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Reducing emotion dysregulation online in nonclinical population with compassion focused therapy and emotional competencies program: A randomized controlled trial

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Abstract

Objectives: The present randomized controlled study aimed to evaluate the effects of two interventions on emotional dysregulation as a primary outcome and on depression, anxiety, stress, well-being, self-compassion and emotional competencies as secondary outcomes. Finally, the mediating role of emotional dysregulation as a core process in the effect of interventions on anxiety-depressive and stress symptoms was evaluated.

Methods: One hundred and seventy-nine individuals aged 18–68 years ($M = 39$, $SD = 12.4$; 83.9% females) with emotion regulation difficulties were randomly assigned to one of the three 12-weeks online programs: Compassion Focused Program (CFP), an Emotional Competencies Program (ECP) or a Waitlist control condition (WL). Participants completed pre-, post- and 3 months follow-up measures of each outcome. Mixed effect linear models compared groups on primary and secondary outcomes.

Results: Results showed that (1) perceived credibility and expectancy and satisfaction did not differ between the two interventions, (2) both interventions reduced emotion

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regulation difficulty, depression, anxiety and stress symptoms, and enhanced well-being, self-compassion, and emotional competencies; (3) ECP was more effective to enhance well-being than CFP; (4) CFP was more effective to enhance emotional competencies than ECP, and (5) emotion regulation difficulty mediated the effect of the interventions on depression, anxiety, and stress symptoms. **Conclusions:** Findings offer preliminary support for the usefulness of online CFP and ECP to reduce emotion dysregulation, symptoms of depression, anxiety, and stress and to increase well-being, self-compassion and emotional competencies. These results are discussed regarding clinical practice and the transdiagnostic role of emotional dysregulation.

KEYWORDS

compassion, emotional regulation, mental health, psychological processes, self-compassion

1 | INTRODUCTION

Emotion Regulation (ER) has been the focus of intense scientific and clinical interest over recent years (e.g., Berking & Wupperman, Reichardt, et al., 2008; Hu et al., 2014; Kraiss et al., 2020). ER can be defined as a process implicitly or explicitly engaged to downregulate or upregulate emotional states and achieve personal goals (Gross, 2015). Specifically, it refers to all attempts to modify the type of emotion, its duration, intensity, or manifestation (Gratz & Roemer, 2004; Gross, 1998). The different ER strategies have often been categorized as either adaptive such as acceptance and cognitive reappraisal or maladaptive such as suppression or rumination (Aldao & Nolen-Hoeksema, 2010; Aldao et al., 2010), given their association with better or worse mental health outcomes (for a meta-analytic review, see Webb et al., 2012). Moreover, the relationship between ER strategies and mental health is not unidirectional, but bidirectional (Dawel et al., 2021). For example, the use of emotional suppression predicts higher anxiety and depression symptoms, which in turn predict greater use of emotional suppression, leading to a downward cycle of difficulties (Dawel et al., 2021). As such, emotion dysregulation can be considered as implicated in the development and maintenance of several emotional difficulties, whatever the type of diagnosis (for reviews see, Aldao & Nolen-Hoeksema, 2010; Sloan et al., 2017). Together, these features lead researchers to consider ER as a transdiagnostic process (Cludius et al., 2020). Thus, targeting this process by preventive and/or psychotherapeutic interventions might reduce the onset and development of psychopathological disorders, to support mental health (Morris & Mansell, 2018).

Emotion regulation, including the ability to implement ER strategies, is based on emotion competences (EC) (e.g., Brasseur et al., 2013; Gross, 1998; Mikolajczak, Brasseur, et al., 2014; Peña-Sarrionandia et al., 2015). More specifically, EC refers to a set of five skills that operate on an intra- and interpersonal level. First, emotion identification is about connecting with one's emotional experience rather than trying to avoid it (Hayes et al., 1996; Terasawa et al., 2013; Williams et al., 1997). The second dimension refers to understanding emotions, their causes and consequences (Mayer & Salovey, 1997; Schneider et al., 2013). Both identifying and understanding one's

emotions are two dimensions of emotional awareness (Gratz & Roemer, 2004), and are therefore two preliminary skills which are useful for ER (Barrett & Gross, 2001; Berking & Wupperman, 2012; Boden & Thompson, 2015; Gratz & Roemer, 2004). Emotional expression, the third dimension, concerns the expression or suppression of emotional response, whether the emotion is positive or negative. Emotional expression serves many functions such as communication and internal states regulation (Ekman & Davidson, 1994), but it can also have, as suppression expression, disruptive consequences when employed indiscriminately or chronically (Bonanno et al., 2004). The fourth-dimension concerns emotion use. Our emotions can help us in decision-making and adjustment. They provide individuals with information about their environment and their progress toward goals, and thereby influence their judgments, decisions, priorities and actions (Schwarz & Clore, 1983; Schwarz, 1990). Finally, the last skill is ER and is linked to the previous ones (e.g., Bodrogi et al., 2022).

There are effective EC-based interventions aiming at developing emotional competencies and increasing ER (Hodzic et al., 2018; Kotsou et al., 2019). These interventions explicitly target the development of the five emotional competencies, using behavioral and cognitive techniques, offering psychoeducation support on emotion and encouraging more effective experience and ER (e.g., Mennin & Farach, 2007). Nevertheless, other forms of promising interventions that explicitly and implicitly target ER have emerged, such as Compassion-Based Interventions (Inwood & Ferrari, 2018). Compassion Focused Therapy (CFT) is one of the most evaluated approaches to developing compassion (Kirby, 2017). This psychotherapy, developed by Gilbert 20 years ago, draws on work from evolutionary psychology, attachment theory, and applied psychology processes from neuroscience and social psychology (Gilbert, 2010). The primary goal of CFT is to help individuals to develop motivation, emotions, and affiliative skills underlying compassion which plays an important role in ER, well-being, and prosocial behaviors (Gilbert, 2014, 2015, 2017). To do so, CFT integrates psychoeducational aspects of human functioning through a model of three emotional regulatory systems: (1) the threat/self-protect system, (2) the drive-reward system, and (3) the affiliative/soothing system (Gilbert, 2009a). Through Compassionate Mind Training (CMT), CFT aims to facilitate the development of the soothing system. This training involves several practices such as mindfulness and CMT techniques such as compassionate letter writing, compassionate attention, compassionate thinking, and compassionate imagery (Gilbert, 2009a, 2009b). By involving six compassionate skills (i.e., imagery, attention, feeling, behavior, reasoning, and sensory skills), these practices lead to the development of six key attributes of compassion towards oneself, as well as to and from others, namely sensitivity, care for well-being, non-judgment, sympathy, sensitivity, and distress tolerance. Through the use of these practices and the development of these attributes, CFT allow the development of a compassion based motivation that involves: (1) recognizing suffering, (2) understanding the universality of suffering in human experience, (3) feeling moved by the person suffering and emotionally connecting with their distress, (4) tolerating uncomfortable feelings aroused (e.g., fear, distress) so that we remain open to and accepting of the person suffering, and (5) acting or being motivated to act to alleviate suffering (Gu et al., 2017; Strauss et al., 2016). Thus, CFT not only strengthens the ability of individuals to feel soothing/positive emotions, particularly in the face of failure, but also to accept and tolerate unpleasant emotions such as shame or anger (Sommers-Spijkerman et al., 2018). Even though several studies showed that CFT has a positive impact on mental health (for a review see, Millard et al., 2023), its effects on ER and, more broadly, on EC remain to be demonstrated (Leaviss & Uttley, 2015). Previous studies show promising results. For example, Eichholz et al. (2020) evaluated the effect of a self-compassion intervention on ER difficulties in a population with obsessive-compulsive disorder and showed that emotion dysregulation mediated the self-compassion-symptom severity relationship. Consistently, participants in the qualitative study by Maynard et al. (2023) reported that compassion helped them to improve the way they dealt with difficult emotions. The clinical case study conducted by Baumgardner and Benoit Allen (2024) also revealed that CFT practices enabled decreases in maladaptive emotion regulation strategies (i.e., suppression, rumination) and increases in self-compassion and adaptive emotion regulation strategies (i.e., expressive engagement, cognitive reappraisal). Self-compassion could, therefore, reduce ER difficulties, but above all, would be beneficial for patients with different psychopathological disorders and could, therefore, be applied in a transdiagnostic perspective (for a systematic review, see Millard et al., 2023).

Despite promising results, these interventional studies suffer from several methodological limitations (e.g., Craig et al., 2020; Vidal & Soldevilla, 2023). The main limitation is the lack of inclusion of an active control group enabling changes to be attributed to CFT. This had prevented the conduct of meta-analyses for some time (Leaviss & Uttley, 2015) and a recent meta-analysis on CFT still highlights the need for randomized controlled trials (Vidal & Soldevilla, 2023).

Finally, as detailed above, the development of ER could be based on a variety of approaches and practices (Mennin & Farach, 2007). The challenge today is to determine which approach and which exercise formats seem most appropriate. Indeed, research in clinical psychology no longer focuses solely on evaluating the effectiveness of psychotherapy, but also on understanding and identifying their processes of effectiveness (Carey et al., 2020). For example, emotion identification as trained in cognitive-behavioral therapies may take a traditional structured format (i.e., asking patients to identify their emotions and associated levels of intensity in and out). However, this same skill will be trained differently in CFT, which encourages greater awareness of bodily reactions associated with emotions. It thus provides to individuals an implicit knowledge of reactions to internal and external events. Understanding the mechanisms through which change occurs such that psychological distress resolves can enable us to develop more effective and efficient evidence-based psychological treatments (Carey et al., 2020, Goldfried et al., 2013). In that sense, evaluating two interventions, involving different therapeutic models and exercises will not only allow to improve the understanding of the effectiveness of these interventions, but also to identify the most efficient and appropriate approaches for developing ER in a population with ER difficulties. The aims of the present study were to address this issue by testing the efficacy of EC training protocols and a CFT protocol on emotion dysregulation in a subclinical population with ER difficulties. This study is a randomized controlled trial with three arms (CFT, EC intervention and waiting list), and three evaluation times (pre-intervention, post-intervention, 3-month follow-up). To our knowledge, this is the first study to compare CFT to a program targeting EC in a RCT. Hence, given the limited data on the comparative effectiveness of CFT versus another approach, we expect CFT to be at least as effective as the program developing CE on ER, psychopathological symptoms, well-being, self-compassion and CE. Finally, on the basis of cross-sectional and longitudinal studies (e.g., Paucsik et al., 2023), but also interventional pilot studies (e.g., Eichholz et al., 2020; Jazaieri et al., 2014), we expect the reduction in ER difficulties to mediate the effect of both interventions on symptoms of depression, anxiety and stress.

2 | METHODS

This study has received approval from a human protection committee (Number of approval 2020.09.03 four_20.05.13.42837). It was pre-registered on OSF (Paucsik et al., 2021) and on clinical trial (ID: NCT05113680). All the information regarding the details of the protocol construction, the study design, the data management and the monitoring are described in the file submitted to the ethical committee, available on OSF (Paucsik et al., 2021). The present study employed a three-arm Randomized Control Trial (RCT) design to compare the Compassion Focused Program (CPF), the Emotion Competence Program (ECP) and a waitlist control group (WL) in community with difficulties in ER. This study also follows the guidelines of the CONSORT 2010 Checklist of information to include when reporting a randomized trial presented in Table 1.

2.1 | Participants

Figure 1 summarizes the recruitment process. Prospective participants were recruited through online advertisements in the community. Patients were screened regarding inclusion and exclusion criteria by the principal investigator. Inclusion criteria were as follows: (1) a score above 20 on the Difficulty in Emotional Regulation Scale (DERS), i.e. at least one item of the scale (meaning an emotional regulation difficulty) being rated as being present sometimes, (2) understanding, speaking, and

TABLE 1 CONSORT 2010 checklist of information to include when reporting a randomized trial.

Section/Topic	Item No	Checklist item	Reported on page No
Title and abstract			
	1a	Identification as a randomized trial in the title	1
	1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	1
Introduction			
Background and objectives	2a	Scientific background and explanation of rationale	2–4
	2b	Specific objectives or hypotheses	4
Methods			
Trial design	3a	Description of trial design (such as parallel, factorial) including allocation ratio	5
	3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	5
Participants	4a	Eligibility criteria for participants	5–6
	4b	Settings and locations where the data were collected	5–6
Interventions	5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered	8–10
Outcomes	6a	Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed	6–8
	6b	Any changes to trial outcomes after the trial commenced, with reasons	13
Sample size	7a	How sample size was determined	10
	7b	When applicable, explanation of any interim analyses and stopping guidelines	NA
Randomization:			
Sequence generation	8a	Method used to generate the random allocation sequence	5
	8b	Type of randomization; details of any restriction (such as blocking and block size)	5
Allocation concealment mechanism	9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned	5
Implementation	10	Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions	5
Blinding	11a	If done, who was blinded after assignment to interventions (e.g., participants, care providers, those assessing outcomes) and how	5

(Continues)

TABLE 1 (Continued)

Section/Topic	Item No	Checklist item	Reported on page No
	11b	If relevant, description of the similarity of interventions	9
Statistical methods	12a	Statistical methods used to compare groups for primary and secondary outcomes	11–12
	12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	11–12
Results			
Participant flow (a diagram is strongly recommended)	13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analyzed for the primary outcome	12
	13b	For each group, losses and exclusions after randomization, together with reasons	12
Recruitment	14a	Dates defining the periods of recruitment and follow-up	5
	14b	Why the trial ended or was stopped	5
Baseline data	15	A table showing baseline demographic and clinical characteristics for each group	13
Numbers analyzed	16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	13
Outcomes and estimation	17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	14
	17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	NA
Ancillary analyses	18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory	14–16
Harms	19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)	NA
Discussion			
Limitations	20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	17–19
Generalizability	21	Generalizability (external validity, applicability) of the trial findings	17–19
Interpretation	22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	17–19
Other information			
Registration	23	Registration number and name of trial registry	5
Protocol	24	Where the full trial protocol can be accessed, if available	5
Funding	25	Sources of funding and other support (such as supply of drugs), role of funders	20

reading French, and (e) aged between 18 and 65 years (3) have given informed consent to participate in the study, and (3) belonging to a social security scheme. Participants were excluded if they (1) had been involved in active emotion regulation intervention (involving CBT, mindfulness, or relaxation) within the last 3 months and (2) were taking anti-anxiolytic medication where the dose had not been stable over 1 month before entering the study. After selection and assessment, 179 individuals were randomized in three group arms.

2.2 | Overview of procedure

This was a double-blind study, and both participants and psychotherapists were unaware of the study's hypotheses. Psychotherapists and participants were told that the purpose of the study was to evaluate interventions to better understand their mechanisms of efficacy. However, neither the therapists nor the participants knew what was at stake in the study. Participants were also unaware of the content of the intervention until they were randomly assigned to it. For this study, we applied a restricted randomization procedure (Lim & In, 2019). More precisely, we applied a blocked randomization to form sub-groups of 8 participants per intervention and to have an equal number of participants in both active conditions. Indeed, as dropouts are generally more important in waiting condition (Cooper & Conklin, 2015), we allocated a larger number of subjects to it. The randomization scheme was computer-generated by the first authors. After informed consent was obtained, all participants completed the baseline questionnaire. Allocation of participants to one of the three groups was concealed until participants had completed the baseline questionnaire. They were subsequently informed of the condition to which they were randomly assigned: CFP, ECP, or WL. After they were assigned to the active groups, a therapist contacted them to inform them of the beginning of the program, the schedule, and how to complete the program online. Interventions were delivered online, as the study was conducted via the Covid-19 lockdown. Each participant then attended the program for 12 weeks, after which they completed a second online questionnaire. During this time, participants on the waiting list were given information about one of the two interventions and were also asked to complete a second set of questionnaires 12 weeks after the first. A third questionnaire was sent to all participants 3 months after the second questionnaire. In agreement with the ethical committee, the present study did not present any particular risks for the participants but would enable them to develop a better way of managing their emotions. However, resources such as places and websites to help with mental health problems were provided when the information note was signed and the final questionnaire administered. At the end of the study, a debriefing of the research objectives and hypotheses was presented to the participants and therapists.

2.3 | Measures

2.3.1 | Primary outcome

Difficulties in emotion regulation was assessed with the French version of Difficulties in Emotion Regulation Scale—Short Form (DERS-SF, (Gratz & Roemer, 2004; Victor & Klonsky, 2016). The DERS-SF is an 18-item self-report multidimensional scale which examines six difficulties in emotion regulation: (1) unacceptance of negative emotions (e.g., *When I'm upset, I feel guilty for feeling that way*), (2) difficulty engaging in goal-directed behaviors in the presence of negative emotions (e.g., *When I'm upset, I have difficulty concentrating*), (3) difficulty controlling impulsive behaviors in the presence of negative emotions (e.g., *When I'm upset, I lose control over my behaviors*), (4) limited access to emotion regulation strategies perceived as effective (e.g., *When I'm upset, I believe that I'll end up feeling very depressed*), (5) lack of emotional awareness (e.g., *I am attentive to my feelings.*, reversed item), et (6) lack of emotional clarity (e.g., *I am confused about how I feel*). Items are scored on a five-point Likert scale. Lower scores indicate the presence of difficulties in emotion regulation. Internal consistency in the present study was good with Cronbach's alphas >0.80 ($\alpha = 0.87$ for unacceptance, $\alpha = 0.90$ for difficulty engaging in goal-directed behaviors,

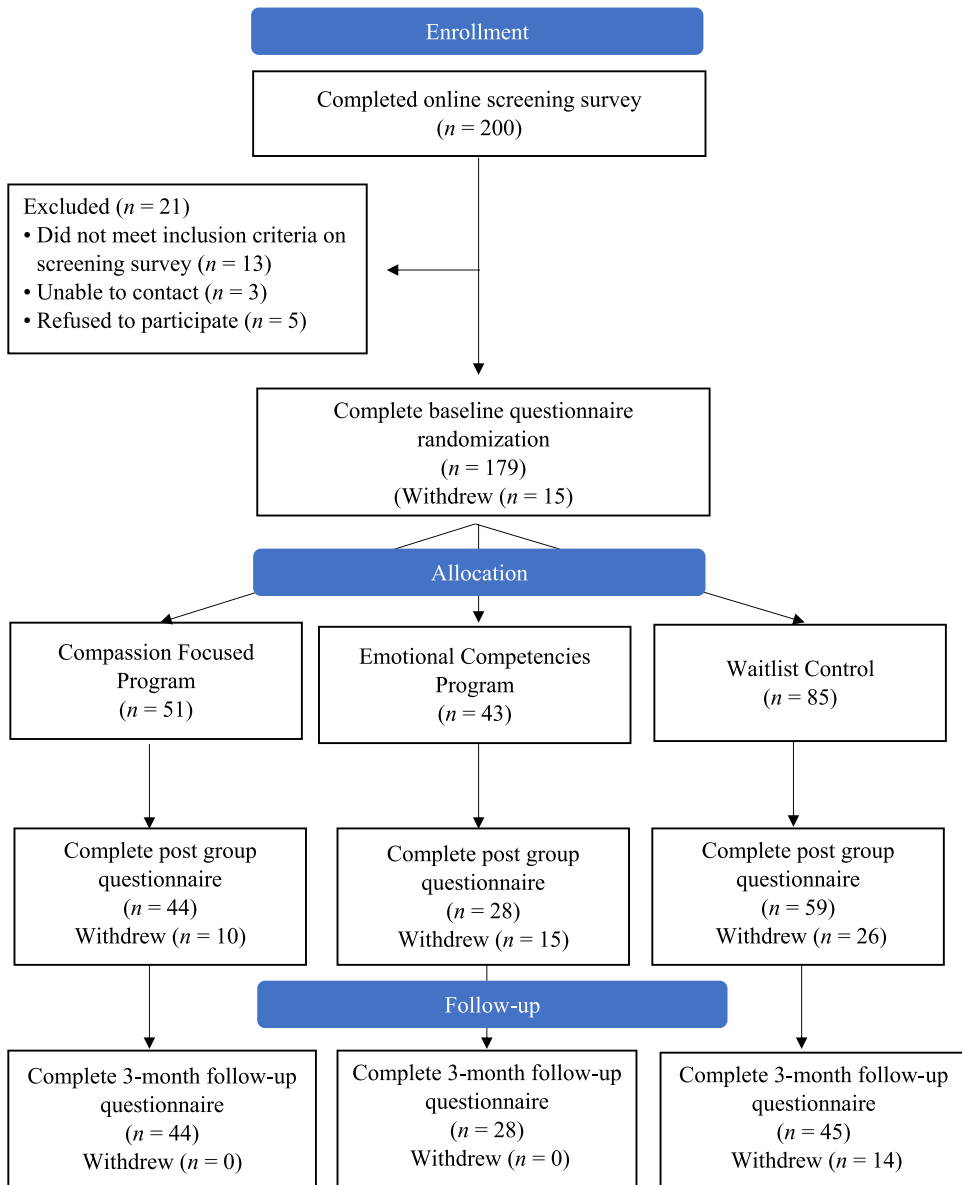


FIGURE 1 CONSORT Flow Diagram of the recruitment process.

$\alpha = 0.88$ for difficulty controlling impulsive behavior, $\alpha = 0.75$ for limited access to emotion regulation strategies, $\alpha = 0.86$ for lack of emotional awareness, $\alpha = 0.66$ for lack of emotional clarity and $\alpha = 0.90$ for the total scale.

2.3.2 | Secondary outcomes

2.3.2.1 | Depression, anxiety and stress

Symptoms of depression, anxiety, and stress were assessed using the French version of the Depression, Anxiety and Stress Scale (DASS-21, (Lovibond & Lovibond, 1995). This scale is composed of 21 items scored from 0 (did not

apply to me at all in the past week) to 3 (applied to me very often or most of the time in the past week). It measures severity of depression (e.g., *I couldn't seem to feel anything positive*), anxiety (e.g., *I worried about situations in which I might panic and make a fool of myself*), and stress (e.g., *I had trouble calming down*) during the past week. Internal consistency in the present study was good ($\alpha = 0.90$ for depression, $\alpha = 0.81$ for anxiety, and $\alpha = 0.85$ for stress).

2.3.2.2 | Well-being

Well-being was measured using the 18-item version of the Psychological Wellbeing (PWB) Scale (Ryff & Keyes, 1995). This scale assesses six sub-dimensions of well-being: (1) self-acceptance (e.g., *I like most parts of my personality*), (2) positive relations with Others (e.g., *Maintaining close relationships has been difficult and frustrating for me*), (3) autonomy (e.g., *I have confidence in my own opinions, even if they are different from the way most other people think*), (4) environmental mastery (e.g., *The demands of everyday life often get me down*), (5) purpose in life (e.g., *I live life 1 day at a time and don't really think about the future*), and (6) personal growth (e.g., *For me, life has been a continuous process of learning, changing, and growth*). Items are rated on a Likert scale from 1 (Strongly agree) to 7 (Strongly disagree). Internal consistency in the present study was low in the subscale ($\alpha = 0.40$ for self-acceptance, $\alpha = 0.20$ for position relationship, $\alpha = 0.31$ for autonomy, $\alpha = 0.41$ for environmental mastery, $\alpha = 0.22$ for purpose in life, $\alpha = 0.38$ for personal growth), but good for the total scale ($\alpha = 0.80$).

2.3.2.3 | Self-compassion

Self-compassion was measured with the French version of the Self-Compassion Short Form Scale (SCS-SF, (Neff, 2003). SCS-SF is a 12-item instrument with six subscales assessing elements of self-compassion: (1) self-kindness (e.g., *I try to be understanding and patient toward those aspects of my personality I don't like*), (2) self-judgment (e.g., *I'm disapproving and judgmental about my own flaws and inadequacies*), (3) common humanity (e.g., *I try to see my failings as part of the human condition*), (4) isolation (e.g., *When I'm feeling down, I tend to feel like most other people are probably happier than I am*), (5) mindfulness (e.g., *When something painful happens I try to take a balanced view of the situation*) and (6) overidentification (e.g., *When I fail at something important to me, I become consumed by feelings of inadequacy*). Internal consistency in the present study was low on some subscales ($\alpha = 0.72$ for self-kindness, $\alpha = 0.75$ for self-judgment, $\alpha = 0.67$ for common humanity, $\alpha = 0.48$ for isolation, $\alpha = 0.72$ for mindfulness, $\alpha = 0.48$ for over-identification), but good for the total scale ($\alpha = 0.80$).

2.3.2.4 | Emotional competencies

Emotional competencies were assessed with the Short Profile of Emotional Competence (S-PEC; Mikolajczak, Brasseur, et al., 2014). This is a multidimensional scale which measures the five emotional competencies: (1) identification (e.g., *When I am touched by something, I immediately know what I feel*), (2) comprehension (e.g., *When I am feeling low, I easily make a link between my feelings and a situation that affected me*), (3) expression (e.g., *I am good at describing my feelings*), (4) regulation (e.g., *I easily manage to calm myself down after a difficult experience*) and (5) utilization (e.g., *I use my feelings to improve my choices in life*). The five skills are assessed in the inter- and intra-personal dimensions. Internal consistency in the present study was good ($\alpha = 0.86$ for identification, $\alpha = 0.76$ for comprehension, $\alpha = 0.70$ for expression, $\alpha = 0.83$ for regulation, $\alpha = 0.77$ for utilization and $\alpha = 0.93$ for the total scale).

2.3.2.5 | Credibility/expectancy

The French version of the Credibility/Expectancy Questionnaire (CEQ; Devilly & Borkovec, 2000) was used to assess participants' credibility (e.g., *At this point, how logical does the therapy offered to you seem?*) and expectations of the intervention they would receive (e.g., *At this point, how much do you really feel that therapy will help you to reduce your symptoms?*). The scale consists of six items, four of them are measured on a nine-point scale ranging from 1 ("not at all" or "none") to 9 ("very") and two are measured on an 11-point scale ranging from 0% to 100%. The measure score is summed and ranges from 3 to 27. Higher scores indicate participants having higher credibility or

expectation of improvement because of the treatment. This scale was completed by the participant of the two interventional arms during the first measurement time, before they started the CFP and the ECP. Internal consistency in the present study was good ($\alpha = 0.87$ for Credibility, $\alpha = 0.86$ for Expectancy and $\alpha = 0.89$ for the total scale).

2.3.2.6 | Satisfaction with intervention

Participants' level of satisfaction with the experimental (CFP) and active control intervention (ECP) was assessed with the Satisfaction With Therapy and Therapist Scale–Revised (STTS–R, (Oei & Green, 2008)). This scale is composed of 13 items assessing three sub-dimensions: (1) the patient's level of Satisfaction with Therapy (ST, e.g., *My needs were met by the program*), (2) the patient's level of Satisfaction With Therapist (SWT, e.g., *The therapist was friendly and warm towards me*) and (3) global improvement (e.g., *How much did this treatment help with the specific problem that led you to therapy?*). Internal consistency in the present study was good ($\alpha = 0.88$ for satisfaction with therapy, $\alpha = 0.86$ for Expectancy and $\alpha = 0.89$ for the total scale, $\alpha = 0.79$ for satisfaction with therapist and 0.90 for the total scale).

2.4 | Interventions

2.4.1 | The compassion focused program (CFP)

The CFP was designed by the first author and Francis Gheysen, both experts in CFT. The program is composed of 12 2-h group sessions and is based on the principles of CFT as described by Gilbert (see Gilbert & Procter, 2006; Gilbert, 2010, 2014). Each session proceeds in three steps: (1) 30 min of feedback on practices carried out by participants between sessions, (2) 30 min of psycho-education and exchanges with the participant on the theme of the session, and (3) 1 h of soothing breathing rhythm or compassionate imagery practice followed by discussions on the practice. For more details, see Table 2 which presents the sessions overview. The goal of this program is to help individuals (a) develop a motivation for compassion, (b) create an internal safe space, (c) soothe themselves, (d) address their painful emotions with insight, wisdom and courage, and (d) engage in compassionate behavior. At the first session of the program, participants received a CFP training manual including all the psycho-educational aspects, the practice guides, the intersession practices to be carried out as well as a practice follow-up journal. After each session, they also received an audio file with the practice done during the session and the one with the practice to be done during the following day.

2.4.2 | The emotional competence program (ECP)

The ECP is a translated and adapted version by the first author of the program developed by Kotsou and colleagues (Kotsou et al., 2011). The program consists of 12 sessions. Each emotional competence is developed in two sessions and two additional sessions are used to synthesize the training of the skills and to evaluate the program. The details of the program sessions are presented in Table 3. Each session starts with a feedback on the home practices, then a theoretical focus on the skill is introduced for 30 min followed by 1 h of practice and discussions. Depending on the skill developed, the program is mainly based on identification and functional analysis charts of emotions, sensations, thoughts, action tendencies, behaviors and short and long time consequences. It is also based on mindfulness practices to facilitate the identification and observation of emotions, but also on relaxation practices such as Schultz' autogenic training. The intervention aims at helping individuals to "(a) observe the relations among environmental triggers, beliefs, thoughts, emotions, and behaviors; (b) identified the links among emotions, thoughts, action tendencies, and habitual behaviors; (c) to use various emotion regulation strategies as appropriate to the individual's goal and the context; (d) to express and

TABLE 2 Content of the online Compassion Focused Program (CFP).

Session	Theme	Practice
1	Presentation of the program and scientific basis.	Introduction to the soothing breathing rhythm and exploration of an affiliative motivation
2	Discovering the emotional regulation systems	Drawing of the three circles of regulation and Soothing Breathing Rhythm
3	Embracing compassion	Practice of the soothing breathing rhythm and acceptance of unpleasant emotions
4	Creating internal safety space	Imagery of the safe place
5	Connect to an ideal compassionate image	Compassionate imagery
6	Develop your compassionate attributes	Imagery of the qualities of compassion
7	Discovering your compassionate self	Imagery of the compassionate self
8	Addressing and understanding self-criticism with compassion	Imagery of the critical self and the compassionate self
9	Dealing with difficult emotions	Imagery of difficult emotion with compassion
10	Dealing with shame and guilt	Imagery of shame and guilt with compassion
11	Writing to your compassionate part	Imagery of the compassionate self and writing the compassionate letter
12	Expanding your circle of compassion	Imagery of the circle of compassion

Note: The CFP was design by Paucsik, M., Gheysen, F and Delamillieure, P. in 2021.

listen to emotions in an adaptive manner; and (e) to use emotions and emotional situations to clarify their priorities and needs" (Kotsou et al., 2011). During the first session, the participants also received a training manual including all the theoretical information about the program, the practice supports and instructions for the inter-session practices.

2.5 | Therapist

The interventions were delivered by 6 psychologists trained by the first author to the two programs for 3 days each. For the CFP, the training was based on the therapist's skills required to provide compassionate therapy (Liddell et al., 2017) and on experience with the program's practices. For the ECP, psychologists were trained to understand the theoretical model of emotional competences (Mikolajczak, Quoidbach, et al., 2014) and to develop them. Supervision sessions were offered to psychologists during the program.

2.6 | Power analysis

A priori sample size analyses were conducted using WebPower online software (Zhiyong Zhang & Yuan, 2018), running on the WebPower R Package (Zhang et al., 2021), based on the observed average effect size of interventions reported by Jazaieri et al. (2014). Based on an effect size of $d = 0.60$, an intra-class correlation of 0.10, a power of $\beta = 0.80$, a significance level of 0.05, and a group size of ~8 persons per group, the a priori power analysis performed on a randomized trial with 3 arms cluster design (i.e., 2 treatments and 1 control), identified that 24 groups were needed (i.e., $n = 192$).

TABLE 3 Content of the online Emotion Competencies Program (ECP).

Session	Theme	Practice
1	Program objective and scientific basis. To identify one's emotions.	Identification of body sensations in the body and identification chart of unpleasant and pleasant emotions
2	Identify one's own emotions and those of others	Mindfulness and emotion identification chart
3	Understand the functional value of emotions.	Understanding chart between emotions and thoughts
4	Understand the emotional message and identify the consequences of inappropriate coping strategies.	Identification of needs and analysis of strategies and short and long time consequences on needs
5	Understand the importance of expressing emotions without judgment	Training in emotional expression without judgment
6	Express emotions in an adaptive way and listen to others' emotions.	Training in emotional expression in pairs
7	Use emotions to take care of oneself.	Functional analysis of needs and available strategies
8	Use emotions to make decisions and build psychological resources.	Functional analysis of strategies and formulation of alternative strategies
9	Regulate emotions through experiential acceptance in mindfulness meditation.	Mindfulness practices
10	Regulating emotions with cognitive restructuring techniques.	Formulation of alternative thoughts in role plays
11	Regulating emotions with our body	Relaxation of the Schultz autogenic training type
12	Encouraging pleasant emotional experiences and program evaluation.	Sharing of the learning achieved in the program.

Note: The ECP is a program translated and adapted from the program created by Kotsou et al. (2011).

2.7 | Data analysis plan

Data were analyzed using JAMOVI Version 1.2.27 (The Jamovi Project, 2020) and using an Intention To Treat analysis (ITT), recommended for RCTs (Schulz et al., 2010). ITT ensures the preservation of the benefits of randomization and avoids the introduction of bias during analysis (Jun et al., 2010). At baseline, group differences were examined with ANOVA for age and chi-square for the other demographic data. To compare participants' expectations and satisfaction between the two interventions, we conducted t-tests.

Due to the nested nature of the data, multilevel linear growth modelings were performed—with Mixed Linear Models module of the GAMLj suite of JAMOVI—to test the main hypothesis. Linear Mixed Model (LMM) analysis allows for the requirements of ITT analysis and permits the inclusion of participants with missing values at T1 and T2 without imputations (Chakraborty & Gu, 2019).

Data was treated as a two-level hierarchical model (i.e., the three waves of measurement at Level 1 and participants at Level 2). Following the recommendations of Singer (2003), an unconditional model (Model 1)—with only an intercept and no explanatory variables—was tested in a preliminary step. This model partitions the variance of each dependent variable into within-individual and between-individual components and permits the examination of intra-class correlation. In a second step, an unconditional linear growth curve model (Model 2) was tested by including the variable “time” as a fixed parameter. This variable was centered on the first measurement (i.e., three waves of measurement, with Wave 1 coded as 0, Wave 2 coded as 1, and Wave 3 coded as 2) and represented the

linear change in the treatment condition over time. In Step 3, the variable “condition” and the interaction term “Time × Condition” were added as predictors (Model 3). To examine the effect of the three conditions, we computed two orthogonal contrasts (Judd et al., 2011). The first contrast compared the WL with ECP and CFP (using -2, 1, 1 respectively for WL, ECP and CFP) was labeled “WL versus ECP-CFP”, the other contrasted ECP with CFP (using 0, -1, 1, respectively for WL, ECP and CFP), and was labeled “ECP versus CFP”. The variables “sex” and “age” were also included in Model 3 as a control variable. The “WL versus ECP-CFP” and the “ECP versus CFP” effect tested whether the treatment conditions and the control condition differed at baseline (time = 0), while the interaction “Time × WL versus ECP-CFP” and “Time × ECP versus CFP” examined whether the linear rate of change over time differed across treatments. Models were compared based on the $-2\log$ likelihood (i.e., likelihood ratio test/deviance test; (Heck et al., 2013), with lower values indicating better model fit. Due to space restrictions, only the results of Models 1 and 3 are presented. An estimate of the effect size was reported using R^2 conditional (i.e., provides the variance explained by the entire model) and R^2 marginal (i.e., provides the variance explained only by fixed effects). To ascertain the mediation effects between the study variables, a further multilevel analysis was performed, in which “Time × WL versus ECP-CFP” and “Time × ECP versus CFP” were included as the input variables; “DERS” was modeled as mediator; and DASS was entered as the outcome variable. Thus, paths a are from “Time × WL versus ECP-CFP” to “DERS” and from “Time × ECP versus CFP” to “DERS”, path b is from “DERS” to “DASS”, and paths c are from “Time × WL versus ECP-CFP” to “DASS” and from “Time × ECP versus CFP” to “DASS”. This multilevel mediation test is based on 2-1-1 models, as the input is situated at Level 2, and the mediator and the outcome are time-varying variables situated at Level 1 (Zhang et al., 2009). In this case, to prevent the risk of confounded mediation-effect estimations, a person-mean centering must be applied to the mediator variable to disentangle within-person from between-person effects (Zhang et al., 2009). Indeed, the composite effect without disaggregation is “generally an uninterpretable blend” (p. 138) of between- and within-person effects (Raudenbush & Bryk, 2002). Given that “a paths” (i.e., from the input variable to the mediators) and “c paths” (from the input variable to the outcome) of the mediation were tested in the multilevel analyses related to Hypothesis 1 and 2, this further multilevel analysis examined “b paths” (i.e., from the mediator to the outcome) and “c’ paths” (i.e., from the input variable to the outcome, controlling for the mediators). Thus, “DASS” was regressed on “Time”, “WL versus ECP-CFP”, “ECP versus CFP”, “Time × WL versus ECP-CFP”, “Time × ECP versus CFP”, DERS at the within-person level (i.e., person-mean-centered mediator), and DERS at the between-person level (i.e., the individual-person mean of the mediator). The typical procedure to test for mediation effects is to use resampling methods to generate bias-corrected confidence intervals, but this conventional bootstrapping method cannot be applied to multilevel modeling, because the assumption of independence of observations is violated when using nested or clustered data (Preacher & Selig, 2012). Accordingly, we utilized a Monte Carlo approach to resampling that allowed us to construct the appropriate confidence intervals. To do so, we used Selig and Preacher’s (Selig & Preacher, 2008) web-based utility to generate and run R code for simulating the sampling distribution of each indirect effect (20,000 values). If the 95% CI from this simulation excludes zero, then the indirect effect test is significant ($p < .05$).

3 | RESULTS

3.1 | Preliminary analysis

The total ITT sample consisted of 179 individuals (151 females) who responded to the baseline questionnaire. Table 4 shows the participant characteristics at baseline. The mean age was 39 years ($SD = 12.5$), and 94.5% ($n = 169$) of participants had French nationality. 84.9% ($n = 151$) of participants had completed higher education. Among the participants, 71.7% ($n = 128$) were in a couple, 56.1% ($n = 100$) had children, 46.4% ($n = 83$) were working and 15.1% ($n = 27$) were students. Finally, in our sample, 11.7% ($n = 20$) of the participants had been on a stabilized treatment for more than 1 month for mood regulation.

Of the 179 participants allocated to one of the three study arms, 28% ($n = 51$) did not complete the post-treatment assessment even though they had been invited three times in weekly intervals by email (CFP: $n = 10$, ECP: $n = 15$, WL: $n = 26$). Descriptive data at baseline are presented in Table 5. Our t -test did not show any significant differences in the age of the participants within the groups, however, our chi-square showed significant differences in some characteristics of our participants including having children, employment status, medication use and meditation experience. Participants who took part in the 3-month follow-up had higher well-being scores at T1 ($M = 74.54$, $SD = 10.21$) relative to those who did not ($M = 64.55$, $SD = 27.57$), $t(175) = -3.49$, $p < 0.001$, $d = -0.5$. However, they did not differ on any of the other outcome measures, either at T1 or T2.

3.2 | Attrition, credibility, expectancy, and satisfaction about the intervention

Overall, the attrition rate was moderate (36%, $n = 48$ at T2 and 62 at T3). Of those randomized to the intervention conditions, $n = 44$ (86%) of the CFP group and $n = 28$ (65%) of the ECP group followed up to T2 (see Figure 1). In the WL condition, 69% answered the second questionnaire and only 52% for the follow-up. Little's MCAR test yielded non-significance, [Little's MCAR test $\chi^2(350) = 301.27$, $p = 0.97$], indicating that the missing data were missing completely at random. We have therefore carried out our analyses on all the data. Based on our conservative approach, $n = 72$ completed all primary outcome measures and received the allocated intervention. Our analyses showed that there were no significant differences between our CFP and ECP participants regarding credibility ($t(93) = 0.79$, $p = 0.43$, $d = 0.16$) and expectation ($t(93) = 0.46$, $p = 0.64$, $d = 0.09$) about the interventions. Furthermore, our analyses show that there was no significant difference in scores of intervention satisfaction between participants in the CFP and ECP groups ($t(63) = -1.43$, $p = 0.16$, $d = -0.38$) nor in their satisfaction towards the therapist in their group ($t(63) = -1.68$, $p = 0.09$, $d = -0.45$).

3.3 | Interventions effects on emotion regulation

The main aim of this study was to assess the effect of the CFP and ECP compare to WL condition. Table 6 presents the results of the LMM analysis on difficulty in emotion regulation. The results showed a significant main effect of time and group. Moreover, a significant interaction effect of time \times group was found between our three arm and no significant effect of time \times group was found between the two intervention groups. Thus, compared to WL, CFP and ECP' participants report a decrease in their difficulties in regulating their emotions over time.

3.4 | Post-hoc paired t -test

Post-hoc paired t -tests showed a significant decrease in emotion regulation difficulties levels from T0 to T1 in the CFP group, $t(42) = 6$, $p < .001$, $d = 0.9$, in the ECP group, $t(27) = 6.02$, $p < .001$, $d = 1.13$, and in the WL group, $t(61) = 1.91$, $p = .03$, $d = 0.24$. Moreover, significant changes emerged from T1 to T2 in CFP groups, $t(43) = 2.11$, $p < .05$, $d = 0.32$ with a decrease in emotional regulation difficulties scores, but not in the ECP intervention, $t(23) = 1.08$, $p = .14$, $d = 0.22$ nor in the WLC group, $t(44) = 1.13$, $p = .13$, $d = 0.17$.

3.5 | Intervention effect on depression, anxiety, stress and well being

Regarding depression, anxiety and stress symptoms, the results showed a main effect of time and of group (see Table 7). Moreover, an interaction effect of time \times group was found between our three arm and no effect of

TABLE 4 Baseline Sample Characteristics for the Intervention (CFP) and the active control group (ECP) and Control Group (Waiting-list, WL).

	WL (n = 85)	ECP (n = 43)	CFP (n = 51)	Statistic		
				df	F Value	p Value
Mean age (SD)	40.7 (13.9)	39.4 (11.2)	35.9 (10.7)	2/177	2.46	.08
				χ^2	V	p Value
Gender, % (n)				1.90	.103	.39
Male	20% (n = 17)	13% (n = 6)	11% (n = 6)			
Female	80% (n = 68)	86% (n = 37)	89% (n = 46)			
Marital status, % (n)				3.13	.093	.54
Single/living alone	70% (n = 60)	70% (n = 30)	75% (n = 39)			
Married/living together	24% (n = 20)	26% (n = 11)	25% (n = 13)			
Other	6% (n = 5)	5% (n = 2)	0% (n = 0)			
Children, % (n)				12.3	.261	.002
Yes	67% (n = 57)	58% (n = 25)	37% (n = 19)			
No	33% (n = 28)	42% (n = 18)	63% (n = 33)			
Highest education, % (n)				11.6	.180	.31
9 th Grade	5% (n = 4)	0% (n = 0)	0% (n = 0)			
High-School Diploma/Degree	10% (n = 9)	16% (n = 7)	13% (n = 7)			
Bachelor	22% (n = 19)	33% (n = 14)	31% (n = 16)			
Master's degree	45% (n = 38)	37% (n = 16)	50% (n = 26)			
Phd	6% (n = 5)	2% (n = 1)	2% (n = 1)			
Other	12% (n = 10)	12% (n = 5)	4% (n = 2)			
Employment, % (n)				23.5	.256	.009
Full-time paid work	41% (n = 35)	33% (n = 14)	33% (n = 17)			
Part-time paid work	11% (n = 9)	14% (n = 6)	4% (n = 2)			
Unemployed	2% (n = 2)	16% (n = 7)	12% (n = 6)			
Student	8% (n = 7)	16% (n = 7)	25% (n = 13)			
Retired	11% (n = 9)	5% (n = 2)	2% (n = 1)			
Other	27% (n = 23)	16% (n = 7)	25% (n = 13)			
Current medications, % (n)				17.9	.317	<.001
Yes	4% (n = 3)	30% (n = 13)	10% (n = 5)			
No	96% (n = 82)	70% (n = 20)	90% (n = 47)			
Meditation experience, % (n)				21.2	.343	<.001
Yes	13% (n = 11)	49% (n = 21)	38% (n = 20)			
No	87% (n = 74)	51% (n = 22)	62% (n = 3)			

Note: Data presented as means (SD) or numbers (%). CFP, compassion focused program; ECP, emotion competence program; WL, waiting list. Chi-squared were conducted for categorical variables and ANOVAs for continuous variables.

TABLE 5 Observed means at baseline and standard deviations for each primary outcome by condition over time.

	Baseline Mean (SD)	Post-intervention Mean (SD)	Follow-up Mean (SD)
Difficulties in Emotion Regulation (DERS)			
CFP	47.2 (12.7)	36.2 (10.2)	33.7 (10.5)
ECP	46.4 (12.4)	35.3 (10.2)	34.1 (9.30)
WL	37.7 (11.8)	34.5 (13.6)	33.8 (10.8)
Depression (DASS21)			
CFP	7.08 (4.27)	3.68 (3.80)	4.02 (3.53)
ECP	6.70 (4.62)	3.93 (4.12)	3.29 (3.10)
WL	4.52 (4.22)	4.64 (4.13)	3.94 (4.36)
Anxiety (DASS21)			
CFP	5.12 (3.51)	3.09 (3)	3.04 (3.77)
ECP	5.58 (3.59)	2.18 (2.88)	2.75 (2.34)
WL	2.96 (3.42)	2.75 (3.06)	2.61 (3.27)
Stress (DASS21)			
CFP	8.77 (3.54)	5.20 (3.29)	5.22 (3.76)
ECP	8.16 (3.15)	4.64 (3.38)	5.68 (2.79)
WL	6.47 (4.44)	6.88 (4.79)	5.61 (4.70)
Well being (PWB)			
CFP	79.4 (8.27)	82 (7.41)	84.9 (8.17)
ECP	75.8 (10.6)	81.3 (9.67)	82.6 (8.85)
WL	81.4 (10.4)	80.8 (14.2)	79.6 (19.7)
Self-compassion (SCS)			
CFP	36.3 (6.97)	41.2 (6.95)	42.4 (9.71)
ECP	35.7 (6.72)	39.1 (7.17)	36.3 (15.9)
WL	40.9 (7.60)	41 (8.76)	29.5 (20.3)
Emotional Competencies (PEC)			
CFP	167 (21.4)	184 (18.3)	187 (21)
ECP	170 (24.2)	181 (21)	185 (23.5)
WL	179 (22.8)	181 (31.6)	176 (44.8)

Note: CFP compassion focused program; ECP emotion competence program; WL waiting list.

time x group was found between our two intervention groups. Regarding well-being, the analysis showed a main effect of time and of groups (see Table 8) and an interaction effect of time x group between our three arms. Moreover, the analysis also showed an interaction effect of time x group between the CFP and the ECP (see Figure 2). Indeed, compared to the ECP' participants, CFP participants, showed a smaller increase of well-being over time.

3.6 | Post-hoc paired t-test

Post-hoc comparisons yielded significant findings between T0 and T1 for the scores of CFP group with a decrease in depression, $t(42) = 5.58, p < .001, d = 0.85$, anxiety, $t(42) = 3.44, p < .001, d = 0.53$ and stress, $t(42) = 5.91, p < .001, d = 0.9$. For the ECP group' scores, paired t-test also showed a significant decrease between T0 and T1 of depression $t(27) = 4.17, p < .001, d = 0.8$, anxiety, $t(27) = 6.25, p < .001, d = 1.18$ and stress, $t(27) = 5.66, p < .001, d = 0.29$. Scored of the WL group only decrease significantly between T1 and T2 for stress, $t(47) = 2.06, p = .022, d = 0.85$.

3.7 | Intervention effect on self-compassion and emotional competencies

Regarding self-compassion, the results showed a main effect of time and group (see Table 9). In addition, an interaction effect of time x group was found between our three arms and between our two intervention groups. Finally, the results of analysis on EC showed an interaction effect of time x group between our three arms and between our two intervention groups. As shown in Figure 3, the EC scores of the CFP'participants increased more than those of participants in the ECP group.

3.8 | Post-hoc paired t-test

Post-hoc comparisons for the CFP group showed an increase in self-compassion between T0 and T1, $t(42) = -4.65, p < .001, d = -0.71$, and between T1 to T2, $t(43) = -2.65, p = .006, d = -0.4$, and an increase in emotion competencies between T0 to T1, $t(42) = -6.7, p < .001, d = -1.02$, and between T1 to T2, $t(43) = -2.55, p = .007, d = -0.38$. Regarding the scores of the ECP group, paired t-test showed a significant increase in self-compassion between T0 and T1, $t(27) = -3.04, p = .003, d = -0.54$, and increase in EC between T0 to T1, $t(27) = -2.54, p = .009, d = -0.48$ and between T1 to T2, $t(23) = -2.54, p = .009, d = -0.52$. For the WL group, paired t-test only showed a significant increase in EC scores between T0 and T1, $t(58) = -1.8, p = .04, d = -0.23$. Finally, we computed independent samples T-test to explore differences in EC scores between the CFP and ECP groups. Group comparisons did not reveal significant difference in emotional competencies in the CFP group compared to the ECP group.

3.9 | Mediation analyses: Treatment effects on depression, anxiety and stress symptoms mediated by emotional regulation difficulties

Analyses of mediation indicated that change in emotion regulation mediated the effect of the interventions on depression, anxiety, and stress. Results for all paths are presented in Table 10 and Figure 4. As presented, all paths are significant. This means that reducing emotional regulation difficulties mediates the effect of interventions on symptoms of depression, anxiety, and stress.

4 | DISCUSSION

ER is a key process in psychotherapy (Berking & Wupperman, 2012) and is considered as a transdiagnostic process (Cludius et al., 2020). Indeed, functional ER can contribute to mental health, but when it is dysfunctional, it can contribute to the development, maintenance or deterioration of many psychological disorders (Aldao et al., 2016). The challenge today is therefore to develop transdiagnostic interventions based on "shared mechanisms" approach,

TABLE 6 Intention-to-treat (ITT) linear mixed model analysis of group, time and interaction effects on emotion regulation difficulty.

	<i>b</i> (SE)	95%CI	<i>p</i>
Fixed Effects			
Intercept	53.52 (3.30)	47.05; 59.98	<.001***
Age	-0.18 (0.06)	-0.30; -0.04	.0008*
Sex	-3.40 (1.90)	-7.13; -0.31	.075
Children	-2.61 (1.70)	-5.94; 0.71	1.12
Current medication	-9.65 (2.31)	-14.18; -5.11	<.001***
Meditation experience	5.16 (1.64)	1.94; 8.37	.002**
WL versus ECP-CFP	2.56 (0.57)	1.44; 3.69	<0.001***
ECP versus CFP	1.02 (1.11)	-1.18; 3.18	.37
Time	-4.95 (0.48)	-5.91; -3.99	<.001***
WL versus ECP-CFP × time	-1.56 (0.32)	-2.19; -0.92	<.001***
ECP versus CFP × time	-0.48 (0.63)	-1.72; 0.76	.448
Random Effects			
Level 2 intercept variance	54.1		
Level 3 intercept variance	0.00		
log-Likelihood	-1555.71		
Conditional R2/Marginal R2	0.61/0.26		
log-Likelihood (null model)	-1630		
ICC (null model)	0.68		

Note: *N* = 179 participants.

p* < .05; *p* < .01; ****p* < .001.

i.e., that target common underlying mechanisms of mental health difficulties (Sauer-Zavala et al., 2012). This study is in line with this trend and aimed to contribute to the processual evaluation of psychotherapeutic interventions. More specifically, the aim of this study was to evaluate the effects of two interventions on mental health through a range of indicators and to assess ER as a mediating process for their effectiveness. The results of this study supported our hypotheses. Both interventions were found to be effective in reducing ER difficulties, symptoms of depression, anxiety and stress and in increasing well-being, self-compassion and emotional competencies. Our mediation hypothesis was also supported, as the results showed that the effect of our interventions was mediated by ER. As expected, both interventions have shown similar effectiveness in developing ER, despite using different practices, i.e. compassion imagery and soothing breathing rhythm for CFP and cognitive reappraisal and relaxation for ECP. Specifically, they both decreased difficulties in acceptance, engagement, impulsivity, awareness, clarity, and in access to ER strategies to deal with difficult emotions. This is consistent with cross sectional or longitudinal studies on the development of ER. For example, Inwood and Ferrari's review (2018) suggested that ER as a mediating process between self-compassion and mental health while Peña-Sarrionandia's meta-analysis (Peña-Sarrionandia et al., 2015) showed that emotional competences were associated with better ER. Furthermore, although very few studies to date have evaluated the effectiveness processes of this type of intervention in RCT, our results are consistent with those identified previously (i.e., decreased symptoms of depression, anxiety, stress,

TABLE 7 Intention-to-treat (ITT) linear mixed model analysis of group, time and interaction effects on depression, anxiety, stress and well-being (DASS).

	Depression			Anxiety			Stress		
	b (SE)	95%CI	p	b (SE)	95%CI	p	b (SE)	95%CI	p
Intercept	7.15 (1.30)	4.58; 9.70	<.001***	7.97 (0.97)	6.07; 9.88	<.001***	11.77 (1.21)	9.4; 14.14	<.001***
Age	-0.04 (0.02)	-0.09; 0.01	.12	-0.007 (0.0.01)	-0.11; -0.03	<.001***	-0.08 (0.02)	-0.012; -0.03	.0002**
Sex	.22 (0.75)	-1.26; 1.70	0.772	-0.77 (0.56)	-1.87; 0.33	.17	-1.10 (0.70)	-2.47; 0.28	.117
Children	-1.21 (0.67)	-2.52; 0.11	0.07	-0.27 (0.49)	-1.25; 0.7	.58	-2.01 (0.62)	-3.23; -0.79	<.001***
Current medications	-2.85 (0.92)	-4.66; -1.04	.002**	-1.98 (0.68)	-3.32; -0.63	.004**	-2.11 (0.85)	-3.78; -0.44	.014*
Meditation experience	.87 (0.65)	-0.4; 2.14	.19	0.62 (0.48)	-0.33; 1.56	.20	0.91 (0.60)	-0.27; 2.09	.13
WL versus ECP-CFP	.62 (0.22)	.19; 1.05	0.005**	0.59 (0.17)	0.26; 0.92	<.001***	0.47 (0.21)	0.05; 0.87	.026*
ECP versus CFP	.37 (0.42)	-0.45; 1.20	0.88	-0.18 (0.32)	-0.81; 0.46	.58	0.48 (0.40)	-0.3; 1.27	.23
Time	-1.09 (0.16)	-1.4; -0.77	<.001***	-0.81 (0.15)	-1.10; -0.53	<.001***	-1.05 (0.17)	-1.39; -0.72	<.001***
WL versus ECP-CFP × time	-0.46 (0.10)	-0.67; -0.25	<.001***	-0.40 (0.09)	-0.59; -0.22	<.001***	-0.45 (0.11)	-0.66; -0.22	<.001***
ECP versus CFP × time	-0.028 (0.20)	-0.43; 0.38	0.89	0.23 (0.19)	-0.14; 0.6	0.23	-0.28 (0.22)	-0.71; 0.14	.20
Random Effects									
Level 2 intercept variance	9.93			4.66			7.72		
Level 3 intercept variance	0.00			0.00			0.00		
log-Likelihood	-1139.63			-1064.27			-1139.24		
Conditional R2/Marginal R2	0.65/0.11			0.56/0.17			0.59/0.15		
log-Likelihood (null model)	-1178			-1106			-1184		
ICC (null model)	0.71			0.61			0.52		

Note: N = 179 participants.

*p < .05; **p < .01; ***p < .001.

TABLE 8 Intention-to-treat (ITT) linear mixed model analysis of group, time and interaction effects on well-being.

	Well-being		
	<i>b</i> (SE)	95%CI	<i>p</i>
Intercept	65.36 (5.98)	53.63; 77.07	<.001***
Age	0.22 (0.12)	-0.01; 0.46	.067
Sex	-2.25 (3.47)	-9.05; 4.54	.516
Children	8.54 (3.08)	2.50; 14.58	.006**
Current medications	5.97 (4.19)	-2.24; 14.19	.156
Meditation experience	-7.20 (3.01)	-13.11; -1.3	.018*
WL versus ECP-CFP	-1.80 (0.96)	-3.70; 0.08	.064
ECP versus CFP	3.17 (1.82)	0.40; 6.74	.083
Time	2.34 (0.40)	1.55; 3.13	<.001***
WL versus ECP-CFP × time	0.77 (0.27)	0.24; 1.29	.004**
ECP versus CFP × time	-0.64 (0.51)	-1.66; 0.37	.21
Random Effects			
Level 1 intercept variance	252.1		
Level 2 intercept variance	.00		
log-Likelihood	-1593.33		
Conditional R2/Marginal R2	.88/0.10		
log-Likelihood (null model)	1628		
ICC (null model)	.90		

Note: *N* = 179 participants.

p* < .05; *p* < .01; ****p* < .001.

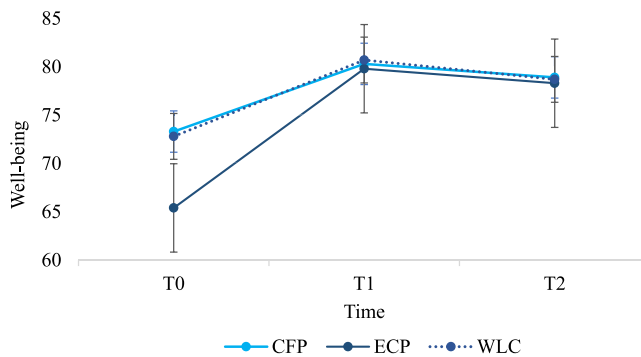
**FIGURE 2** Estimated marginal means of well-being from T0 to T2 for Compassion, Emotional Competencies and Wait-list control group. CFP, compassion focused program; ECP, emotion competencies program. WLC, wait-list control group. Error bars represent standard errors.

TABLE 9 Intention-to-treat (ITT) linear mixed model analysis of group, time and interaction effects on self-compassion and emotional competencies.

	Self-compassion			Emotional Competencies		
	b (SE)	95%CI	p	b (SE)	95%CI	p
Intercept	32.50 (7.04)	18.69; 46.31	<.001***	147.74 (19.70)	109.12; 186.37	<.001***
Age	-0.03 (0.05)	-0.15; 0.08	.596	.15 (0.17)	-0.18; 0.49	.365
Sexe	2.73 (1.74)	-0.69; 6.15	.120	-1.23 (4.95)	-10.92; 8.47	.805
Children	1.09 (1.54)	-1.92; 4.11	.479	7.92 (4.34)	-0.58; 16.43	.07
Current medications	4.19 (2.13)	.02; 8.36	.05*	12.62 (5.86)	1.14; 24.11	.033
Meditation experience	-3.38 (1.49)	-6.3; -0.45	.025*	-8.18 (4.2)	-16.42; 0.061	.053
WL versus ECP-CFP	-2.20 (0.58)	-3.33; -1.06	<.001***	-4.01 (1.42)	-6.79; -1.22	.005**
ECP versus CFP	-0.95 (1.14)	-3.19; -1.27	.401	-3.50 (2.68)	-8.77; 1.76	.19
Time	1.09 (1.54)	-1.92; 4.11	.479	5.61 (0.96)	3.72; 7.50	<.001***
WL versus ECP-CFP × time	2.33 (0.38)	1.58; 3.08	<.001***	2.17 (0.64)	0.91; 3.44	<.001***
ECP versus CFP × time	1.55 (0.78)	0.02; 3.09	.048*	3.66 (1.24)	1.22; 6.08	.004**
Random Effects						
Level 1 intercept variance	25.2			401		
Level 2 intercept variance	.00			.00		
log-Likelihood	-1681.70			-1845.45		
Conditional R2/Marginal R2	0.30/0.12			0.67/0.10		
log-Likelihood (null model)	-1682			-1860		
ICC (null model)	.05			.84		

Note: N = 179 participants.

*p < .05; **p < .01; ***p < .001.

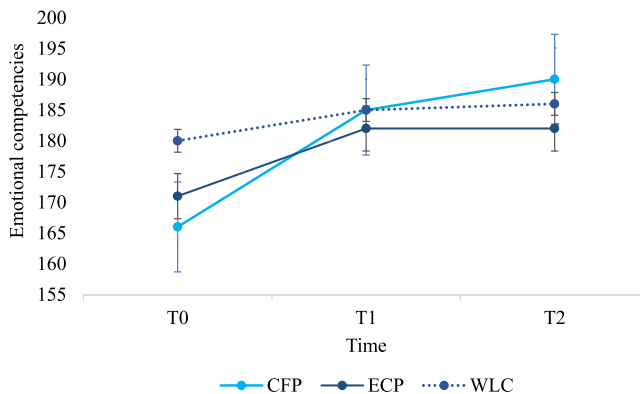


FIGURE 3 Estimated marginal means of emotional competencies from T0 to T2 for Compassion, Emotional Competencies and Wait-list control group. CFP, compassion focused program; ECP, emotion competencies program; WLC, wait-list control group. Error bars represent standard errors.

improved well-being, self-compassion, and emotional competence). However, post-hoc test showed that participants of the CFP showed sustained improvements of ER and self-compassion even after the end of the intervention. In contrast to the ECP group, participants in the CFP group show a decrease in ER difficulties and an increase in self-compassion up to 3 months after the end of the intervention. It would seem that, the effects of CFP are more sustainable than those of ECP.

In addition, our interventions differ in their effects on well-being, self-compassion and emotional competence: the ECP program allowed the development of more well-being than the CFP program. However, many previous studies have shown that interventions based on both emotional skills and compassion significantly increase individuals' well-being (e.g., Nelis et al., 2011; Schoeps et al., 2020; Neff & Germer, 2017; Sommers-Spijkerman et al., 2018). Nevertheless, it is interesting to note that the average scores of the participants in T2 in the three conditions are similar and seem to reach a peak score. The higher increase in well-being scores in the ECP condition could thus be explained by the difference in means present at T0, which leaves more possibility for participants in the ECP group to evolve than in the CFP or control group.

One of the most surprising results concerns the evolution of emotional competence scores. The emotional competence scores of the CFP group increased more than those of the ECP group over time, although the evolution of the scores was significant in both interventions and at each measurement time. These results allow to better understand the links between compassion and ER in a broader way, i.e., by including other emotional skills than the ability to regulate emotions. Indeed, if several studies have focused on the links between compassion and ER (for a review see, Inwood & Ferrari, 2018), so far, none has assessed other emotional skills such as identification, understanding or expression of emotions in interventional research.

Finally, our results showed that the effects of CFP and ECP on mental health are mediated by the decrease in ER difficulties. They are consistent with the current state of research showing the mediating role of ER between compassion and mental health (e.g. (Inwood & Ferrari, 2018), and between emotional competences and mental health (Peña-Sarrionandia et al., 2015). However, to date, few studies have explored the mediating processes of interventions that develop these skills. Indeed, several research highlighted and hypothesized on the potential mediating role of ER in compassion-based interventions on mental health, but none had evaluated it. For example, several studies have shown that ER, and more specifically certain components of ER (cognitive reappraisal and expression), are mechanisms of change in the relationship between self-compassion and anxiety disorders (e.g., Bates et al., 2021; McBride et al., 2022). Consistently, the review by Finlay-Jones (2017) presented the role of ER in compassion-based interventions, but also highlighted the need for new interventional studies to evaluate it. In that sense, these results offer new research perspectives in understanding the mechanisms of effectiveness of compassion-based interventions although it needs to be replicated on larger samples and with measurement tools integrating the various facets of ER (i.e., strategies, competencies, flexibility). These studies will provide a better understanding of ER efficacy processes involved in the interventions, which in turn will improve our understanding of the practice efficacy processes used in these interventions. In addition, and most importantly, it will contribute to a fundamental understanding of the role of the different components of ER both as transdiagnostic processes when dysfunctional, and as levers for mental health.

The present study contributes to this line of research and has several important strengths. First, this RCT allows preliminary conclusions to be drawn about the causal effects of interventions on outcome and mediators, without the bias of confounding variables. In addition, the use of three assessment phases, analyzed in ITT with GLMM allows for appropriate modeling of individual change over time and thus to generate accurate estimates in mediating processes (Maxwell & Cole, 2007; Schulz et al., 2010). Finally, our study meets several conditions of practical clinical trials (Tunis et al., 2003) to enhance relevance to clinicians: (1) a clinically relevant active comparison group and a waitlist control (2) relatively broad inclusion criteria that created a sample with characteristics similar to nonclinical patients, (3) use of nonexpert therapists rather than academic researchers, and (4) the evaluation of several dimensions including anxiety-depressive symptoms, well-being, expectations and satisfaction of the participants with the program received. Despite these strengths, our study has several limitations. First, the assessment

TABLE 10 Linear mixed model analysis to examine multilevel mediation of emotion regulation difficulty between condition and depression, anxiety, stress.

	Paths a b (SE)	Paths b b (SE)	Paths c b (SE)	Paths c' b (SE)	Monte Carlo CI
Input					
WL versus ECP-CFP × time			$\hat{c}_1 = -1.36 (0.26)***$	$\hat{c}'_1 = -0.85 (0.24)***$	
ECP versus CFP × time			$\hat{c}_2 = -0.02 (0.51)$	$\hat{c}'_2 = 0.04 (0.44)$	
Mediator					
DERS	$\hat{a}_1 = -1.63 (0.32)***$				
	$\hat{a}_2 = -0.36 (0.62)$				
DERS at BP		$\hat{b}_1 = 0.66 (0.05)***$			$(-1.52, -0.65)$
DERS at WP		$\hat{b}_2 = 0.38 (0.05)***$			$(-0.91, -0.36)$

Note: Path a: relationships between the input and the mediator; path b: relationship between the mediators and the outcome; path c: relationship between the input and the outcome; path c': relationship between the input and the outcome, controlling for the mediators. BP, between person; SE, standard error; WP, within person.

* $p < .05$; ** $p < .01$; *** $p < .001$.

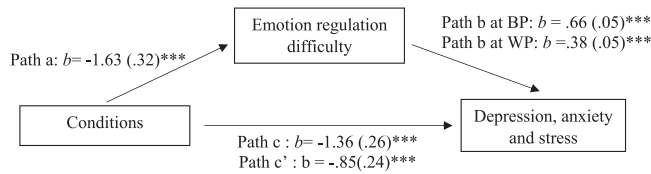


FIGURE 4 Mediation model of emotion regulation difficulty between condition and depression, anxiety, stress. Path a: relationships between the input and the mediator; path b: relationship between the mediators and the outcome; path c: relationship between the input and the outcome; path c': relationship between the input and the outcome, controlling for the mediators. BP, between person; WP, within person.

of ER was based on a single questionnaire. However, there are now many models that assess ER and that take into account other ER competencies than those assessed by the DERS or that assess ER strategies. For example, the Adaptive Coping with Emotions model (ACE) by Berking and Whitley (2014) conceptualize adaptive ER as a situation-dependent interaction between seven ER skills (i.e., awareness, identification & labeling, understanding, modification, acceptance and tolerance, readiness to confront and self-support). Their model led to the development of a scale assessing all of these skills (ERSQ, Berking & Znoj, 2008). To increase external validity, future studies could thus use more comprehensive instruments such as the ERSQ to comprehensively assess ER skills while also assessing strategies and flexible strategy use. Indeed, while ER skills are essential, it appears that flexible use of strategies is also essential to contribute to mental health (Kobylińska & Kusev, 2019). Future studies could therefore use scales that assess ER strategies while relying on designs and tools to measure their use such as experience sampling methods that allow to comprehensively monitor time co-variations among contextual and motivational demands, ER strategy use, resulting affect and the fit of such outcomes to initially triggering regulatory goals (Sanchez-Lopez, 2021). Second, and this is a common problem in RCTs (de Bruin et al., 2015; Dumville et al., 2006), attrition constitutes another important limitation of our study. The differential attrition rates between our arms could be related to the interventions themselves or to their acceptability. Indeed, a higher rate of participants in the control and ECP intervention did not complete the final follow-up questionnaire compared to the CFP participants. We can hypothesize that the ECP intervention appears to be less attractive or may propose practices that are more difficult for participants to integrate, leading them to stop participating in the intervention. For the control group, this attrition rate is not abnormal given that participants on the waiting list are not engaged in an intervention and feel less obligation or meaning to respond to follow-up measures (Wortman, 1978). The attrition rate can also be explained by the way in which the interventions were conducted online. Indeed, attrition rates online are generally higher than when interventions are conducted in face to face sessions (Eysenbach, 2005; Mathieu et al., 2013). Finally, beyond attrition, there are also limits to the generalizability of our results, given the predominantly French female sample. Yet several studies have shown cultural and gender differences in compassion, emotional skills and emotional regulation (Engelmann & Pogosyan, 2013; Ishii et al., 2003; Park & Huang, 2010; Yarnell et al., 2015). In that sense, future studies are needed to replicate this study with face-to-face interventions and with more gender-balanced and culturally diverse samples to clarify the role of ER in compassion-based and emotional competencies based interventions.

5 | CONCLUSION

This RCT showed the effect of a compassion-based program and an emotional competence program on ER, mental health, self-compassion, and emotional competence at short and long terms. It also provided preliminary evidence regarding ER as a mediating process of these effects. If replicated, future studies should more precisely determine the effect of these interventions on ER skills and strategies to increase our

understanding of the mechanisms of treatment effect. This study also revealed the interest of offering online psychotherapeutic programs to promote mental health and reduce the risk of psychopathological disorders, but also invites to evaluate the effectiveness of these interventions on mental health in clinical populations suffering from co-morbidities.

INSTITUTIONAL REVIEW BOARD STATEMENT

The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by a Human Protection Committee (Number of approval 2020.09.03 four_20.05.13.42837).

AUTHOR CONTRIBUTIONS

Conceptualization, methodology, investigation, validation, data curation, writing—original draft, visualization, Marine Paucsik; formal analysis, Marine Paucsik and Damien Tessier; writing—review & editing, Marine Paucsik, Damien Tessier, Céline Baeyens and Rebecca Shankland; supervision, Rebecca Shankland and Céline Baeyens, project administration, Marine Paucsik, Rebecca Shankland and Céline Baeyens.

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CONFLICTS OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data supporting the conclusions of this study as well as the Ethics Committee's advice and the questionnaire are openly available at the Center for Open Science (OSF) at the following address: https://osf.io/spv9h/?view_only=00e441a8b7e74c1d9e02c597a34803b5.

INFORMED CONSENT STATEMENT

Informed consent was obtained from all subjects involved in the study.

CLINICAL TRIAL REGISTRATION

NCT05113680.

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