*. 2022;**12**:950-955. DOI: 10.1038/s41558-022-01465-8
- [3] Walinski A, Sander J, Gerlinger G, Clemens V, Meyer-Lindenberg A, Heinz A. The effects of climate change on mental health. *Deutsches Arzteblatt International*. 2023;**120**(8):117-124
- [4] Kurth C, Pihkala P. Eco-anxiety: What it is and why it matters. *Frontiers in Psychology*. 2022;**13**:981814
- [5] Clayton S. Climate anxiety: Psychological responses to climate change. *Journal of Anxiety Disorders*. 2020;**74**:102263
- [6] Dodds J. The psychology of climate anxiety. *BJPsych Bulletin*. 2021;**45**(4):222-226. DOI: 10.1192/bjb.2021.18
- [7] Galway LP, Field E. Climate Emotions and Anxiety among Young People in Canada: A National Survey and Call to Action. Available at SSRN: <https://ssrn.com/abstract=4217725> or. DOI: 10.2139/ssrn.4217725
- [8] Lawrance E, Thompson R, Fontana G, Jennings. The Impact of Climate Change on Mental Health and Emotional Wellbeing: Current Evidence and Implications for Policy and Practice. *PreventionWeb*; 2021. Available from: <https://www.preventionweb.net/publication/impact-climate-change-mental-health-and-emotional-wellbeing-current-evidence-and>
- [9] Albrecht G, Sartore GM, Connor L, Higginbotham N, Freeman S, Kelly B, et al. Solastalgia: The distress caused by environmental change. *Australasian Psychiatry*. 2007;**15**(1_suppl):S95-S98
- [10] Hurley EA, Dalglish SL, Sacks E. Supporting young people with climate anxiety: Mitigation, adaptation, and resilience. *Lancet Planet Health*. 2022;**6**(3):e190
- [11] Comtesse H, Ertl V, Hengst SMC, Rosner R, Smid GE. Ecological grief as a response to environmental change: A mental health risk or functional response? *International Journal of Environmental Research and Public Health*. 2021;**18**(2):734. DOI: 10.3390/ijerph18020734
- [12] Neta G, Pan W, Ebi K, Buss DF, Castranio T, Lowe R, et al. Advancing climate change health adaptation through implementation science. *Lancet Planet Health*. 2022;**6**(11):e909-e918
- [13] Middleton J, Cunsolo A, Jones-Bitton A, Shiwak I, Wood M, Pollock N, et al. "We're people of the snow:" Weather, climate change, and Inuit mental wellness. *Social Science & Medicine*. 2020;**262**:113137
- [14] Kriebel-Gasparro A. Climate change: Effects on the older adult. *The Journal for Nurse Practitioners*. 2022;**18**(4):372-376
- [15] White BP, Breakey S, Brown MJ, Smith JR, Tarbet A, Nicholas PK, et al. Mental health impacts of climate change among vulnerable populations globally:

An integrative review. *Annals of Global Health*. 2023;**89**(1):66

[16] Lebel L, Paquin V, Kenny TA, Fletcher C, Nadeau L, Chachamovich E, et al. Climate change and indigenous mental health in the circumpolar north: A systematic review to inform clinical practice. *Transcultural Psychiatry*. 2022;**59**(3):312-336

[17] Whyte K. Too late for indigenous climate justice: Ecological and relational tipping points. *Wiley Interdisciplinary Reviews: Climate Change*. 2020;**11**(1):e603

[18] Dasgupta S, Wheeler D, Sobhan MI, Bandyopadhyay S, Paul T. Coping with Climate Change in the Sundarbans: Lessons from Multidisciplinary Studies. *World Bank Publications*; 2020

[19] Hartnett R. Climate imperialism: Ecocriticism, postcolonialism, and global climate change. *Electronic Journal of Studies in the Tropics*. 2021;**20**(2):138-155

[20] Mercer H, Simpson T. Imperialism, colonialism, and climate change science. *Wiley Interdisciplinary Reviews: Climate Change*. 2023;**14**(6):e851

[21] Palinkas LA, Wong M. Global climate change and mental health. *Current Opinion in Psychology*. 2020;**32**:12-16

[22] van Nieuwenhuizen A, Hudson K, Chen X, Hwong AR. The effects of climate change on child and adolescent mental health: Clinical considerations. *Current Psychiatry Reports*. 2021;**23**:1-9

[23] Dooley L, Sheats J, Hamilton O, Chapman D, Karlin B. *Climate Change and Youth Mental Health: Psychological Impacts, Resilience Resources, and Future Directions*. Los Angeles, CA: See Change Institute; 2021

[24] Carlson JM, Foley J, Fang L. Climate change on the brain: Neural correlates of climate anxiety. *Journal of Anxiety Disorders*. 2024;**103**:102848

[25] Burke SEL, Sanson AV, Van Hoorn J. The psychological effects of climate change on children. *Current Psychiatry Reports*. 2018;**20**(5):35

[26] Ojala M. Regulating worry, promoting hope: How do children, adolescents, and young adults cope with climate change? *International Journal of Environmental and Science Education*. 2012;**7**(4):537-561

[27] Doyle P, Kelly I, O'Neill D. Older people: Canaries in the coal-mine for health effects of climate change. *Irish Medical Journal*. 2019;**112**(10):1015

[28] Roelofs C, Wegman D. Workers: The climate canaries. *American Journal of Public Health*. 2014;**104**(10):1799-1801

[29] Zhao Q, Yu P, Mahendran R, Huang W, Gao Y, Yang Z, et al. Global climate change and human health: Pathways and possible solutions. *Eco-Environment & Health*. 2022;**1**(2):53-62

[30] Haseley D. Climate change: Clinical considerations. *International Journal of Applied Psychoanalytic Studies*. 2019;**16**(2):109-115

[31] Randall R. A new climate for psychotherapy? *Psychotherapy and Politics International*. 2005;**3**(3):165-179

[32] Van Lange PAM, Huckelba AL. Psychological distance: How to make climate change less abstract and closer to the self. *Current Opinion in Psychology*. 2021;**42**:49-53

[33] Wang S, Hurlstone MJ, Leviston Z, Walker I, Lawrence C. Climate change from a distance: An analysis of construal

level and psychological distance from climate change. *Frontiers in Psychology*. 2019;**10**:230

[34] Spence A, Poortinga W, Pidgeon N. The psychological distance of climate change. *Risk Analysis: An Official Publication of the Society for Risk Analysis*. 2012;**32**(6):957-972

[35] Chu H, Yang JZ. Risk or efficacy? How psychological distance influences climate change engagement. *Risk Analysis: An Official Publication of the Society for Risk Analysis*. 2020;**40**(4):758-770

[36] Maiella R, La Malva P, Marchetti D, Pomarico E, Di Crosta A, Palumbo R, et al. The psychological distance and climate change: A systematic review on the mitigation and adaptation behaviors. *Frontiers in Psychology*. 2020;**11**:568899

[37] Raja US, Carrico AR. Formative experiences and psychological distance in the lives of contemporary environmentalists. *Frontiers in Psychology*. 2023;**14**:1192018

[38] Jones C, Hine DW, Marks ADG. The future is now: Reducing psychological distance to increase public engagement with climate change. *Risk Analysis: An Official Publication of the Society for Risk Analysis*. 2017;**37**(2):331-341

[39] Clayton S. Psychology and climate change. *Current Biology*. 2019;**29**(19):R992-R995

[40] Cianconi P, Betrò S, Janiri L. The impact of climate change on mental health: A systematic descriptive review. *Frontiers in Psychiatry*. 2020;**11**:74

[41] Hickman C, Marks E, Pihkala P, Clayton S, Lewandowski RE, Mayall EE, et al. Climate anxiety in children and young people and their beliefs about

government responses to climate change: A global survey. *Lancet Planet Health*. 2021;**5**(12):e863-e873

[42] Innocenti M, Santarelli G, Lombardi GS, Ciabini L, Zjalic D, Di Russo M, et al. How can climate change anxiety induce both pro-environmental behaviours and eco-paralysis? The mediating role of general self-efficacy. *International Journal of Environmental Research and Public Health*. 2023;**20**(4):3085

[43] Lukacs JN, Bratu A, Adams S, Logie C, Tok N, McCunn LJ, et al. The concerned steward effect: Exploring the relationship between climate anxiety, psychological distress, and self-reported climate related behavioural engagement. *Journal of Environmental Psychology*. 2023;**90**:102091

[44] Adams M. Critical psychologies and climate change. *Current Opinion in Psychology*. 2021;**42**:13-18

[45] Forbes D, Alkemade N, Waters E, Gibbs L, Gallagher C, Pattison P, et al. The role of anger and ongoing stressors in mental health following a natural disaster. *The Australian and New Zealand Journal of Psychiatry*. 2015;**49**(8):706-713

[46] Charlson F, Ali S, Benmarhnia T, Pearl M, Massazza A, Augustinavicius J, et al. Climate change and mental health: A scoping review. *International Journal of Environmental Research and Public Health*. 2021;**18**(9):4486

[47] O'Brien AJ, Elders A. Climate anxiety. When it's good to be worried. *Journal of Psychiatric and Mental Health Nursing*. 2022;**29**(3):387-389

[48] Soutar C, Wand APF. Understanding the spectrum of anxiety responses to climate change: A systematic review of

the qualitative literature. *International Journal of Environmental Research and Public Health*. 2022;**19**(2):990

[49] Malone PA, Pomeroy EC, Jones BL. Disoriented grief: A lens through which to view the experience of Katrina evacuees. *Journal of Social Work in End-of-Life & Palliative Care*. 2011;**7**(2-3):241-262

[50] Baumgartner T, Lobmaier JS, Ruffieux N, Knoch D. Feeling of guilt explains why people react differently to resource depletion warnings. *Scientific Reports*. 2021;**11**(1):11988

[51] Schneider CR, Zaval L, Weber EU, Markowitz EM. The influence of anticipated pride and guilt on pro-environmental decision making. *PLoS One*. 2017;**12**(11):e0188781

[52] Ágoston C, Urbán R, Nagy B, Csaba B, Kőváry Z, Kovács K, et al. The psychological consequences of the ecological crisis: Three new questionnaires to assess eco-anxiety, eco-guilt, and ecological grief. *Climate Risk Management*. 2022;**37**:100441

[53] Basch CH, Yalamanchili B, Fera J. #Climate change on TikTok: A content analysis of videos. *Journal of Community Health*. 2021;**47**(1):163-167. DOI: 10.1007/s10900-021-01031-x

[54] Nordgren A. Pessimism and optimism in the debate on climate change: A critical analysis. *Journal of Agricultural and Environmental Ethics*. 2021;**34**(4):22

[55] Williams MN, Jaftha BA. Perceptions of powerlessness are negatively associated with taking action on climate change: A preregistered replication. *Ecopsychology*. 2020;**12**(4):257-266

[56] Gunderson R. Powerless, stupefied, and repressed actors cannot challenge

climate change: Real helplessness as a barrier between environmental concern and action. *Journal for the Theory of Social Behaviour*. 2023;**53**(2):271-295

[57] Galway LP, Field E. Climate emotions and anxiety among young people in Canada: A national survey and call to action. *Journal of Climate Change and Health*. 2023;**9**:100204

[58] Aitken C, Chapman R, McClure J. Climate change, powerlessness and the commons dilemma: Assessing New Zealanders' preparedness to act. *Global Environmental Change*. 2011;**21**(2):752-760

[59] Ekman P. Are there basic emotions? *Psychological Review*. 1992;**99**(3):550-553

[60] Clayton S, Karazsia BT. Development and validation of a measure of climate change anxiety. *Journal of Environmental Psychology*. 2020;**69**:101434

[61] Hogg T, Stanley S, O'Brien L, Wilson M, Watsford C. The Hogg Eco-Anxiety Scale: Development and Validation of a Multidimensional Scale [Internet]. *OSF Preprints*; 2021. Available from: <https://osf.io/rxudb/> [Accessed: September 1, 2021]

[62] Whitmarsh L, Player L, Jiongco A, James M, Williams M, Marks E, et al. Climate anxiety: What predicts it and how is it related to climate action? *Journal of Environmental Psychology*. 2022;**83**:101866

[63] Boluda-Verdú I, Senent-Valero M, Casas-Escolano M, Matijasevich A, Pastor-Valero M. Fear for the future: Eco-anxiety and health implications, a systematic review. *Journal of Environmental Psychology*. 2022;**84**:101904

- [64] Chu B, Marwaha K, Sanvictores T, Ayers D. Physiology, stress reaction. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK541120/> [Accessed: April 2, 2024]
- [65] Kinlein SA, Wilson CD, Karatsoreos IN. Dysregulated hypothalamic-pituitary-adrenal axis function contributes to altered endocrine and neurobehavioral responses to acute stress. *Frontiers in Psychiatry*. 2015;**6**:31
- [66] Dieleman GC, Huizink AC, Tulen JHM, Utens EMWJ, Creemers HE, van der Ende J, et al. Alterations in HPA-axis and autonomic nervous system functioning in childhood anxiety disorders point to a chronic stress hypothesis. *Psychoneuroendocrinology*. 2015;**51**:135-150
- [67] Jones C, Gwenin C. Cortisol level dysregulation and its prevalence—Is it nature's alarm clock? *Physiological Reports*. 2021;**8**(24):e14644
- [68] Hartig EI, Zhu S, King BL, Coffman JA. Chronic cortisol exposure in early development leads to neuroendocrine dysregulation in adulthood. *BMC Research Notes*. 2020;**13**(1):366
- [69] Stephens MAC, Wand G. Stress and the HPA axis. *Alcohol Research: Current Reviews*. 2012;**34**(4):468-483
- [70] McEwen BS. Neurobiological and systemic effects of chronic stress. *Chronic Stress* (Thousand Oaks, Calif.). 2017;**1**:2470547017692328
- [71] Nicolaidis NC, Kyratzi E, Lamprokostopoulou A, Chrousos GP, Charmandari E. Stress, the stress system and the role of glucocorticoids. *Neuroimmunomodulation*. 2015;**22**(1-2):6-19
- [72] Dhabhar FS. Effects of stress on immune function: The good, the bad, and the beautiful. *Immunologic Research*. 2014;**58**(2-3):193-210
- [73] Hawkey LC, Berntson GG, Engeland CG, Marucha PT, Masi CM, Cacioppo JT. Stress, aging, and resilience: Can accrued wear and tear be slowed? *Canadian Psychology/Psychologie Canadienne*. 2005;**46**(3):115-125
- [74] O'Donovan A, Slavich GM, Epel ES, Neylan TC. Exaggerated neurobiological sensitivity to threat as a mechanism linking anxiety with increased risk for diseases of aging. *Neuroscience and Biobehavioral Reviews*. 2013;**37**(1):96-108
- [75] Licht CMM, Vreeburg SA, van Reedt Dortland AKB, Giltay EJ, Hoogendijk WJG, DeRijk RH, et al. Increased sympathetic and decreased parasympathetic activity rather than changes in hypothalamic-pituitary-adrenal axis activity is associated with metabolic abnormalities. *The Journal of Clinical Endocrinology and Metabolism*. 2010;**95**(5):2458-2466
- [76] Gubman GD, Tessler RC. The impact of mental illness on families: Concepts and priorities. *Journal of Family Issues*. 1987;**8**(2):226-245
- [77] Larson RW, Almeida DM. Emotional transmission in the daily lives of families: A new paradigm for studying family process. *Journal of Marriage and the Family*. 1999;**61**(1):5-20
- [78] Herrando C, Constantinides E. Emotional contagion: A brief overview and future directions. *Frontiers in Psychology*. 2021;**12**:712606
- [79] Vergunst F, Berry HL. Climate change and children's mental health: A developmental perspective.

Clinical Psychological Science: An Official Journal of the Association for Psychological Science. 2022;**10**(4):767-785

[80] Repetti RL. Social withdrawal as a short-term coping response to daily stressors. In: Hostility, Coping, & Health. Washington, DC, US: American Psychological Association; 1992. pp. 151-165

[81] Noel P, Cork C, White RG. Social capital and mental health in post-disaster/conflict contexts: A systematic review. Disaster Medicine and Public Health Preparedness. 2018;**12**(6):791-802

[82] Prior J. Community engagement to resolve climate adaptation conflicts. In: Climate Adaptation Futures [Internet]. John Wiley & Sons, Ltd; 2013. pp. 167-176. Available from: <https://onlinelibrary.wiley.com/doi/abs/10.1002/9781118529577.ch16> [Accessed: March 31, 2024]

[83] Abbass K, Qasim MZ, Song H, Murshed M, Mahmood H, Younis I. A review of the global climate change impacts, adaptation, and sustainable mitigation measures. Environmental Science and Pollution Research International. 2022;**29**(28):42539-42559

[84] Delpla I, Diallo TA, Keeling M, Bellefleur O. Tools and methods to include health in climate change adaptation and mitigation strategies and policies: A scoping review. International Journal of Environmental Research and Public Health. 2021;**18**(5):2547

[85] Rayan M, Gruehn D, Khayyam U. Planning for sustainable green urbanism: An empirical bottom-up (community-led) perspective on green infrastructure (GI) indicators in Khyber Pakhtunkhwa (KP), Pakistan. International Journal of Environmental Research and Public Health. 2022;**19**(19):11844

[86] Barron S, Nitoslawski S, Wolf KL, Woo A, Desautels E, Sheppard SRJ. Greening blocks: A conceptual typology of practical design interventions to integrate health and climate resilience co-benefits. International Journal of Environmental Research and Public Health. 2019;**16**(21):4241

[87] Lowe D, Ebi KL, Forsberg B. Heatwave early warning systems and adaptation advice to reduce human health consequences of heatwaves. International Journal of Environmental Research and Public Health. 2011;**8**(12):4623-4648

[88] Seth A, Maxwell J, Dey C, Le Feuvre C, Patrick R. Understanding and managing psychological distress due to climate change. Australian Journal of General Practice. 2023;**52**(5):263-268

[89] Roeser S. Risk communication, public engagement, and climate change: A role for emotions. Risk Analysis: An Official Publication of the Society for Risk Analysis. 2012;**32**(6):1033-1040

[90] Bhullar N, Davis M, Kumar R, Nunn P, Rickwood D. Climate anxiety does not need a diagnosis of a mental health disorder. Lancet Planet Health. 2022;**6**(5):e383

[91] Davidson DJ. Rethinking adaptation: Emotions, evolution, and climate change. Nature and Culture. 2018;**13**(3):378-402

[92] Cunsolo A, Harper SL, Minor K, Hayes K, Williams KG, Howard C. Ecological grief and anxiety: The start of a healthy response to climate change? Lancet Planet Health. 2020;**4**(7):e261-e263

[93] Cunsolo A, Ellis NR. Ecological grief as a mental health response to climate change-related loss. Nature Climate Change. 2018;**8**(4):275-281

- [94] Heeren A, Asmundson G. Understanding climate anxiety: What decision-makers, health care providers, and the mental health community need to know to promote adaptive coping. *Journal of Anxiety Disorders*. 2022;**93**:102654. DOI: 10.1016/j.janxdis.2022.102654
- [95] LeDoux JE, Gorman JM. A call to action: Overcoming anxiety through active coping. *The American Journal of Psychiatry*. 2001;**158**(12):1953-1955
- [96] Baudon P, Jachens L. A scoping review of interventions for the treatment of eco-anxiety. *International Journal of Environmental Research and Public Health*. 2021;**18**(18):9636. DOI: 10.3390/ijerph18189636
- [97] Charlson F, Ali S, Augustinavicius J, Benmarhnia T, Birch S, Clayton S, et al. Global priorities for climate change and mental health research. *Environment International*. 2022;**158**:106984
- [98] Gunasiri H, Wang Y, Watkins EM, Capetola T, Henderson-Wilson C, Patrick R. Hope, coping and eco-anxiety: Young people's mental health in a climate-impacted Australia. *International Journal of Environmental Research and Public Health*. 2022;**19**(9):5528
- [99] Carr A, Cullen K, Keeney C, Canning C, Mooney O, Chinseallaigh E, et al. Effectiveness of positive psychology interventions: A systematic review and meta-analysis. *The Journal of Positive Psychology*. 2021;**16**(6):749-769
- [100] Bolier L, Haverman M, Westerhof GJ, Riper H, Smit F, Bohlmeijer E. Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health*. 2013;**13**(1):119
- [101] Mughairbi FA, Abdulaziz Alnajjar A, Hamid A. Effects of psychoeducation and stress coping techniques on posttraumatic stress disorder symptoms. *Psychological Reports*. 2020;**123**(3):710-724
- [102] Oflaz F, Hatipoğlu S, Aydin H. Effectiveness of psychoeducation intervention on post-traumatic stress disorder and coping styles of earthquake survivors. *Journal of Clinical Nursing*. 2008;**17**(5):677-687
- [103] Van Zomeren M, Pauls IL, Cohen-Chen S. Is hope good for motivating collective action in the context of climate change? Differentiating hope's emotion- and problem-focused coping functions. *Global Environmental Change*. 2019;**58**:101915
- [104] Birken M, Wong HT, McPherson P, Killaspy H. A systematic review of the published literature on interventions to improve personal self-care for people with severe mental health problems. *British Journal of Occupational Therapy*. 2021;**84**(4):200-211
- [105] Algorani EB, Gupta V. Coping mechanisms. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024. Available from: <http://www.ncbi.nlm.nih.gov/books/NBK559031/> [Accessed: April 2, 2024]
- [106] Bryant RA, Moulds ML, Nixon RVD. Cognitive behaviour therapy of acute stress disorder: A four-year follow-up. *Behaviour Research and Therapy*. 2003;**41**(4):489-494
- [107] Ferreira MG, Mariano LI, Rezende JV de, Caramelli P, Kishita N. Effects of group acceptance and commitment therapy (ACT) on anxiety and depressive symptoms in adults: A meta-analysis. *Journal of Affective Disorders*. 2022;**309**:297-308.
- [108] Gurwitch R. Healing after Trauma Skills (H.A.T.S.) : A Manual for

Professionals, Teachers, and Families Working with Children after Trauma/ Disaster [Internet]. 2005. Available from: <https://digitalprairie.ok.gov/digital/collection/stgovpub/id/10263/> [Accessed: March 31, 2024]

[109] Wu J. Support for Students Exposed to Trauma: School Support for Childhood Trauma [Internet]. The National Child Traumatic Stress Network; 2017. Available from: <https://www.nctsn.org/interventions/support-students-exposed-trauma-school-support-childhood-trauma> [Accessed: March 31, 2024]

[110] Jaycox LH, Langley AK, Stein BD, Wong M, Sharma P, Scott M, et al. Support for students exposed to trauma: A pilot study. *School Mental Health*. 2009;**1**(2):49-60

[111] Rowe CL, Liddle HA. When the levee breaks: Treating adolescents and families in the aftermath of hurricane katrina. *Journal of Marital and Family Therapy*. 2008;**34**(2):132-148

[112] Eco-Anxious Stories [Internet]. Ecoanxious.ca; 2024. Available from: <https://ecoanxious.ca/resources/follow-the-feeling/> [Accessed: October 18, 2024]

[113] Han H, Ahn SW. Youth mobilization to stop global climate change: Narratives and impact. *Sustainability*. 2020;**12**(10):4127

[114] Taylor LK, Weems CF. Cognitive-behavior therapy for disaster-exposed youth with posttraumatic stress: Results from a multiple-baseline examination. *Behavior Therapy*. 2011;**42**(3):349-363

[115] Liddle HA. Multidimensional family therapy: Evidence base for transdiagnostic treatment outcomes, change mechanisms, and implementation in community settings. *Family Process*. 2016;**55**(3):558-576

[116] Wang L, Norman I, Edleston V, Oyo C, Leamy M. The effectiveness and implementation of psychological first aid as a therapeutic intervention after trauma: An integrative review. *Trauma, Violence, & Abuse*. 2024;**25**(4):2638-2656. DOI: 10.1177/15248380231221492

[117] Wang L, Norman I, Xiao T, Li Y, Leamy M. Psychological first aid training: A scoping review of its application, outcomes and implementation. *International Journal of Environmental Research and Public Health*. 2021;**18**(9):4594

[118] Sim T, Wang A. Contextualization of psychological first aid: An integrative literature review. *The Journal of Nursing Scholarship*. 2021;**53**(2):189-197

[119] Gilbert R, Abel MR, Vernberg EM, Jacobs AK. The use of psychological first aid in children exposed to mass trauma. *Current Psychiatry Reports*. 2021;**23**(9):53

[120] Müller-Leonhardt A, Mitchell SG, Vogt J, Schürmann T. Critical incident stress management (CISM) in complex systems: Cultural adaptation and safety impacts in healthcare. *Accident; Analysis and Prevention*. 2014;**68**:172-180

[121] Everly GS, Flannery RB, Eyster VA. Critical incident stress management (CISM): A statistical review of the literature. *The Psychiatric Quarterly*. 2002;**73**(3):171-182

[122] Wade D, Crompton D, Howard A, Stevens N, Metcalf O, Brymer M, et al. Skills for psychological recovery: Evaluation of a post-disaster mental health training program. *Disaster Health*. 2014;**2**(3-4):138-145

[123] Abebe N. Exploring Climate Change and Mental Health: An Educational Toolkit. 2022

- [124] Richards G, Frehs J, Myers E, Bibber MV. Commentary the climate change and health adaptation program: Indigenous climate leaders' championing adaptation efforts. *Health Promotion and Chronic Disease Prevention in Canada: Research, Policy and Practice*. 2019;**39**(4):127-130
- [125] Neil AL, Pryor A, Kneebone J, Flies EJ, Nature Effect Team. Outdoor mental healthcare: What, who, why and where to? *Australasian Psychiatry: Bulletin of Royal Australian and New Zealand College of Psychiatrists*. 2023;**31**(6):798-805
- [126] Adewuyi FA, Knobel P, Gogna P, Dadvand P. Health effects of green prescription: A systematic review of randomized controlled trials. *Environmental Research*. 2023;**236**(Pt 2):116844
- [127] Keller J, Kayira J, Chawla L, Rhoades JL. Forest bathing increases adolescents' mental well-being: A mixed-methods study. *International Journal of Environmental Research and Public Health*. 2023;**21**(1):8
- [128] Khoury B, Sharma M, Rush SE, Fournier C. Mindfulness-based stress reduction for healthy individuals: A meta-analysis. *Journal of Psychosomatic Research*. 2015;**78**(6):519-528
- [129] Brady E. Nature Rx: Addressing climate anxiety through eco therapeutic practices and nature immersion to increase Earth stewardship. *Health, and Hope*. 2023
- [130] Our Story - Climate Cafe [Internet]. Climate.cafe; 2024. Available from: <https://www.climate.cafe/our-story/> [Accessed: October 18, 2024]
- [131] Van Valkengoed AM, Steg L, Perlaviciute G. Development and validation of a climate change perceptions scale. *Journal of Environmental Psychology*. 2021;**76**:101652
- [132] De Graaf JA, Stok FM, de Wit JBF, Bal M. The climate change skepticism questionnaire: Validation of a measure to assess doubts regarding climate change. *Journal of Environmental Psychology*. 2023;**89**:102068
- [133] Sexton KA, Dugas MJ. The cognitive avoidance questionnaire: Validation of the english translation. *Journal of Anxiety Disorders*. 2008;**22**(3):355-370
- [134] Meshes E, Kamau LZ, Summers M, Hoppin KB. Climate change and six Americas: What can behavior analysts do? *Behavior and Social Issues*. 2022;**31**(1):497-521
- [135] Marczak M, Wierzba M, Zaremba D, Kulesza M, Szczypiński J, Kossowski B, et al. Beyond climate anxiety: Development and validation of the inventory of climate emotions (ICE): A measure of multiple emotions experienced in relation to climate change. *Global Environmental Change*. 2023;**83**:102764
- [136] Washington E, Zandvakili E. The emotional climate scale: Understanding emotions, context and justice. *Journal of Education and Learning*. 2018;**8**:21
- [137] Hepp J, Klein SA, Horsten LK, Urbild J, Lane SP. Introduction and behavioral validation of the climate change distress and impairment scale. *Scientific Reports*. 2023;**13**(1):11272
- [138] Cáceres C, Leiva-Bianchi M, Serrano C, Ormazábal Y, Mena C, Cantillana JC. What is solastalgia and how is it measured? SOS, a validated scale in population exposed to drought and forest fires. *International Journal*

of Environmental Research and Public Health. 2022;**19**(20):13682

[139] Christensen BK, Monaghan C, Stanley SK, Walker I, Leviston Z, Macleod E, et al. The brief solastalgia scale: A psychometric evaluation and revision. *EcoHealth*. 2024;**21**(1):83-93. DOI 10.1007/s10393-024-01673-y

[140] Innocenti M, Perilli A, Santarelli G, Carluccio N, Zjalic D, Acquadro Maran D, et al. How does climate change worry influence the relationship between climate change anxiety and eco-paralysis? A moderation study. *Climate*. 2023;**11**:190

[141] Li C, Monroe MC. Development and validation of the climate change hope scale for high school students. *Environment and Behavior*. 2018;**50**(4):454-479

[142] Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The brief resilience scale: Assessing the ability to bounce back. *International Journal of Behavioral Medicine*. 2008;**15**(3):194-200

[143] Kiffer CG, Carly M, Niloufar A, Bratu A, Kalysha C, Martin G, et al. The Effect of Subjective Social Disconnectedness on Climate Change Anxiety. Available at SSRN: <https://ssrn.com/abstract=4097132> or <http://dx.doi.org/10.2139/ssrn.4097132>

[144] Card KG, Palmer-Fluevog A. Understanding the mental health impacts of climate change and how to address them: A review of climate-related emotions and corresponding mental health approaches. 2024

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Emotional regulation refers to recognising, managing, and responding to emotional experiences in a healthy and constructive way. It involves adjusting one's emotional responses, whether by suppressing, amplifying, or changing how emotions are expressed, depending on the context and situation. Emotional regulation is crucial for mental health because it helps individuals cope with stress, prevent emotional overwhelm, and maintain emotional stability.

Effective regulation can improve relationships, decision-making, and overall well-being, reducing the risk of mental health issues like anxiety, depression, and emotional dysregulation disorders. Poor emotional regulation, on the other hand, can lead to impulsive behaviours, emotional outbursts, or withdrawal, which may contribute to mental health challenges.

These aspects apply to individuals, relational interactions, and responses to social cues, the environment, and interpersonal behaviours. Mastering emotional regulation is essential for emotional resilience, fostering positive social interactions, and maintaining psychological balance. This book will capture emotional regulation across various theoretical and application-based contexts in therapy. Emotional regulation in therapy involves collaborating with clients on effectively managing and responding to their emotions, particularly in situations that might otherwise trigger distress or impulsive reactions. Therapeutic approaches for emotional regulation help clients develop the skills to identify, understand, and modulate their emotional responses, thereby promoting healthier coping mechanisms and enhancing mental well-being. The chapters in this book will review how to develop a fuller awareness and labelling of emotions, cognitive aspects of emotional regulation, healthy expression versus suppression, distress tolerance for self and relationships, as well as application to unique populations, mental health concerns and in response to our surrounding environmental changes. Recent developments in problem-solving strategies, innovations in various interventions and therapeutic formats will be discussed, and suggestions for effective coping strategies will be provided.

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