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Emotion Regulation as a Moderator of Outcomes of Transdiagnostic Group Cognitive-Behavioral Therapy for Emotional Disorders

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The aim of this study was to examine the potential moderating effect of baseline emotion regulation skills—cognitive reappraisal and expressive suppression—on the relationship between treatment allocation and treatment outcomes in primary care patients with emotional symptoms. A total of 631 participants completed scales to evaluate emotion regulation, anxiety, depression, functioning, and quality of life (QOL). The moderation analysis was carried out using the SPSS PROCESS macro, version 3.5. Expressive

suppression was a significant moderator in the relationship between treatment allocation and treatment outcomes in terms of symptoms of anxiety ($b = -0.530$, $p = .026$), depression ($b = -0.812$, $p = .004$), and QOL ($b = 0.156$, $p = .048$). Cognitive reappraisal acted as a moderator only in terms of QOL ($b = 0.217$, $p = .028$). The findings of this study show that participants with higher scores of expressive suppression benefited more from the addition of transdiagnostic cognitive-behavioral therapy to treatment as usual (TAU) in terms of anxiety and depressive symptoms, and QOL. Individuals with higher levels of cognitive reappraisal obtained a greater benefit in terms of QOL from the addition of psychological treatment to TAU. These results underscore the relevant role that emotion regulation skills play in the outcomes of psychological therapy for emotional symptoms.

Keywords: moderator; expressive suppression; cognitive reappraisal; emotional symptoms; performance

EMOTION REGULATION CAN BE DEFINED as a process by which individuals control their emotions in order to respond adequately to the demands of the environment (Gross, 1998). Research into the processes involved in emotion regulation began in the 1990s—however, in recent years, understanding the impact of emotion regulation has become an essential aspect of all areas of psychology (Gross, 2015). Among the multitude of existing emotion regulation strategies, two of the most common are expressive suppression and cognitive reappraisal. Cognitive reappraisal refers to thinking about the meaning of a situation that causes an emotional response, thus cognitively changing the interpretation of a stimulus in a way that has a subsequent impact on the individual's responses (Bebko et al., 2011). In contrast, expressive suppression consists of inhibiting the response of external expression, thus modifying the behavioral component of the emotional response, such as visible emotional expressions (Bebko et al., 2011). Therefore, cognitive reappraisal has been associated with higher interpersonal functioning and greater well-being (Gross & John, 2003) and is considered an adaptative strategy—by contrast, expressive suppression has been associated with an increase in negative emotional experience, and thus considered a maladaptive strategy (Dryman & Heimberg, 2018; Gross & John, 2003).

There is mounting evidence that the different emotion regulation strategies play a fundamental role in the development and maintenance of psychopathology (Aldao et al., 2010), which is why they have been proposed as a transdiagnostic construct (Ehring et al., 2010; Medrano et al., 2016). However, although expressive suppression and deficits in cognitive reappraisal are present in many mental disorders, this connection is particularly strong in emotional disorders (Ehring et al., 2010), especially in anxiety and depression disorders (Aldao et al., 2010). Both emotion regulation strategies are associated with the symptoms of various mental disorders and can also impact quality of life (QOL) and functioning. Indeed, a significant association has been observed between these emotion regulation skills and QOL, showing a better QOL in those individuals with higher levels of cognitive reappraisal, and lower levels of expressive suppression (Butler et al., 2003; Wenzel, 2018). Similarly, higher levels of cognitive reappraisal and lower levels of expressive suppression have been associated with better psychosocial functioning (Perez & Soto, 2011; Soto et al., 2011).

Cognitive reappraisal and expressive suppression have therefore been identified as key mechanisms underlying the effects of psychological transdiagnostic treatments for emotional disorders (Sloan et al., 2017). In recent years, there has been increasing interest in transdiagnostic treatments that target common psychological processes, especially cognitive processes, such as cognitive emotion regulation strategies, which have been observed to contribute to the development and maintenance of different disorders (Gutner et al., 2016). Most of these studies have focused on transdiagnostic cognitive-behavioral therapy (TD-CBT), an approach that is based on the assumption that the onset and maintenance of emotional disorders is due to shared emotion regulation difficulties (Aldao et al., 2010). As a result, one of the main aims of this therapy is to improve emotion regulation strategies, such as reducing expressive suppression and enhancing cognitive reappraisal (Sakiris & Berle, 2019; Sloan et al., 2017).

The important role of both emotion regulation strategies in predicting the severity of multiple mental disorders has been widely reported. A systematic review found that lower levels of cognitive reappraisal and higher levels of expressive suppression were associated with more severe depressive and anxiety symptoms, especially after cognitive-behavioral therapy (CBT; Dryman & Heimberg, 2018). The literature has also shown that expressive suppression and cognitive reappraisal play a mediating role in emotional symptoms. One study stated that expressive suppression mediated the relationship between avoidant attachment and depressive symptoms (Brenning et al., 2012). Similarly, it has been observed that this maladaptive emotion regulation strategy is a mediator between childhood emotional invalidation and symptoms

of anxiety and depression (Krause et al., 2003). Another study (Llewellyn et al., 2013) found that both expressive suppression and cognitive reappraisal strategies seemed to mediate the association between promotion of positive behaviors and cognitions and anxiety. Finally, regarding cognitive reappraisal, it was observed that this emotion regulation strategy mediated the relationship between forgiveness and QOL (Rey & Extremera, 2016). In short, the study of mediators shows that emotion regulation is a key mechanism that underlies the effects of psychological interventions on clinical and performance outcomes. In addition, cognitive reappraisal seems to be a mediator of the relationship between CBT and depressive and anxiety symptoms (Goldin et al., 2016; Mennin et al., 2018). Also, we recently reported that expressive suppression can act as a mediator between TD-CBT and depressive symptoms (Muñoz-Navarro et al., 2022).

The key role of both emotion regulation strategies in treatment raises the question of whether the initial levels of cognitive reappraisal and expressive suppression also affect treatment outcomes. However, published results in the literature about the potential moderating effects of these baseline emotion regulation skills on the outcomes of psychological therapy are inconclusive. A better understanding of the moderating effect of cognitive reappraisal and expressive suppression could help to identify and differentiate between patients most likely to benefit from a transdiagnostic psychological intervention and those who require more targeted interventions to ensure good treatment outcomes. In this way, the study of moderators could be key to help clinicians when selecting the most appropriate treatment for each patient individually and, at the same time, to determine the generalizability of the interventions to individuals with diverse emotion regulation strategies.

We found only one study that evaluated emotion regulation strategies as moderators in the treatment of anxiety and depressive symptoms in CBT (Hosogoshi et al., 2020). That study found that high baseline levels of expressive suppression could negatively affect the outcomes of CBT. We were unable to identify any published studies on the moderating effect of cognitive reappraisal in terms of the relationship between treatment allocation and clinical symptoms.

There is a notable lack of data regarding the potential moderating effect of cognitive reappraisal, which is highly relevant given that both emotion regulation strategies have been shown to play a key role in CBT, whose main objectives involve the reduction of expressive suppression and the strengthening of cognitive reappraisal (Sakiris & Berle, 2019; Sloan et al., 2017). Given this background, together with the important limitations of the studies carried out to date, the aim of the present study was to explore the moderating effect of cognitive reappraisal and expressive suppression strategies on the relationship between treatment allocation and treatment outcomes. In order to shed light on these conflicting results, we used a large sample in longitudinal study design, controlling for baseline levels of the respective outcome variables. In addition, this study included not only clinical symptoms, but also aspects of vital importance to patients, such as QOL and functioning.

In this context, the main aim of the current study was to examine the potential moderating effect of baseline cognitive reappraisal and expressive suppression skills on the relationship between treatment allocation and treatment outcomes (anxiety and depressive symptoms, QOL, and functioning) in primary care patients with mild to moderate emotional symptoms who participated in a large, multicenter randomized controlled trial (RCT) comparing TD-CBT plus treatment as usual (TAU) to TAU alone. Given the relevance of both emotion regulation strategies in psychological well-being and as key components in CBT, we hypothesized that expressive suppression and cognitive reappraisal would moderate the relationship between treatment allocation and treatment outcomes. Based on previous studies in which a cognitive reappraisal strategy has been associated with lower anxiety and depressive symptoms, and better QOL and functioning, and conversely, expressive suppression is related to negative emotional experiences and worse performance, we expected that the benefits of adding TD-CBT to TAU would be greater in individuals with lower expressive suppression and higher cognitive reappraisal skills at baseline. This was expected in terms of a larger reduction in anxiety and depressive symptoms, and greater improvements in QOL and functioning.

Method

PARTICIPANTS

The data for this study were obtained from a previous RCT—the PsicAP study (Cano-Vindel et al., 2021)—conducted to assess the efficacy of TD-CBT for emotional symptoms (mainly anxiety and depression) in primary care in Spain.

In the PsicAP study, 1,061 individuals were randomized to an experimental arm ($N = 527$) consisting of TD-CBT+TAU and a control arm ($N = 534$, TAU alone). TD-CBT was administered in seven group sessions over a 3- to 4-month period. A detailed description of the study design is available elsewhere (Cano-Vindel et al., 2016).

Specifically, in the present study, we analyzed a total sample of 631 participants (corresponding to the number of individuals who completed the posttreatment evaluation). The mean age of the sample at baseline was 44.7 years (standard deviation [*SD*] = 11.4). Most participants were female (81.1%) and living with a partner (68.3%). Most of the participants had a basic educational level (72.6%) and were currently employed (52.1%), with an annual income level under €24,000 (~$27,000; 76.7%). A minority of the sample were taking the following psychotropic medications: hypnotics (19.8%), anxiolytics (37.9%), and antidepressants (25.8%). Descriptive data for the sample by treatment allocation (TD-CBT +TAU and TAU alone) are provided in Table 1. No between-group differences in any of the sociodemographic variables were observed at baseline ($p > .05$). In addition, the mean scores for each scale are shown in Table 2

PROCEDURE

The study comprised adult patients, ages 18–65 years. All individuals whose general practitioner (GP) suspected the presence of an emotional disorder (i.e., anxiety, depression, or somatoform disorder) were asked to complete the study baseline battery that included screening measures for anxiety and depression. Those who screened positive on these scales (Generalized Anxiety Disorder–7 [GAD-7] ≥ 10; Patient Health Questionnaire–9 [PHQ-9] ≥ 10; Patient Health Questionnaire–15 [PHQ-15] ≥ 5) were invited to participate in the study. After the individuals completed the baseline questionnaires (e.g., GAD-7, PHQ-9, Sheehan Disability Scale [SDS], World Health Organization Quality of Life [WHOQOL-BREF], Emotion Regulation Questionnaire [ERQ]), if there were any doubts about whether the individual qualified for study inclusion due to the possible presence of severe major depression (PHQ > 20) and/or severe disability (SDS > 25), a clinical psychologist conducted the Structured Clinical Interview for DSM Axis I Disorders (SCID-I; First et al., 1999) to rule out the presence of severe mental disorders (e.g., bipolar disorder, schizophrenia, eating disorders, substance dependence, personality disorders) or a history of severe or recent suicide attempts. If this

Table 1
Sociodemographic Description of the Participants at Baseline and Posttreatment

	Baseline ($N = 631$)	Baseline TD-CBT group ($N = 315$)	Baseline TAU group ($N = 316$)
Sex, *N* (%)			
Female	512 (81.1)	251 (79.7)	261 (82.6)
Male	119 (18.9)	64 (20.3)	55 (17.4)
Age, mean (*SD*)	44.7 (11.4)	44.56 (10.9)	44.82 (11.8)
Marital status, *N* (%)			
With a partner	431 (68.3)	220 (69.8)	211 (66.8)
Without a partner	200 (31.7)	95 (30.2)	105 (33.2)
Education level, *N* (%)			
Basic studies	458 (72.6)	221 (70.2)	237 (75.0)
Higher studies	173 (27.4)	94 (29.8)	79 (25.0)
Employment status, *N* (%)			
Working	329 (52.1)	163 (51.7)	166 (52.5)
Not working	302 (47.9)	152 (48.3)	150 (47.5)
Income level, *N* (%)			
<24,000€ (~$27,000)	484 (76.7)	237 (75.2)	247 (78.2)
>24,000€	147 (23.3)	78 (24.8)	69 (21.8)
Hypnotics, *N* (%)			
Yes	125 (19.8)	55 (17.5)	70 (22.2)
No	506 (80.2)	260 (82.5)	246 (77.8)
Anxiolytics, *N* (%)			
Yes	239 (37.9)	122 (38.7)	117 (37.0)
No	392 (62.1)	193 (61.3)	199 (63.0)
Antidepressants, *N* (%)			
Yes	163 (25.8)	74 (23.5)	89 (28.2)
No	468 (74.2)	241 (76.5)	227 (71.8)

Note. TD-CBT = transdiagnostic cognitive-behavioral therapy; TAU = = treatment as usual; *SD* = standard deviation.

Table 2
Mean Scores and Standard Deviations of the Participants on Different Scales at Baseline

	Baseline ($N = 631$)	Baseline TD-CBT group ($N = 315$)	Baseline TAU group ($N = 316$)
Cognitive reappraisal	4.20 (1.20)	4.29 (1.22)	4.11 (1.17)
Expressive suppression	3.86 (1.50)	3.88 (1.49)	3.83 (1.51)
GAD-7	12.33 (4.62)	12.53 (4.67)	12.09 (4.57)
PHQ-9	13.58 (5.27)	13.78 (5.16)	13.38 (5.37)
WHOQOL	4.49 (1.32)	4.45 (1.33)	4.52 (1.32)
SDS	12.83 (7.51)	13.24 (7.50)	12.43 (7.05)

Note. TD-CBT = transdiagnostic cognitive-behavioral therapy; TAU = treatment as usual; GAD-7 = Generalized Anxiety Disorder–7; PHQ-9 = Patient Health Questionnaire–9; WHOQOL = World Health Organization Quality of Life; SDS = Sheehan Disability Scale.

clinical interview confirmed either of these suspected diagnoses, then the individual was excluded from the study and referred to his or her GP for an appropriate treatment alternative.

TD-CBT consisted of seven 90-minute therapy sessions delivered over a 3- to 4-month period in groups of 8–10 participants. TD-CBT included psychoeducation, relaxation techniques, cognitive restructuring processes, behavioral techniques, and relapse prevention (see González-Blanch et al., 2018). The TAU intervention involved regular consultations with the GP; in general, TAU consisted of prescription medication (e.g., anxiolytics, antidepressants, or hypnotics) and/or counseling from the GPs (Cano-Vindel et al., 2021; González-Blanch et al., 2018). Participants in both study arms were allowed to make appointments with their GPs at any time during or after the TD-CBT intervention. The results of the PsicAP study demonstrated that the addition of TD-CBT to TAU reduces anxiety, depressive, and somatic symptoms, and that these effects are maintained up to 12 months after treatment completion. The addition of TD-CBT has also been shown to improve functioning and QOL (see Cano-Vindel et al., 2021).

The ethics committees at all participating centers, the National Ethics Committee, and the Spanish Agency of Medicines and Medical Devices (AEMPS) all approved the study protocol (code: ISRCTN58437086). Written informed consent was obtained from all participants.

INSTRUMENTS

For the purpose of the present study, we evaluated the data obtained from the following questionnaires administered pre- and posttreatment, as follows:

Emotion regulation strategies were assessed with the Spanish version of the ERQ (Gross & John, 2003), a 10-item self-report measure that consists of six items to assess cognitive reappraisal and four items for expressive suppression. Responses on this instrument are given on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Total scores range from 4 to 28 points for expressive suppression and from 6 to 42 points for cognitive reappraisal, with higher scores indicating a greater use of that emotion regulation strategy, since the ERQ does not have defined cutoff points to classify emotion regulation, as it intrinsically varies along a continuum of severity. For this reason, based on the scores on each ERQ subscale, participants were classified into three groups according to the mean score (medium), mean –1 *SD* (low), or mean +1 *SD* (high). Both subscales have demonstrated good levels of internal consistency, reliability, and validity across different samples and cultures (Preece et al., 2020). The internal consistencies of the Expressive Suppression ($\alpha = .78$) and Cognitive Reappraisal ($\alpha = .87$) scales were acceptable to good.

Anxiety symptoms were assessed with the GAD-7 (García-Campayo et al., 2010), a seven-item self-report instrument based on *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM-IV) criteria. Although the GAD-7 was developed as a screening measure for generalized anxiety disorder in primary care settings, previous studies have shown that it is a useful tool for evaluating anxiety in general and for detecting other anxiety disorders (Beard & Björgvinsson, 2014; Johnson et al., 2019; Plummer et al., 2016; Spitzer et al., 2006; Williams, 2014). Consequently, we used this scale to assess anxiety symptoms in general. The items are rated on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*nearly every day*). Total scores range from 0 to 21 points, with higher scores indicating greater anxiety-related symptomatology. The internal consistency was good ($\alpha = .81$).

Depression symptoms were assessed with the PHQ-9 (Kroenke et al., 2001; Muñoz-Navarro et al., 2017a), a nine-item self-report scale commonly used to screen for depressive symptoms.

The items are based on DSM-IV criteria for a major depressive episode during the last 2 weeks. All items are scored on a 4-point Likert scale ranging from 0 (*not at all*) to 3 (*almost every day*). Total scores range from 0 to 27, with higher scores indicating greater depressive symptoms. The internal consistency of the scale was adequate ($\alpha = .79$).

QOL was assessed with the WHOQOL-BREF (Lucas-Carrasco, 2012; World Health Organization, 1996), an abbreviated version of the WHOQOL-100 (World Health Organization, 1998). The brief version consists of two general and 24 specific self-reported items that measure perceived QOL on four domains: physical health, psychological health, social relationships, and environmental health. For the present study, we considered only the 24 specific items (World Health Organization, 1996). Participants are asked to rate their satisfaction with life experiences on the four domains during the last 4 weeks on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*extremely*). Total scores for each domain are as follows: physical health (range, 7–35), psychological health (6–30), social relationships (3–15), and environmental health (8–40). Higher scores indicate better QOL. In this study, since there is no established method for collecting a single unifying measure of QOL on this scale, we converted each domain score into a z score, and then summed and normalized these scores to create a single global score for this measure, which ranged from 0 to 10. At the posttreatment assessment, the composite score correlated strongly with each QOL subdomain (.74–.85). The internal consistency was good ($\alpha = .80$).

The SDS (Sheehan et al., 1996) was used to assess functional impact. The SDS is a five-item self-report scale designed to measure performance during the past month, with three main items (work, family, and social functioning) and two optional items (perceived stress and perceived social support). For this study, a total score was obtained following the SDS scoring procedure (work, family, and social functioning), but excluding the two optional items, as these are not directly related to functioning (Luciano et al., 2010). The three items are rated on a scale from 0 to 10. The three domains were summed to provide a single total score of global functional impairment, ranging from 0 (*unimpaired*) to 30 (*highly impaired*), with higher scores indicative of greater functional impairment. At the posttreatment assessment, the total score had high to very high correlations with each SDS subdomain, ranging from .86 to .93. Internal consistency was adequate ($\alpha = .77$).

DEMOGRAPHIC VARIABLES

The following baseline demographic variables were collected: sex, age, marital status, education level, employment status, and income level. To facilitate the statistical analyses and interpretation of the data, all demographic variables (except for age) have been dichotomized based on clinical experience as follows: (a) educational level—basic (≤secondary education) versus higher education (university degree, master's degree, or Ph.D.), (b) marital status—having a partner or not having a partner, (c) employment status—currently working or not working (temporary and permanent leave, unemployed, or retired), (d) income level—moderate/high income (>€24,000 [~$27,000]/year) versus low income (<€24,000/year), and (e) medication use (hypnotics, anxiolytics, and antidepressant)—current versus no current prescription.

DATA ANALYSIS

We evaluated whether cognitive reappraisal and expressive suppression strategies were moderators of the association between treatment allocation (experimental vs. TAU) and treatment outcomes (anxiety, depression, QOL, and functioning). A total of eight moderation models have been conducted. In each model, we included the candidate moderator (score on the Cognitive Reappraisal and Expressive Suppression subscales), an independent variable (treatment allocation), and the outcome measures (GAD-7, PHQ-9, WHOQOL, and SDS) as dependent variables at posttreatment. Additionally, we included the baseline scores of the corresponding outcome variable as a covariate. If significant moderation was detected, a pick-a-point approach was used to test the interaction. This strategy enables the visualization of the relationship between the predictor (control vs. experimental) and the outcome variables (i.e., anxiety and depressive symptoms, QOL, and functioning) at different points of the moderator (plus and minus 1 *SD* from the mean), which are plotted and compared visually.

The power analysis was performed with G*Power 3.1 software (Faul et al., 2007). This analysis indicated that, given the sample size ($N = 631$) and the number of predictors ($n = 4$), we had sufficient power to detect medium effect sizes ($\alpha = .05$, $f^2 = 0.15$, so $\beta = 1$). We used the SPSS PROCESS macro 3.5 (Hayes, 2017) to test the moderation effect. PROCESS macro applies a listwise deletion procedure for missing data. The software provides bias-corrected 95% confidence intervals (CI) for the indices using bootstrap calculation, which was based on 5,000 samples. For all other statistical analyses, version 19 of the

IBM-SPSS statistical software program was used (IBM Corp., Armonk, NY).

Results

DIFFERENCES BETWEEN DROPOUTS AND PARTICIPANTS INCLUDED IN THE ANALYSIS

Students' *t* test for independent samples was used to compare pretreatment emotion regulation levels in each strategy, symptoms of anxiety and depressive symptoms, QOL, and functioning between participants who completed the posttreatment assessment ($n = 631$, 59.5%) and those who did not ($n = 430$, 40.5%). No significant between-group differences were observed in any of the baseline levels of the variables analyzed ($p > .05$). In addition, the scores obtained on each scale in the pretreatment evaluation correlated significantly with the posttreatment scores (see Table 3).

MODERATORS

Moderation analysis was used to examine the potential moderation effects of baseline cognitive reappraisal and expressive suppression abilities on the relationship between the type of intervention administered and the treatment outcomes (anxiety and depressive symptoms, QOL, and functioning) at the posttreatment assessment. The eight models were adjusted for the severity of the corresponding baseline measures of depression and anxiety symptoms, QOL and functioning (see Table 4). Given the weak correlation ($r < .10$) between sociodemographic variables and baseline emotion regulation skills, the sociodemographic variables were not included as covariates in the analysis. The expressive suppression strategy moderated the relationship between treatment allocation and treatment outcomes in terms of depressive and anxiety symptoms, as well as QOL (see Table 4). However, the expressive suppression strategy was not a significant moderator in improving functioning. The cognitive reappraisal strategy did not have a moderating effect on the relationship between treatment allocation and treatment outcomes, such as depression or anxiety symptoms, or on functioning. However, this strategy moderated the relationship between type of intervention and QOL.

As shown in Figure 1, individuals who tended to use expressive suppression most frequently at baseline benefited more from the addition of TD-CBT to TAU in terms of anxiety and depressive symptoms, and QOL compared to participants with low to medium levels of this strategy. In the same way, those individuals who obtained higher scores of cognitive reappraisal at baseline benefited

Table 3
Pearson's Correlation of the Variables in the Pretreatment and Posttreatment Evaluations

	ERQES pre	PHQ-9 pre	GAD-7 pre	WHOQOL pre	SDS pre	ERQCR post	ERQES post	PHQ-9 post	GAD-7 post	WHOQOL post	SDS post
ERQCR pre	.186**	−.022	−.075	.080*	−.088*	.390**	.062	−.074	−.091*	.187**	−.050
ERQES pre		.158**	.088*	−.224**	.063	.080*	.528**	.140**	.088*	−.194**	.089*
PHQ-9 pre			.572**	−.468**	.377**	0.19	.115**	.403**	.287**	−.310**	.286**
GAD-7 pre				−.256**	.271**	−.021	.083*	.286**	.359**	−.193**	.163**
WHOQOL pre					−.318**	.064	−.121**	−.262**	−.192**	.541**	−.243**
SDS pre						−.013	.058	.168**	.106**	−.204**	.375**
ERQ post CR							.150**	−.131**	−.173**	.250**	−.084*
ERQ post ES								.320**	.263**	−.286**	.194**
PHQ-9 post									.788**	−.597**	.543**
GAD-7 post										−.484**	.504**
WHOQOL post											−.437**

Note. ERQ = Emotion Regulation Questionnaire; ERQCR = Cognitive Reappraisal; ERQES = Expressive Suppression; PHQ-9 = Patient Health Questionnaire–9; GAD-7 = Generalized Anxiety Disorder–7; WHOQOL = World Health Organization Quality of Life; SDS = Sheehan Disability Scale.

* $p < .05$.

** $p < .01$.

Table 4
Baseline Clinical Variables as Potential Moderators at the Posttreatment Evaluation

ERQ[a]	Posttreatment evaluation ($N = 631$) B [95% CI]	P
Expressive Suppression		
GAD-7	−0.530 [−0.996, −0.064]	.026*
PHQ-9	−0.812 [−1.364, −0.257]	.004**
WHOQOL	0.156 [0.001, 0.312]	.048*
SDS	−0.496 [−1.249, 0.259]	.196
Cognitive Reappraisal		
GAD-7	−0.372 [−0.962, 0.218]	.216
PHQ-9	−0.496 [−1.197, 0.205]	.165
WHOQOL	0.217 [0.024, 0.411]	.028*
SDS	−0.612 [−1.560, 0.335]	.205

Note. ERQ = Emotion Regulation Questionnaire; GAD-7 = Generalized Anxiety Disorder–7; PHQ-9 = Patient Health Questionnaire–9; WHOQOL = World Health Organization Quality of Life; SDS = Sheehan Disability Scale.
[a] Covariate adjustment for baseline corresponding symptoms (PHQ-9 baseline, GAD-7 baseline, SDS baseline, and WHOQOL baseline).
* $p < .05$.
** $p < .01$.

to a greater extent from TD-CBT+TAU in terms of QOL.

Moreover, in terms of expressive suppression, we found significant differences in depressive symptoms in the low ($t = -5.77$, $p < .001$), medium ($t = -11.05$, $p < .001$), and high ($t = -9.85$, $p < .001$) levels between participants who received TAU alone versus those who received TD-CBT +TAU. For anxiety symptoms, these between-group differences were also observed at low ($t = -7.29$, $p < .001$), medium ($t = -12.54$, $p < .001$), and high ($t = -10.45$, $p < .001$) levels. The same findings were observed for QOL, where low ($t = 4.03$, $p < .001$), medium ($t = 7.68$, $p < .001$), and high ($t = 6.83$, $p < .001$) levels differed significantly between the TAU and TD-CBT groups. Similarly, significant between-group differences in QOL were also seen in the low ($t = 3.65$, $p < .001$), medium ($t = 7.38$, $p < .001$), and high ($t = 6.76$, $p < .001$) levels of cognitive reappraisal.

Discussion

Research conducted to examine moderators can help to identify the patients who are likely to obtain the greatest benefit from a given treatment, thus revealing the wide heterogeneity among individuals in order to adapt the therapy according to their specific characteristics. In the present study, we examined cognitive reappraisal and expressive suppression strategies as potential moderators of treatment outcomes in patients who received TD-CBT+TAU versus TAU alone. To our knowledge, this is the first study to evaluate the moderating effect of cognitive reappraisal and expressive suppression skills in individuals with emotional disorders and to include not only symptoms but also QOL and functioning as outcome measures. Our results partially confirm our initial hypothesis that emotion regulation would be a significant moderator of the relationship between treatment allocation and treatment outcomes.

We expected that cognitive reappraisal would moderate the relationship between treatment and clinical symptoms due to its apparent relevance as a mechanism of change associated with symptom improvement in psychological treatments (Dryman & Heimberg, 2018). The absence of a moderating effect for cognitive reappraisal in our study may be because the use of cognitive reappraisal normally increases during CBT. In this regard, Moscovitch et al. (2012) found that individuals who responded best to treatment were those who showed a significant change from pre- to midtreatment in cognitive reappraisal levels.

With regard to the moderating effect of expressive suppression on treatment response (clinical symptoms), we found that adding TD-CBT to TAU led to a greater reduction in symptoms of anxiety and depression in individuals with higher baseline levels of expressive suppression compared to those with lower levels. Importantly, our finding contradicts the results reported in a previous study (Hosogoshi et al., 2020) in which expressive suppression had a moderating effect on CBT outcomes but that higher baseline levels of expressive suppression negatively affected the outcomes of CBT. This discrepancy between our find-

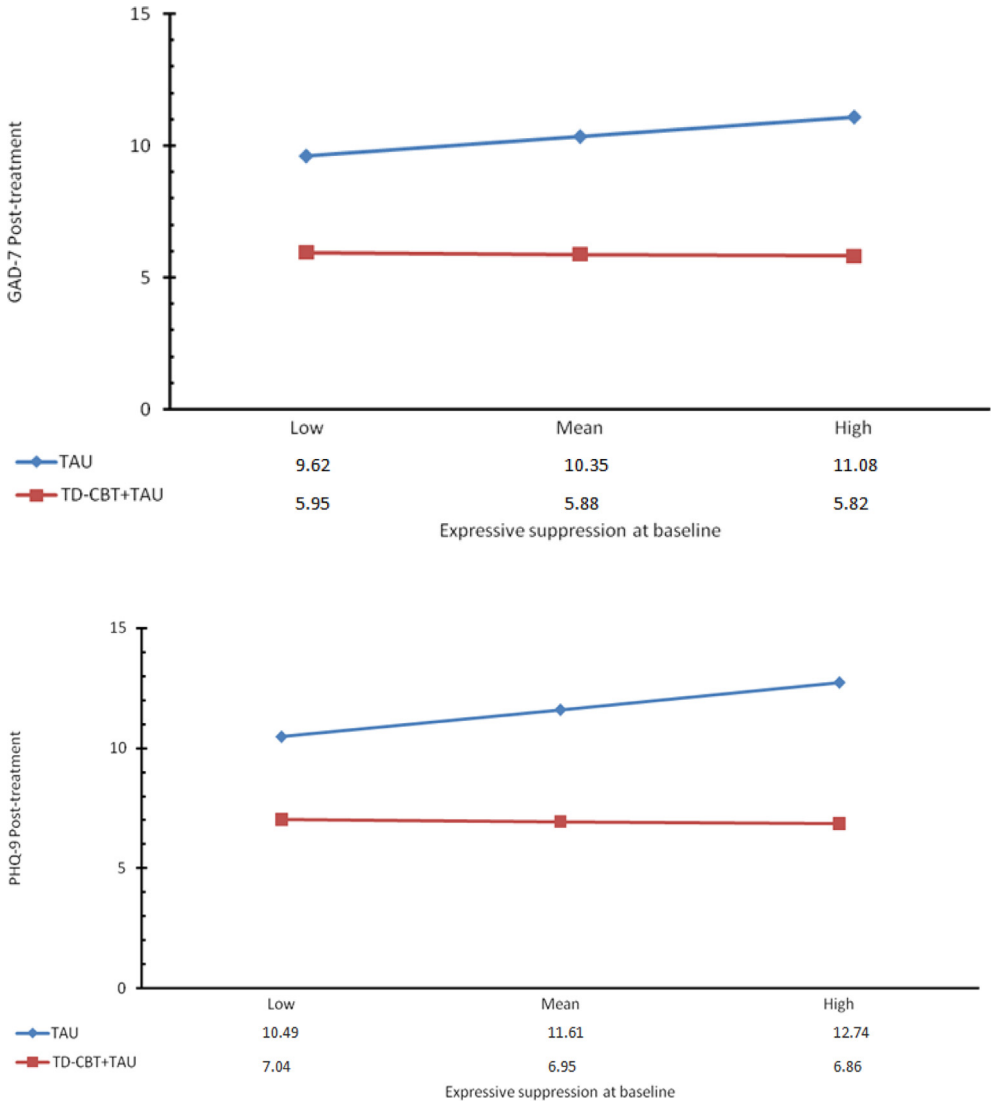

FIGURE 1 Moderator effect of expressive suppression and cognitive reappraisal at baseline of the intervention (TD-CBT+TAU vs. TAU) on symptoms of anxiety and depressive symptoms, and on QOL at posttreatment (only significant moderators are shown). Low and high baseline emotion regulation levels were defined as the mean −1 *SD* (low) or mean +1 *SD* (high). *Note.* TD-CBT = transdiagnostic cognitive-behavioral therapy; TAU = treatment as usual; QOL = quality of life; *SD* = standard deviation; GAD-7 = Generalized Anxiety Disorder–7; PHQ-9 = Patient Health Questionnaire–9; WHOQOL = World Health Organization Quality of Life.

ings and those reported by Hosogoshi et al. may be attributable to several factors in that study, including the small sample size ($n = 17$), the failure to adjust for the severity of baseline levels of the outcome variables (anxiety and depressive symptoms), and interstudy differences in outcome measures and the types and protocolization of psychological treatments (e.g., not everyone received the same number of sessions and the treatment was individualized in the study by Hosogoshi et al., 2020). Similarly, from a clinical point of view, it seems probable that individuals who tend to use maladaptive emotion regulation strategies would benefit more from the addition of a psychological treatment designed to improve those strategies. In this way, clinicians will understand that adding TD-CBT to TAU can help to reduce emotional symptoms in most patients, but that the effect is likely to vary depending on the individual's tendency to suppress emotions. In turn, awareness of the differential impact of TD-CBT among patients can help the therapist to decide whether to place a greater or lesser emphasis on this strategy as a function of the patient's clinical profile to achieve optimal results.

To our knowledge, the role of emotion regulation strategies as potential moderators of QOL and functioning have not been previously

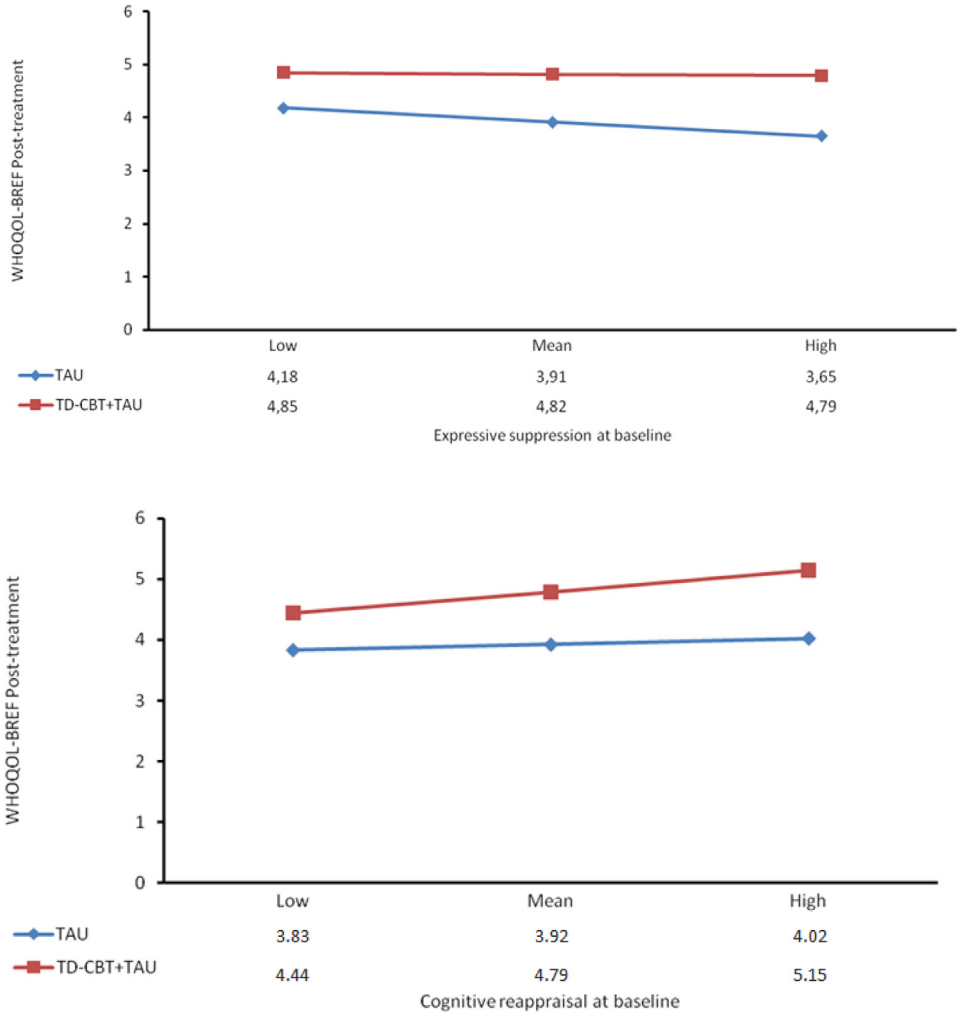

Fig 1. *(continued)*

evaluated. Nevertheless, as we expected, we found that both of these emotion regulation strategies played a moderating role in the relationship between QOL and treatment. Our findings demonstrated that individuals with higher scores in expressive suppression at baseline appeared to obtain a greater benefit from adding TD-CBT to TAU in the primary care setting than those with lower levels. As with emotional symptoms, it is reasonable to think that patients with higher levels of expressive suppression before treatment obtain greater benefits from it, since the treatment would modify the management of this maladaptive strategy, decreasing its level (Kivity et al., 2021) and therefore improving to a greater degree the QOL of individuals.

Individuals with higher levels of cognitive reappraisal at baseline appear to obtain more benefits from adding TD-CBT to TAU in the primary care setting. This result is consistent with previous research showing that cognitive reappraisal is an adaptive strategy associated with better functioning and well-being (Gross & John, 2003), which explains why it is likely that those with high levels of this skill before treatment would benefit more from psychological treatment in terms of QOL. The data and studies discussed above indicate that patients who do not receive psychological treatment (i.e., TAU alone) and have difficulties with emotion regulation (i.e., high expressive suppression and low cognitive reappraisal) are more likely to present more severe emotional symptoms and worse QOL. Therefore, one of the key benefits of CBT is to modify how frequently patients use these emotion regulation strategies in order to reduce anxiety and depressive symptoms (Gratz et al., 2015) and improve QOL (Jazaieri et al., 2017). In the same way, in our study, we did not find any significant interaction effect of emotion regulation (neither in cognitive reappraisal nor in expressive suppression) on functioning outcomes. A plausible explanation for the absence of a

moderating effect of emotion regulation on functioning might be that changes in functioning require more time to take root than changes in symptoms and QOL (Hammer-Helmich et al., 2018; Murphy et al., 2015; Naragon-Gainey et al., 2014).

The present findings extend previous research on the predictive role of emotion regulation strategies in reducing the severity of emotional symptoms, such as anxiety (Wirtz et al., 2014) and depression (Berking et al., 2008, 2014). These findings also expand our understanding of the role of emotion regulation as a key mediator of transdiagnostic psychological therapy (Khakpoor et al., 2019).

Our study has several limitations. First, the sample recruited for this study was derived from an RCT conducted to evaluate the effectiveness of TD-CBT for individuals with mild to moderate emotional symptoms; consequently, this limits the generalizability of our findings. In addition, treatment outcomes were assessed after a relatively brief intervention (3–4 months), and the moderating effects of this treatment on long-term outcomes could differ significantly from those observed in our study. Additionally, it is important to emphasize that emotion regulation is a multidimensional construct (Walden & Smith, 1997) and thus there may be other dimensions (apart from cognitive reappraisal and expressive suppression) that are not captured by the ERQ. Nonetheless, this scale has been well validated and has demonstrated optimal psychometric properties for the evaluation of emotion regulation strategies, both in our geographic region (Cabello et al., 2013) and worldwide (Preece et al., 2020). Future research should analyze the moderating role of other emotion regulation strategies. Another limitation is the high rate of missing data (40%) from the posttreatment evaluation, which means that the methods of imputation can be misleading (Jakobsen et al., 2017). Importantly, however, no significant differences in any of the baseline variables were found between individuals who completed the posttreatment evaluation and those who did not. In addition, similar dropout rates have been observed in previous RCTs carried out in the primary care setting (Bortolotti et al., 2008). Finally, the present study used self-report scales, and although all of them are widely used and validated (Muñoz-Navarro et al., 2017a, 2017b, 2021), they do not replace clinical evaluation by a clinician; consequently, the results may not be generalizable to the clinical population.

The findings of this study further support the relevance of emotion regulation as a key mechanism underlying the effectiveness of psychological therapies. More specifically, this study shows that baseline levels of expressive suppression and cognitive reappraisal strategies influence the expected benefits of TD-CBT in the treatment of emotional symptoms. Crucially, these results also support the generalization of TD-CBT in primary care given that all of the participants in the interventional arm at low, medium, and high baseline emotion regulation skill levels benefited from the addition of TD-CBT to TAU, although not to the same extent. The results obtained in the present study are clinically relevant, as they may help clinicians to identify those individuals with emotional symptoms who require extra assistance to achieve optimal outcomes from psychological therapy, such as TD-CBT. In short, these findings could provide the basis to develop more specific interventions aimed at improving emotion regulation skills.

Conflict of Interest Statement

The authors report no conflict of interest.

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