



Effects of a Psychotherapeutic Pathway Based on Mindfulness, Acceptance and Commitment Therapy and Creative Contact with Nature in People with Mild Intellectual Disability

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Abstract

Mild intellectual disability is characterized by a limited ability to adapt to novel situations and difficulties in managing emotions. Common challenges faced by individuals with mild intellectual disability include difficulty managing anger and reduced psychological flexibility, factors that can hinder their ability to cope with daily challenges and negatively impact their quality of life. The current study demonstrates that an integrated psychotherapeutic program, incorporating Mindfulness exercises, the third-generation cognitive-behavioural approach known as Acceptance and Commitment Therapy (ACT), and interactions with nature inspired stimuli either imagined or co-created with the participant (for example billboards depicting sea or mountain landscapes, plants present in the psychotherapeutic work context, background nature sounds, etc.), can enhance psychological flexibility, anger management skills, reduce perceived stress, and improve subjective well-being in individuals with mild intellectual disability. The sample, consisting of 20 people with mild intellectual disability aged 17-26 years showed significant improvements after the intervention. These results fill the existing gap in the literature. Historically, research has often emphasized the limitations associated with patients' cognitive impairments, overlooking their inherent strengths and underutilizing their personal resources. As a result, reduced cognitive ability has frequently been cited as a barrier to benefiting from psychological counselling, leading to limited therapeutic options being offered to this population.

Keywords: Disability; ACT; Mindfulness; Flexibility; Nature

Abbreviations

ACT: Acceptance and Commitment Therapy; DSM-V: Diagnostic and Statistical Manual of Mental Disorders; MBSR: Mindfulness-Based Stress Reduction; MBCT: Mindfulness-Based Cognitive Therapy; SWLS: Satisfaction with Life Scale; PSS: Perceived Stress Scale.

Introduction

Mild intellectual disability is characterized by a limited ability to adapt to novel situations and difficulties in managing emotions. According to the WHO classification, "Intellectual developmental disorders are a group of etiologically diverse conditions that originate during the developmental period, characterized by significantly below average intellectual functioning and adaptive behavior, i.e., about two or more standard deviations below the mean" [1]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V), deficits in intellectual function include reasoning, problem solving, planning, abstract thinking, judgment, and, finally, academic and experiential learning [2].

Adults with mild intellectual disability show deficits and limitations in executive functions such as planning, organizing, prioritizing, and abstract thinking [2]. Moreover, they present limitations in activities requiring short-term memory. In addition, they run a higher risk of being manipulated by others, show difficulties to accurately judge or understand the norms of discourse and social interactions, and, often, their behavior in social situations may be considered immature or inappropriate to the context [2]. Therefore, deficits in adaptive functioning result in failure to meet sociocultural developmental standards for personal independence and social responsibility [3]. They also limit social awareness of others' thoughts, feelings, and experiences, empathy, interpersonal communication skills, ability to develop friendships, and social judgment skills [3].

Common challenges faced by individuals with mild intellectual disability include difficulty managing anger and reduced psychological flexibility, factors that can hinder their ability to cope with daily challenges and negatively impact their quality of life. Indeed, the literature shows that adolescents with mild intellectual disability are three- to four times more likely to develop behavioural problems compared to their peers without intellectual disability [4]. The risk includes externalizing problems such as aggression and delinquency [5], as well as challenges with self-regulation, emotion regulation, behaviors, and cognition [6].

Both children and adolescents with mild to moderate intellectual disabilities have a lower capacity for self-regulation compared to their peers with typical development

[7]. In addition, research on coping strategies, the conscious efforts to regulate emotions, cognition, behaviors, and physiology in response to stressful events or circumstances [8], show that adults with mild intellectual disability tend to use fewer emotion-focused coping strategies, which could indicate specific difficulties in emotional management [9].

Several psychotherapeutic approaches have consistently proven effective in enhancing emotional management and psychological flexibility, which are recognized as two central constructs for biopsychosocial well-being [10]. The third-generation Cognitive Behavioral approach known as Acceptance and Commitment Therapy (ACT) appears in the literature to be functional and it gains added value when integrated with Mindfulness exercises. The term "Mindfulness-based interventions" refers to a set of practices that aim to intentionally bring one's attention to experiences occurring in the present moment, without applying judgment to them [11]. They derive from an intervention formalized by Kabat Zinn in the 1990s called "Mindfulness-Based Stress Reduction" (MBSR), aimed at cultivating non-processing moment-to-moment attention to achieve awareness of external and internal events, such as thoughts, emotions, and bodily sensations [12,13].

The focus is on the awareness of the present moment and acceptance of things as they are, however they are in reality, rather than chasing a specific desired outcome in the future [14]. It implies mindfulness through an open and receptive attitude to what is happening in the present moment, cultivating a present experience with acceptance [15]. Mindfulness practice and mindful attitude can help people to embrace evaluative thoughts that have already occurred as they are, without suppression or distortion, maintain a subtle distance from mental experiences, and observe thoughts as mental events that do not necessarily reflect the facts of reality [16].

Overall, the greatest effectiveness of Mindfulness-based practice as a treatment has been found in treating recurrent depression [17]; indeed, rumination tendency predicts future depressive symptoms in adults [18]. Research conducted by Cladder-Micus, et al. [19] showed that participants who practiced MBCT had a decrease in negative intrusive thoughts, compared to the control group. Studies conducted by Proeve, et al. [20] showed significant reductions in shame, anxiety, stress, and rumination through the use of Mindfulness. Mindfulness interventions train two stress resilience pathways at the brain level: they increase activity and functional connectivity in the stress-regulatory regions of the prefrontal cortex and decrease activity and functional connectivity in the stress-alert system regulatory brain regions [21]. Large randomized studies show that Mindfulness interventions can improve pain management

outcomes [22,23]. In addition, those who practice Mindfulness regularly report improved performance in working memory and sustained attention [24], as well as reduced symptoms of anxiety [25,26].

Acceptance and Commitment Therapy is a third-generation cognitive behavioural therapy capable of working on six processes: acceptance, defusion, values, committed actions, self as context, and contact with the present moment, so that human beings can choose to change certain behavioural traits [27]. ACT promotes acceptance of unpleasant and intense emotions, helping people to live according to their values [28]. The main purpose is to help individuals acquire the skills to control effectively pain and suffering in order to lead a meaningful and successful life experience [29]. The main message of ACT is “to accept things as they are when they are beyond one’s control and to commit to doing so while maintaining behavior that enrich one’s life [30].”

ACT is considered a method for moderating anger and aggression by teaching individuals to accept events of life and maintain a responsible attitude in line with their personal values [31]. ACT aims to teach individuals to notice and recognize anger-related thoughts and feelings in order to respond to them less impulsively and decrease their credibility by engaging in the pursuit of important life goals [32]. Indeed, ACT teaches individuals to “act out life, not anger” by choosing to consistently live according to their personal values [32].

Psychological flexibility lies at the core of ACT [33,34] and it is defined as the “ability to engage more fully with the present moment as a conscious human being, while adapting or maintaining behaviors that align with one’s valued goals” [35]. In contrast, psychological inflexibility is characterized by a behavioural pattern of excessive control of thoughts, feelings, and emotions, with a tendency to avoid unpleasant internal experiences at the expense of more effective or valuable actions [36]. Experiential avoidance is the most widely studied component of psychological inflexibility [37]. It is defined as behavior that attempts to “alter the frequency or form of undesirable internal events, including thoughts, memories, and bodily sensations, even when it causes personal harm” [38]. Experiential avoidance has been linked to a wide range of relevant clinical phenomena [39,40].

For example, experiential avoidance has been found to be a key process in emotional disorders [41], depressive symptoms [42], uncontrolled eating [43], body image disorders [44], in social anxiety [45], in chronic pain [46], in anxiety and stress sensitivity [47], in trauma [48], and in post-traumatic stress disorder [49]. The present study aims to integrate the use of Acceptance and Commitment Therapy

with Mindfulness and contact with elements belonging to nature reproduced by the user or constructed by the therapist, within the psychotherapy room. The literature suggests that interaction with nature or natural elements in artificial environments (such as billboards depicting landscapes of the sea or mountains, real plants to take care of, background nature sounds, etc.) can have numerous psychological benefits and have a significant increase in people’s physical and mental well-being [50].

Physical health benefits include, for example, greater physical fitness, lower blood pressure and fewer symptoms of illness [51]; on the other hand, in terms of mental health benefits, it includes greater satisfaction and motivation, lower levels of stress and anxiety, greater comfort, better problem solving, and higher levels of creativity. In addition, there may also be benefits in terms of behavioural change: this includes better coping skills, increased attention and concentration, improved social interaction, and less hostility and aggression [51].

Oh and coworkers [52], highlighted the connection with nature as the key element moderating the relationship between the duration of exposure to nature and mental well-being outcomes: in fact, individuals with a stronger connection with nature were less likely to experience symptoms of depression, stress, and anxiety, regardless of the time spent in nature; whereas, individuals with a weaker connection to nature were more likely to experience more symptoms as the duration of time spent in nature increased.

Therefore, the researchers did not identify a direct relationship between the amount of exposure to nature and positive outcomes in terms of mental well-being, since mediating this relationship was the sense of connectedness to nature [52]. Similarly, Colding and Barthel [53] found that even as little as 10-20 minutes of time spent sitting or walking in nature can have a beneficial effect on young adults’ mental health, compared to the same amount of time spent in urbanized environments. In Herrington and Brussoni’s [54] study, natural elements were incorporated into the playgrounds of two kindergartens that had only structured and artificial play spaces. Before the installation, children displayed behaviors such as “channel surfing” (tendency to move from one game to another without ever completing any of them) and repetitive movements, such as walking back and forth. After the installation of the new natural material, the children’s movement pattern became more complex [54].

These findings highlight the benefits of engaging with nature and participating in pro-nature behaviors [55]. Connecting with nature increased concentration, creativity and happiness; it stimulates the immune system and pro-

social behaviors [56]. In fact, according to Gordon [56], the natural context consciously or unconsciously draws attention, and promotes calm, rest, and contemplation. The aim of the current study is to evaluate improvements in psychological flexibility and anger management in a sample of 20 individuals with mild intellectual disability (ages 17-26 years) who participated in an integrated psychotherapeutic program based on Mindfulness, ACT, and nature connection interventions.

Materials and Methods

Sample

The sample consisted of 20 people with mild intellectual disability, with an average age of 21.5 years ($ds=3.2$), referred to the Disability Service S.C. Corporate Psychology on referral from the Child Neuropsychiatry South and North, East and West and the S.C. Care and Disability of the City of Turin. The diagnosis of mild intellectual disability was confirmed by clinical evaluation and standardized cognitive tests. All participants were informed about the purpose of the study and provided informed consent. The disabilities in the sample included both physical ($n = 2$) and mild cognitive ($n = 18$) problems. The sample consisted of 9 females and 11 males. Seventeen participants had already graduated from high school. All participants live in Turin in the Piedmont region.

Materials and Procedures

The individual psychotherapeutic program was structured in 8 weekly meetings lasting 90 minutes each, for a total duration of 8 weeks. Interventions were conducted on the basis of a multimodal model integrating the third-generation cognitive behavioural approach known as Acceptance and Commitment Therapy, Mindfulness exercises and nature-based activities. Specifically, interventions followed protocols from the Mindfulness-Based Cognitive Therapy (MBCT), which has demonstrated remarkable results; it is a group psychosocial intervention that includes training in Mindfulness and elements of cognitive behavioural psychotherapy [19].

The primary objective of this program is to help participants relate to their thoughts, emotions, and bodily sensations with awareness, thereby interrupting the dysfunctional cycles of rumination, maladaptive emotion regulation, and self-criticism [57]. The intervention is designed to encourage a more “decentered” perspective, where the person is less identified with the content of thoughts and feelings and more able to observe them as transient phenomena on which there is no need to act [57]. These Mindfulness interventions included exercises

such as body scans, mindful breathing, and present-moment meditation. Interventions based on Acceptance and Commitment Therapy (ACT) have centered work on psychological flexibility, a broad and overarching construct composed of six distinct sub-processes: acceptance, cognitive defusion, self-considered as context, present-moment awareness, values, and enactment of actions oriented to one’s values [35]. ACT seeks to reduce cognitive rigidity, which often manifests as experiential avoidance, cognitive fusion, an overly fixed sense of self, lack of present-moment awareness, disconnection from personal values, and actions that do not align with one’s values [36]. Specifically, the interventions aimed to convey exercises based on acceptance of intense and unpleasant emotions, identification of personal values, and engagement in behaviors that reflect one’s own values.

Finally, sessions were organized with the presence or construction of elements belonging to the outdoors and natural parks (such as billboards depicting landscapes of the sea or mountains, real plants to take care of, background nature sounds, etc.), including activities of observing and interacting with the natural environment to reduce stress and promote emotional well-being. Indeed, it has been shown by several researches that engaging in nature directly or indirectly in a variety of forms (through nature walks, nature-based tourism, living closer to nature, and immersive experiences provided by virtual and imaginative reality) positively affects well-being [58]. A study from Franco and colleagues in 2017 showed that when we are surrounded by nature we use our sensory organs and even some non-sensory ones to stimulate the brain, reduce stress and unpleasant emotions, and increase pleasant ones instead. The following questionnaires were administered to each participant before and after the intervention: AAQ-II, STAXI-2 and a series of multiple-choice questionnaires to assess levels of perceived stress and well-being [59].

The AAQ-II is the “Psychological Flexibility Questionnaire”; it is a validated 7-item scale that measures psychological flexibility, defined as the ability to accept unpleasant thoughts and emotions without avoiding them, while maintaining value-oriented behavior. A lower score indicates greater psychological flexibility. The initial effort in developing a measure of the psychological variables covered by the ACT was the design of a unidimensional self-assessment measure called the Acceptance and Action Questionnaire [60]. The AAQ was presented as a measure of experiential avoidance, although its items contemplated a broader construct.

For instance, the AAQ items contained descriptions related to negative evaluations of feelings, avoidance of private events, distancing from thoughts, and behavioural

flexibility in the presence of difficult personal events. The second version of the AAQ was designed to overcome the difficulties encountered with the first version; specifically, to develop a unidimensional measure, Bond, et al. [61] asked a group of 12 ACT researchers and practitioners to create items describing psychological flexibility and inflexibility. The preliminary 10-item version of the AAQ-II contained seven items describing psychological inflexibility and three describing psychological flexibility.

However, the final version of the AAQ-II eliminated the three items describing psychological flexibility through factor analysis that produced a two-factor solution. Therefore, the final version of the AAQ-II was presented as a measure of psychological inflexibility [61]. The 7-item version of the AAQ-II revealed stronger psychometric properties than both the 10-item version of the AAQ-II and the first version of the AAQ [61]. In addition, the 7-item version of the AAQ-II has acceptable reliability and validity values for measuring psychological inflexibility [62].

The STAXI- 2 is the Anger Expression Scale [63]: it is a measure of the frequency, intensity and patterns of anger expression, with subscales to assess withheld anger, expressed anger and anger control. The STAXI-2 contains 57 items divided in 3 sections (anger as a state, anger as a trait and expression and control of anger). Responses range from 1 (almost never) to 4 (almost always) on a Likert-type scale and scores are converted to percentiles based on gender and age [63]. Anger as a trait is measured using 10 items to assess the frequency with which anger is experienced over time [64]. In contrast, the anger expression and anger control subscales have 8 items each: the externalizing anger expression subscale (AX-O) assesses how often anger is expressed with physical or verbal aggression, while the internalizing anger expression subscale (AX-I) assesses how often anger is experienced but is repressed [64].

The externalizing anger control subscale (AC-O) measures how often a person attempts to control the expression of anger, while the internalizing anger control subscale (AC-I) assesses how often a person attempts to control feelings of anger by actively calming down [64]. Finally, participants completed a series of multiple-choice questionnaires to assess levels of perceived stress and subjective well-being. The Perceived Stress Scale (PSS) by Sheldon Cohen [65] is a psychometric instrument designed to measure the level of stress perceived by individuals, providing a subjective assessment of their stress status.

The Perceived Stress Scale (PSS; Scale for Perceived Stress) is one of the most widely used tool for assessing stress perception in various life context. Its items are designed to capture the extent to which respondents perceive their lives

as unpredictable, uncontrollable, or overwhelming. The scale also contains a series of direct questions about current levels of perceived stress. The PSS is suitable for the general population with an educational level of at least junior high school. Both the items and the response alternatives are easy to understand.

The questions are general, making them applicable to diverse populations. The PSS questions are about feelings and thoughts related to the past month. For each item people are asked to indicate how often they felt a certain way. Responses are recorded on a 5-point Likert scale ranging from “never (0)” to “very often (4).” Higher PSS scores were found to be associated with high perceived stress. Scores are calculated by reversing the responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0) given to the four positively worded items (items 4, 5, 7, and 8) and then summing all items on the scale. The others remain unchanged. A short scale of 4 items can be obtained from questions 2, 4, 5 and 10 of the 10-item PSS scale.

Finally, the Satisfaction with Life Scale (SWLS), developed by Ed Diener and colleagues is a questionnaire that measures subjective well-being and helps to understand how happy and fulfilled a human being feels in the present moment. The SWLS consists of 5 questions, which must be answered using a Likert scale (5 response types ranging from totally disagree, disagree, neutral, agree, fully agree). The SWLS also allows one to assess how life satisfaction evolves during a course of psychotherapy. Therefore, it can be considered a very reliable and interesting tool in the field of psychology and research. Low scores on the test indicate a low degree of perceived subjective well-being.

Data Analysis and Results

To evaluate the effectiveness of the intervention, data were collected before and after the psychotherapeutic program. Statistical analyses were conducted using the paired samples t-test to compare pre- and post-intervention scores with respect to psychological flexibility, anger management, and levels of perceived stress and subjective well-being.

A p value < 0.05 was considered significant in the analysis of the results and their comparison. The study employed a within-subjects design, comparing each participant's results before (pre) and after (post) the intervention. Therefore, individual's changes were assessed in order to obtain a measure of the effectiveness of the intervention with respect to the variables analyzed.

The results obtained, shown in the graph below, outline the observed changes for each variable examined:

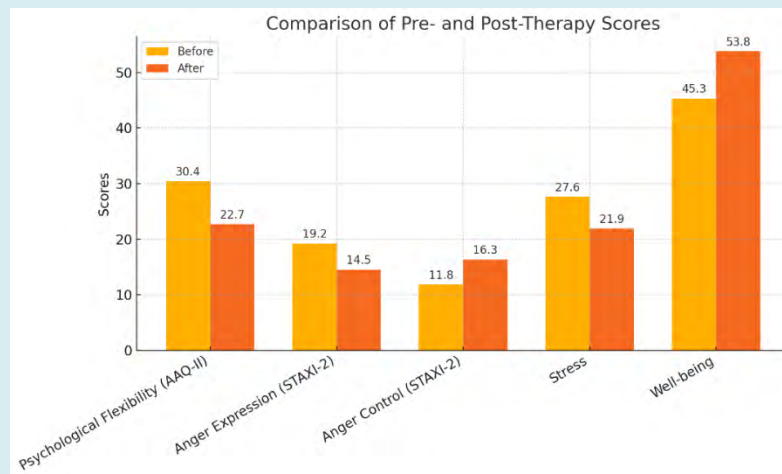


Figure 1: The graph shows the comparison of the mean scores before and after the intervention of the variables under research.

Psychological flexibility, as measured by the AAQ-II, showed notable improvement following the intervention. The pre-intervention mean score on the AAQ-II scale was 30.4 (SD = 6.2), while the post-intervention mean score dropped to 22.7 (SD = 5.1). Since the AAQ-II measures Psychological Flexibility through items that reflects its opposite, i.e., Psychological Inflexibility, it is expected that individuals with high levels of Psychological Flexibility would obtain lower scores than individuals with higher Psychological Inflexibility. The results reveal a significant reduction in scores from the pre- to post-intervention assessment, indicating substantial improvement ($t(19) = 5.12, p < 0.001$). Specifically, 75% of participants experienced a reduction in their AAQ-II scores, with an average improvement of 25%. These results suggest that the integrated psychotherapy intervention based on ACT, Mindfulness and contact with nature led to a 25% improvement in Cognitive Flexibility.

With respect to the management of Anger, as measured by the STAXI-2, the pre- and post-intervention results of the Expressed Anger and Anger Control sections were compared. The mean scores on the STAXI-2 scale for Expressed Anger pre-intervention were 19.2 (SD = 3.8), while post-intervention scores were 14.5 (SD = 3.2) ($t(19) = 4.45, p < 0.01$). The Expressed Anger scale assesses how often anger is expressed with physical or verbal aggression and how often anger is experienced but is repressed (Mc Ewan et al., 2009). These results indicate a 24.5 percent improvement in the Expressed Anger variable.

Regarding the Anger Control scale, the mean scores of the pre-intervention administration were 11.8 (SD = 2.9), while the mean post-intervention scores were 16.3 (SD = 3.4) ($t(19) = 5.23, p < 0.001$). These results show that the integrated intervention enhanced in a 27.6 percent Anger

Control. The Perceived Stress Scale (PSS) indicated a 20.7% reduction in stress levels. The mean pre-intervention score was 27.6 (SD = 4.5), while the post-intervention mean dropped to 21.9 (SD = 4.1) ($t(19) = 4.16, p < 0.01$). This decline reflects a significant decrease in perceived stress levels among participants. Regarding subjective well-being, as measured by the Satisfaction With Life Scale (SWLS), mean scores increased from 45.3 (SD = 6.7) pre-intervention to 53.8 (SD = 6.2) post-intervention ($t(19) = 4.68, p < 0.001$). This 15.8% improvement highlights the positive impact of the intervention of ACT, Mindfulness and contact with nature on participants' perceived life satisfaction. This study followed standard research criteria, reporting quantitative and objective data to support the initial hypotheses and providing rigorous statistical analysis. There are significant improvements in all areas: Psychological Flexibility, Psychological Wellbeing and Anger Control; in addition, there was a reduction in levels of Perceived Stress.

Discussion

The objective of the present study was to evaluate improvements in psychological flexibility and anger management, as well as in perceived stress and subjective well-being in a sample of 20 persons with mild intellectual disability (ages 17-26 years) who participated in an integrated psychotherapeutic program based on Mindfulness interventions, Acceptance and Commitment Therapy, and nature connection interventions. The results of the study highlight the effectiveness of this approach in anger management, perceived stress and subjective well-being, as well as psychological flexibility. Specifically, the results showed a 25 percent increase in psychological flexibility, a 24.5 percent improvement in anger expression, a 27.6 percent increase in anger control, a 20.7 percent decrease in

perceived stress, and a 15.8 percent increase in psychological well-being. The 25% improvement in psychological flexibility is particularly noteworthy, as this skill plays a pivotal role in adapting to daily emotional difficulties.

Psychological flexibility is at the core of ACT [33,34] and it is defined as the “ability to contact the present moment more fully as a conscious human being and to change or persist in behavior when it serves the esteemed ends” [35]. In fact, ACT interventions aim to teach individuals to notice and recognize anger-related thoughts and feelings in order to respond to them less impulsively and diminish their credibility by engaging in the pursuit of important life goals [32]. Such interventions aim to limit the rigidity given by cognitive inflexibility, which includes experiential avoidance, cognitive fusion, the self-viewed as content, lack of awareness of the present moment, lack of values, and enactment of actions not oriented toward the pursuit of one’s personal values [36].

For individuals with mild intellectual disabilities, the tendency to rely heavily on others for decision-making and problem-solving can often result in feelings of frustration and discomfort, leading to manifestations of anger and aggression [66]. This study demonstrated that an integrated therapeutic approach can support these individuals in learning more functional strategies for handling problems and conflicts, as evidenced by the significant reduction in expressed anger and the improvement in anger control scores. In addition, research on coping strategies shows that adults with mild intellectual disability use fewer emotion-focused coping strategies than non-emotion-focused coping strategies, which could indicate specific difficulties in emotional management [9].

Improvement in psychological flexibility and anger management was also reflected in reduced perceived stress and increased psychological well-being. Indeed, these findings further confirm the effectiveness of an integrated intervention between ACT, Mindfulness, and connection with nature in improving cognitive flexibility and anger management in a sample of people with mild intellectual disability. However, a limitation of the study is the small experimental sample size of 20 people and the lack of a control group. Indeed, such a small sample makes generalization of the results difficult; nevertheless, these results serve as an important foundation for future research. In the future, randomized trials with larger samples could confirm the applicability and validity of the results.

In addition, the presence in the future of a control sample would ensure a more specific evaluation of the validity of an integrated intervention between ACT, Mindfulness and contact with nature in improving cognitive

flexibility, anger management, reduction of perceived stress and psychological well-being. The possibility of long-term follow-up data should be included in order to test the sustainability of the effects of time intervention. Future studies could also explore individual differences in response to the intervention to refine the strategies and improve the target or the effectiveness of the intervention could be tested in a real natural context such as a park, beach or mountain.

Conclusion

In conclusion, this study provides preliminary evidence on the effectiveness of an integrated psychotherapeutic intervention based on Mindfulness, Acceptance and Commitment Therapy and contact with nature in improving psychological flexibility and anger management in people with mild intellectual disability. The results suggest that these approaches may be effective in promoting emotional well-being and reducing stress symptoms. Moreover, an integration of these methods could be useful in psychological support programs for people with intellectual disabilities, contributing to a higher quality of life and better management of difficult emotions. Psychotherapy for individuals with mild intellectual disabilities also provides a valuable opportunity to establish a secure therapeutic relationship, promote self-awareness and self-esteem, encourage emotional expression, and cultivate more socially appropriate behavioural strategies [67-71].

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