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Exploring the Role of Resilience as a Mediator in Selective Preventive Transdiagnostic Intervention (PROCARE+) for Adolescents at Risk of Emotional Disorders

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Abstract: *Introduction:* Psychological treatments are becoming an increasingly important component of medical healthcare, as a growing number of people seek treatment for a wide range of mental health problems. While these treatments are known to be effective, much remains to be understood about their mechanisms and reasons for effectiveness. The study of statistical mediators is crucial in psychological research, as it is fundamental to understanding how psychological factors influence health, well-being, and human behavior, and thus to designing effective psychological interventions. *Aim:* This study investigates the role of resilience as a treatment mediator in PROCARE+, a brief transdiagnostic, personalized protocol for the selective prevention of emotional disorders in adolescents. This approach has proven effective for young people at risk of developing emotional issues. *Method:* We used simple mediation models in a sample of 153 adolescents to assess the impact of interventions on resilience. Outcome variables included self-reported and parent-reported emotional risk, mood, anxiety symptoms, and quality of life. *Discussion:* The results of this study provide valuable information on how PROCARE+ works and how to improve its effectiveness, pointing to resilience as a key mediator in reducing the risk of developing emotional disorders and improving quality of life.

Keywords: adolescence, anxiety, depression, mediation, selective prevention, resilience

Introduction

In recent years, psychological treatments have become an important part of modern medical healthcare, given the increasing prevalence of emotional disorders such as anxiety, depression, and obsessive-compulsive disorder (OCD) (Polanczyk et al., 2015; Santomauro et al., 2021). Today, more people are seeking psychological help, increasing the demand for treatment for a variety of mental health problems (Fahimi et al., 2015; Olfson et al., 2014; World Health Organization, 2020).

The most current understanding of resilience defines it as a dynamic and multifaceted process encompassing an individual's capacity to withstand, adapt to, and recover from adversity, stress, and trauma. This concept extends beyond merely coping with challenges; it involves a transformative process that leads to personal growth and new

coping strategies (Herrera et al., 2022; Renati et al., 2023). Resilience is not a fixed trait but a set of behaviors, thoughts, and actions that can be learned and developed over time. Various factors influence it, including individual characteristics, life experiences, and environmental supports (Connor & Davidson, 2003; Hu et al., 2015; Masten & Barnes, 2018; Southwick & Charney, 2012). This ability is crucial for adequately adapting to unforeseen situations, recovering from their stressful effects, overcoming obstacles, and moving forward (Wollny & Jacobs, 2023). Resilience is considered an essential factor for psychological well-being, and there are studies on its positive influence on reducing depression and improving the quality of life (Hu et al., 2015; Lee et al., 2013).

In adolescents, resilience acts as a protective factor, countering symptoms like emotional exhaustion or mood alterations. Several studies have linked resilience to

variables such as self-efficacy, sense of purpose, and psychological well-being, and it has been shown to negatively correlate with perceived stress, depression, and anxiety (Dias & Cadime, 2017; Lee et al., 2017; Mestre et al., 2017; Vinayak & Judge, 2018). Resilience becomes particularly important during adolescence, a phase filled with changes and challenges, thereby underscoring the need to focus efforts on its assessment and promotion (Mesman et al., 2021).

Psychological interventions based on cognitive behavioral therapy (CBT) increase resilience by reinforcing coping skills (Behnamfar et al., 2022; Bischops et al., 2023). They focus on using CBT to teach individuals practical and applicable strategies for managing stress and difficult emotions, such as cognitive restructuring or exposure to emotionally demanding situations (Walter et al., 2020). By improving these skills, individuals can develop a greater capacity to adapt to and recover from adverse situations, which is central to resilience (Llistosella et al., 2023). This focus on practical skills development is complemented by work on self-perception and self-efficacy, strengthening individuals' belief in their ability to handle future challenges (Bandura, 1977; Brenninkmeijer et al., 2019). Thus, these psychological interventions seek not only to alleviate current symptoms but also to empower individuals to better cope with future adversity, a key component in building and maintaining resilience (Joyce et al., 2018; Kaczurkin & Foa, 2015; Leppin et al., 2014).

Building on these research findings, the transdiagnostic approach to cognitive-behavioral therapy – and more specifically the Unified Protocol (UP) developed by Barlow et al. (2016) – has recently been recognized as one of the most effective and affordable treatments to address emotional disorders (Barlow et al., 2017; Lopez et al., 2015; Maia et al., 2013). Ehrenreich-May et al. (2018) developed the Unified Protocol for the Transdiagnostic Treatment of Emotional Disorders in Adolescents (UP-A), maintaining an emphasis on common factors related to the etiology and treatment of these disorders (McEvoy et al., 2009). UP-A has proven to be effective for the treatment of clinical disorders associated with anxiety and depression in young people as well as for universal and indicated prevention (Ehrenreich-May & Kennedy, 2021; Jiménez-Vázquez et al., in press; Garcia-Lopez et al., 2023; García-Escalera et al., 2020; Ghandour et al., 2019; Kishida et al., 2023; Vivas-Fernandez et al., in press).

Although such interventions were effective, many aspects of how they work and what makes them effective are still not yet fully understood (Andersson et al., 2019; Garcia-Lopez, 2023; Kazdin, 2009). In addition, there is no consensus on specific treatment outcome measures to tailor interventions using a personalized medicine approach (Bandelow et al., 2015; Cook et al., 2017). To do so, it is essential to identify and study statistical mediators

to further research and to design effective interventions for the treatment of mental health problems in general (Baron & Kenny, 1986; Breitborde et al., 2010; Kazdin, 2007; Linardon et al., 2017) and emotional disorders, such as anxiety and depression, more specifically (Hale et al., 2018; Hayes, 2017; Hoppen & Chalder, 2018; Moreno-Peral et al., 2020). The most common mediators in interventions to address emotional problems are emotional regulation (Cavicchioli et al., 2023; Klein et al., 2022; Miu et al., 2022), resilience (Kural & Kovacs, 2021; Zhao et al., 2018), physical activity (Gujral et al., 2017), and social support (Moeller & Seehuus, 2019; Nilsen et al., 2013; Turner et al., 2018). Further, the role of statistical mediators in adults has spawned studies that found emotional regulation (Khakpoor et al., 2019) and negative affectivity (Sauer-Zavala et al., 2012) as potential mediating variables. However, although resilience has been widely studied as a mediating variable across different approaches and contexts (Sihvola et al., 2022; Surzykiewicz et al., 2022), few studies explore its relationship from a transdiagnostic approach, particularly in young populations.

Such exploration is important for several reasons. First, adolescence is a period of significant personal and social transformations, making resilience especially crucial for this stage of life (Mesman et al., 2021). Adolescents' ability to adapt and recover from challenges is key to their overall well-being and can serve as a shield against the development of emotional disorders (Racine et al., 2020; Ungar & Theron, 2020). In addition, the transdiagnostic approach, which has proved to be effective in young people, offers a unique opportunity to address multiple symptoms and disorders that often occur simultaneously at this stage of life (Clauss et al., 2023; Shah et al., 2020). Understanding the role of resilience as a mediator between treatment and mental health outcomes could provide valuable insights into the underlying mechanisms of these interventions. This contributes to a deeper understanding of psychological treatments for young people and also guides the development of more personalized and effective interventions (Anderson et al., 2022; Lee, 2021).

Recently, PROCARE+ was developed within the transdiagnostic approach. This is a brief and personalized protocol for the selective prevention of emotional disorders, adapted from UP-A. PROCARE+ has been instrumental in reducing the risk of developing emotional disorders as well as anxious and depressive symptomatology. Furthermore, it has enhanced emotional regulation posttreatment and maintained these improvements at 6- and 12-month follow-ups after the intervention (Vivas-Fernandez et al., 2023b). While PROCARE+ has proven effective as a preventive treatment for emotional disorders, there remains a need to investigate the fundamental mechanisms essential to meet the specific requirements of adolescents. Also, there

is a need for more mediation analysis studies involving comparisons with control groups (Maric et al., 2012).

This study delves into the role of resilience to elucidate the mediatory mechanisms within the PROCARE+ treatment. We propose the following hypotheses to investigate the mediation of resilience in improving emotional symptomatology and quality of life scores among participants in the PROCARE+ treatment compared to an active control condition (ACC). First, we hypothesize that resilience acts as a significant mediator in the relationship between treatment and the improvement of emotional well-being variables, as measured by the risk of emotional problems and quality of life; we expect this mediating effect to be more pronounced in the PROCARE+ treatment group than in the ACC group. Furthermore, we expect the mediating effect of resilience to be more evident in measures taken at follow-up after a booster session, compared to pre-post-treatment measures, suggesting a consolidation and increased mediation of resilience over time. Although its role in transdiagnostic treatments has not been explored in depth, understanding its impact in the context of PROCARE+ may provide valuable information that could be useful in refining and adapting interventions and broadening therapeutic outcomes for adolescent participants.

Methods

Participants

The sample comprised 153 adolescents who enrolled and completed every phase of the treatment and all the assessments described in Vivas-Fernandez et al.'s (2023a) study, 46.4% of whom self-reported as female, 52.9% as male, and 0.6% self-identified as nonbinary gender. Age ranged from 12 to 18 ($M = 13.6$; $SD = 0.09$). The following samples remained in each of the treatment conditions: Active Control Condition (ACC; $n = 47$), PROCARE ($n = 54$), and PROCARE+ ($n = 52$). This was the sample analyzed in this study (see Figure 1).

The inclusion criteria for the initial RCT were as follows: (1) having the informed consent of the adolescents and their guardian or legal custodian; (2) the technological means to attend the online sessions; (3) possible risk of emotional problems reported by the Spanish version of the emotional symptoms subscale of the Strengths and Difficulties Questionnaire (SDQ) in the Self-Reported or the Parent-Reported version (Barriuso-Lapresa et al., 2014; Ortuño-Sierra et al., 2014); (4) low or medium resilience reported by the 10-Item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007; Notario-Pacheco et al., 2011); (5) low overall emotional symptomatology or scores below normative data for any of the subscales

(depression, panic, social phobia, separation, generalized anxiety and obsessive-compulsive disorder measured with the Revised Children's Anxiety and Depression Scale (RCADS-30; Sandín et al., 2010; Piqueras et al., 2017); (6) presence of at least one risk factor (social exclusion, stress-related situations, unhealthy lifestyle habits, parental-child interaction); (7) not receiving psychological or psychiatric treatment; (8) not presenting acute suicidality; and (9) absence of neurodevelopmental disorders.

Table 1 shows that the distribution was homogeneous, and that no significant interdependence existed between the experimental conditions and any of the tested sociodemographic variables ($p > .05$).

Measures

The 10-Item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007) is a self-report tool designed to measure resilience. This abbreviated version, consisting of 10 items, was developed and validated as a more concise and efficient adaptation of the original 25-item CD-RISC (Connor & Davidson, 2003). The CD-RISC-10 is distinguished by its robust and stable factorial structure and is particularly effective and easy to use (Salisu & Hashim, 2017). It focuses on key aspects of resilience, such as persistence, strength, and tolerance to negative experiences, such as failure and pressure. The participants' resilience score served as the mediator variable in the current study. Internationally, the CD-RISC-10 has been the subject of multiple studies confirming its psychometric quality in various contexts and populations, including adolescents (Broche-Pérez et al., 2022; Cheng et al., 2020; López-Fernández et al., 2024; Nartova-Bochaver et al., 2021; Notario-Pacheco et al., 2011; Rezaeipandari et al., 2022; Wollny & Jacobs, 2023). Its reliability and validity are well documented. Because of these superior psychometric properties, the CD-RISC-10 has become one of the most widely used resilience scales in psychological research (Salisu & Hashim, 2017; Windle, 2011).

The Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) is a standardized measure designed to assess emotional and behavioral difficulties in pediatric populations. It consists of 30 items with a Likert-type scale from 0 to 3 (*never, sometimes, often, and always*). It is further subdivided into five subscales, namely, Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behavior. This study used the Emotional Problems subscale of the self-reported adolescent version (Self-Reported SDQ) and the Emotional Problems subscale of the parent version (Parent SDQ), both versions having demonstrated reliable psychometric properties in previous studies (Barriuso-Lapresa et al., 2014; Ortuño-Sierra et al., 2022).

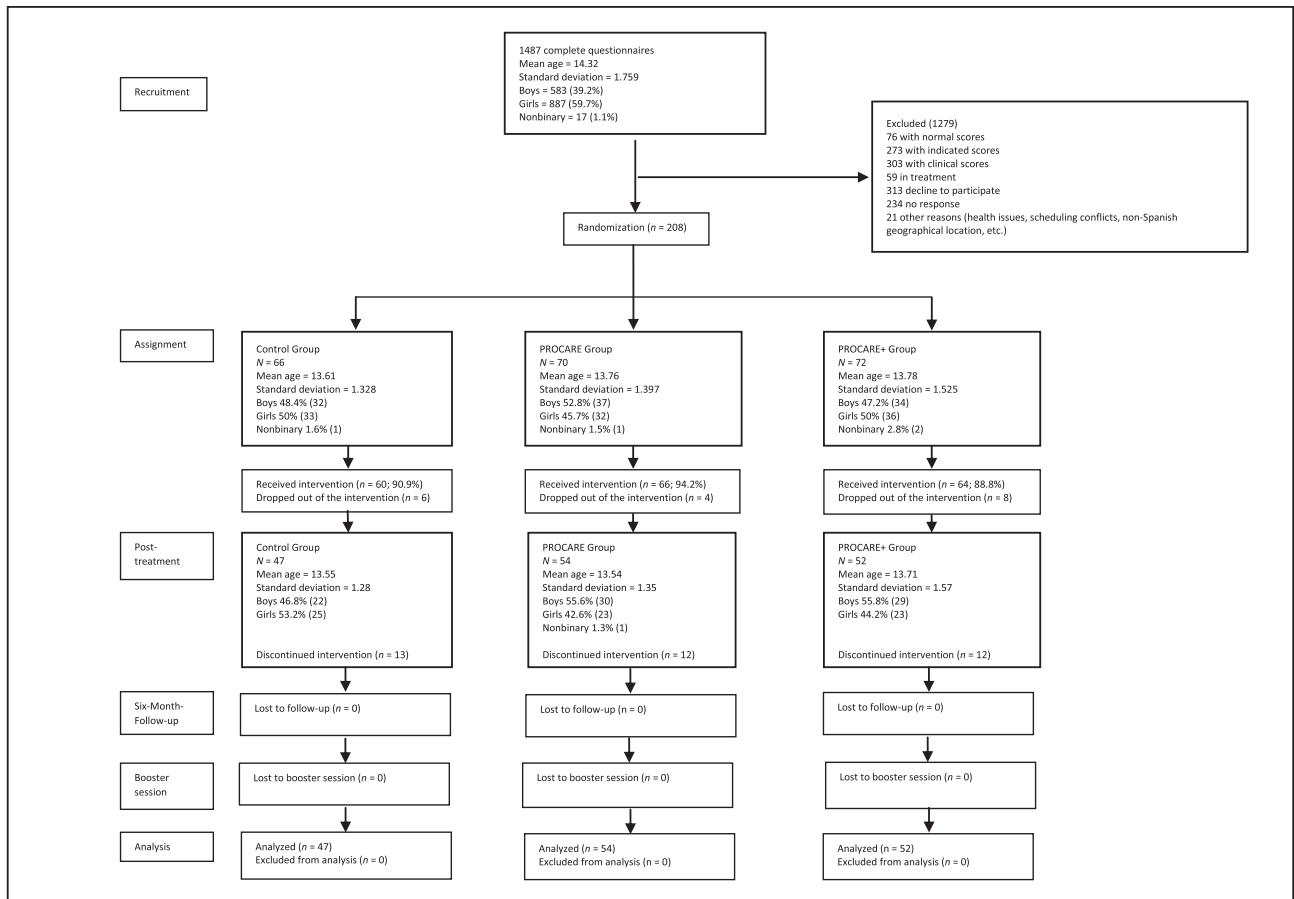


Figure 1. Consort flow diagram.

Table 1. Sociodemographic variables

	ACC M (SD)	PROCARE M (SD)	PROCARE+ M (SD)	
N	47	54	52	ns
Age	13.55 (1.28)	13.54 (1.35)	13.71 (1.57)	ns
Gender				ns
Girls	25.00 (53.2%)	23.00 (42.6%)	23.00 (44.2%)	
Boys	22.00 (46.8%)	30.00 (55.6%)	29.00 (55.8%)	
Nonbinary	0.00 (0%)	1.00 (1.3%)	0.00 (%)	
Nationality				ns
Spanish	42.00 (89.4%)	47.00 (87%)	49.00 (94.2%)	
Non-Spanish	5.00 (10.6%)	7.00 (13%)	3.00 (5.8%)	
Attendance (0–8)	7.62 (0.76)	7.70 (0.57)	7.62 (0.59)	ns

Note. M = mean; SD = standard deviation; ns = nonsignificant $p > .05$.

The KIDSCREEN-10 Index (Ravens-Sieberer et al., 2001) evaluates health-related quality of life across physical, mental, and social health domains. It contains 10 items with a Likert-type response format ranging from 0 to 5 (*not at all, a little, moderately, a lot, and very much*). Its psychometric properties have been validated (Gálvez Casas et al., 2014; Ravens-Sieberer et al., 2010).

The Revised Child Anxiety and Depression Scale, 30-item version (RCADS-30; Sandín et al., 2010), is an abbreviated adaptation of the original RCADS that targets symptoms of anxiety and depression in pediatric cohorts. It contains 30 items with a Likert-type scale from 0 to 3 (*never, sometimes, often, and always*). This instrument consists of six subscales that assess symptoms of anxiety

and depression in children and adolescents according to the most prevalent pediatric mental disorders (panic disorder, social phobia, separation anxiety disorder, generalized anxiety disorder, obsessive-compulsive disorder, and major depressive disorder). We used the RCADS-30 total score as a measure of general mood symptomatology. The good psychometric properties of the tool have been validated for Spanish populations (Piqueras et al., 2017).

Procedure

This research delves into a mediation analysis of the work undertaken by Vivas-Fernandez et al. (2023a), which is based on a 3-arm randomized controlled trial encompassing the following arms: ACC, PROCARE, and PROCARE+ within the context of Spanish adolescents. Readers are directed to the aforementioned paper for a full description of the methodologies employed.

We accomplished participant recruitment for this study through a multifaceted approach. Our methods included outreach to secondary education institutions, engagement on digital platforms, radio broadcasts, press announcements targeting the broader public, and collaboration with Spanish state organizations related to education and youth at local, regional, and national levels.

To ensure compliance with ethical standards, we sought informed consent, both informed and explicit, from the adolescent participants and their legal guardians. We meticulously executed the evaluations online via a protected portal. We impartially assigned the initial group of adolescents to one of the ACC, PROCARE, or PROCARE+ conditions, blind to the specific telehealth intervention they were slated to experience.

Before initiating the interventions, we carried out a pretest assessment to select the appropriate sample and confirm that participants adhered to the study's inclusion criteria. We streamlined this assessment using Limesurvey[®], an online platform that ensures the secure design, dissemination, and collation of data through online surveys. The evaluators remained unaware of the participants' treatment categorizations. Concurrently, we made a summarized report of their scores available to the adolescents and their families. Any adolescents presenting symptoms of anxiety or depression were then either redirected to a specialized preventive program or referred to public mental health institutions. Following the conclusion of the interventions, we conducted a posttest assessment to capture any shifts in the targeted variables.

Furthermore, we did a 6-month follow-up to assess the long-term effects of the interventions. We also conducted a 60-minute booster session to reinforce the learning acquired during the interventions. Finally, we carried out a 1-month follow-up after the booster session to assess

whether the effects of the intervention were sustained over time.

The study was structured in alignment with globally recognized guidelines (ICH-E6, E8, and E9) and was also in line with additional standards, such as those set by the European Medicine Agency (EMA). Moreover, PROCARE complied with the prevailing data protection laws (Regulation (EU) 2016/679).

Interventions

The study involved three group-based, telepsychological, and transdiagnostic preventive interventions aimed at improving adolescent emotional regulation skills. The first intervention was PROCARE, a shortened version of the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders in Adolescents (UP-A; Ehrenreich-May et al., 2018). This protocol uses cognitive-behavioral therapy (CBT) techniques, which are supported by evidence, to treat emotional disorders. These techniques include emotional education, cognitive reappraisal, behavioral activation, exposure therapy, motivational enhancement, and mindfulness. The goal is to improve emotional regulation skills, increase tolerance to distress associated with strong emotions, and eliminate maladaptive emotional behaviors that contribute to long-term emotional distress. The current adaptation consists of only eight sessions and is specifically designed for adolescents, focusing on improving emotional well-being using the core modules of the UP-A.

The second intervention, PROCARE+, included all the contents of PROCARE plus additional modules adapted to specific risk factors, such as a parental module, social exclusion in adolescents, stress concerning COVID-19 experiences, and healthy habits.

The third intervention, ACC, was an abbreviated adaptation of Utalk (La Greca et al., 2016), a preventive intervention for adolescents who are at risk for problems with social anxiety and/or depression and which focuses on emotional psychoeducation in a group format, emphasizing the discussion of thoughts, feelings, and behaviors as parts of emotions.

Please refer to Vivas-Fernandez et al. (2023a) for an in-depth review of the interventions.

Data Analysis

First, we analyzed the homogeneity of the sample using multivariate analysis of covariance (MANOVA) in the pretest, posttest, and postbooster measurements, controlling the effect of age, gender, nationality, and session attendance (as covariates). We found no interaction effects.

Following Hayes' (2017) guidelines, we used simple mediation models to determine changes in resilience,

measured using the CD-RISC-10, as a result of the interventions (ACC vs. PROCARE+ and PROCARE vs. PROCARE+) at pre-post and pre-post booster assessments. The specific outcome variables assessed were self-reported emotional risk (assessed using the Emotional Subscale of SDQ-A), parent-reported emotional risk (assessed using the Emotional Subscale of SDQ-P), general anxiety and mood symptomatology (assessed using RCADS-30), and quality of life (measured by KIDSCREEN-10). We computed the mediator and dependent variables in these models as residualized change scores using linear regression from preintervention to postintervention and from preintervention to postbooster session, which has been shown to be a reliable method to control baseline score variability (Gollob & Reichardt, 1991; Sanchez et al., 2023; Segal et al., 2006).

We used the SPSS (version 28.0) and SPSS PROCESS macro (version 4.1) to conduct data analysis and examine mediation effects (Hayes, 2017). The analysis involved the study of unstandardized coefficients, standard errors, and lower and upper limits. The macro employed bootstraps calculation to provide bias-corrected 95% confidence intervals for the indices, based on 10,000 samples. Statistical significance was established when the estimated 95% bootstrap confidence intervals did not include zero.

The datasets generated and/or analyzed during this study are not publicly available at the time of the production of this article because the data are in the process of publication, but it can be provided to the corresponding author upon reasonable request.

Results

We established 16 simple mediation models, one for each proposed dependent variable in both the pre-post and pre-post booster comparisons for the ACC vs. PROCARE+ (Experimental Group 1) and PROCARE vs. PROCARE+ (Experimental Group 2) comparisons, as shown in Tables 2, 3, 4, and 5.

The direct effect (c') of each model refers to the direct path of the relationship between the experimental condition (Experimental Group 1 vs. Experimental Group 2) and the change in the outcome variable, while controlling the mediating variable (CD-RISC). The indirect effect ($a \times b$) refers to the effect of the experimental group on the change in the outcome variable, through the mediating variable, in this case, the change in resilience assessed with the CD-RISC. Finally, the total effect (c) refers to the sum of the direct and indirect effects of the independent variable (experimental condition) on the change in the outcome variable.

In the comparison between the active control condition (ACC) and PROCARE+ (Experimental Group 1; EG1) and

between PROCARE and PROCARE+ (Experimental Group 2; EG2) in the pre-post mediation models, we observed no significant mediation effects of resilience in any of the models. Specifically, for EG1 (see Table 2), models 1–4 showed no significant mediation effects on the emotional subscale (measured by the SDQ-A and SDQ-P), quality of life (assessed by KIDSCREEN-10), or anxiety and mood symptomatology (measured by the RCADS-30). Similarly, for EG2 (see Table 3), models 5–8 also showed no significant mediation effects in these same areas. This was set as the confidence intervals for each model's indirect effects ($a \times b$) included 0, indicating a lack of statistical significance.

When we analyzed the pre-post booster mediation effects (see Table 4), we found the following results in the comparison ACC versus PROCARE+ (EG1). For model 9, the results showed a statistically significant indirect effect when we analyzed the mediation of the CD-RISC on the SDQ-A. The sign of the coefficient β is negative, thus participating in the PROCARE+ condition reduced self-reported emotional risk by adolescents to a greater extent; these effects were mediated through an improvement in resilience change, as measured by the CD-RISC ($\beta = -0.53$, $SE = 0.14$, 95% CI $[-0.83, -0.27]$). Furthermore, the results showed a total mediation effect on change in resilience, as there was a nonsignificant direct effect of the experimental condition on change in the emotional subscale of the SDQ-A ($c' = 0.19$, $SE = 0.17$; $p = .26$). Thus, PROCARE+ generated an improvement in resilience ($a = 0.88$, $SE = 0.19$); $p = .000$), and this increased resilience produced an improvement in adolescents' self-reported emotional state ($b = 0.59$, $SE = 0.08$; $p = .000$).

For model 10, the results showed a statistically significant indirect effect, and because the sign of the coefficient β was negative, we observed that participating in the PROCARE+ condition further reduced parent-reported emotional risk, as assessed by change in the emotional subscale of the SDQ-P, and that these effects were mediated by an improvement in a change in resilience, as measured by the CD-RISC ($\beta = -0.21$, $SE = 0.09$, 95% CI $[-0.417, -0.048]$). In addition, the results revealed a partial mediation effect of resilience, as the direct effect of the experimental condition on the emotional subscale of the SDQ-P was significant ($c' = 0.63$, $SE = 0.20$; $p = .002$).

For model 11, the results showed a statistically significant indirect effect, meaning that participating in the PROCARE+ condition improved quality of life, as assessed by the KIDSCREEN-10, to a greater extent, and that these effects were mediated by the improvement in changes in the CD-RISC ($\beta = 0.31$, $SE = 0.09$, 95% CI $[0.138, 0.524]$). In this case, the results also revealed a partial mediation effect of resilience, given the significant results of the direct effect of the experimental condition on the change in the KIDSCREEN-10 ($c' = 0.44$, $SE = 0.18$; $p = .019$).

Table 2. Mediation models (pre-post). Active control condition-PROCARE+ comparison

Model	X	M	Y	a		b		R ²	Total effect c		Direct effect c'		Indirect effect a × b	
				β (SE)	t (p)	β (SE)	t (p)		β (SE)	t (p)	β (SE)	T (p)	β (SE)	95% CI
1	EG1	CDRISC	SDQ-A	0.254 (0.190)	1.337 (.184)	-0.230 (0.087)	-2.645 (.009**)	.111	-0.587 (0.168)	-3.494 (.000***)	-0.529 (0.164)	-3.211 (.001***)	-0.058 (0.055)	[-0.194, 0.024]
2	EG1	CDRISC	SDQ-P	0.254 (0.190)	1.337 (.184)	-0.142 (0.104)	-1.362 (.176)	.058	-0.480 (0.196)	-2.451 (.016*)	-0.444 (0.197)	-2.257 (.026*)	-0.036 (0.039)	[-0.128, 0.030]
3	EG1	CDRISC	KIDSCREEN	0.254 (0.190)	1.337 (.184)	0.493 (0.089)	5.519 (.000***)	.018	0.260 (0.191)	1.364 (.175)	0.135 (0.168)	0.801 (.424)	0.125 (0.091)	[-0.067, 0.296]
4	EG1	CDRISC	RCADS-t	0.254 (0.190)	1.337 (.184)	-0.416 (0.093)	-4.476 (.000***)	.053	-0.446 (0.190)	-2.345 (.021*)	-0.340 (0.175)	-1.940 (.055*)	-0.105 (0.098)	[-0.342, 0.043]

Note. X = independent variable: Experimental Group 1: ACC vs PROCARE+ (EG1); M = mediator variable: CDRISC (The 10-Item Connor-Davidson Resilience Scale); Y = dependent variable: SDQ-A (Emotional Subscale Self-Report SDQ, The Strengths and Difficulties Questionnaire Adolescents); SDQ-P (Emotional Subscale Parent SDQ, The Strengths and Difficulties Questionnaire Parents); RCADS-t (The Revised Child Anxiety and Depression Scale); KIDSCREEN (The KIDSCREEN-10 Index); a = path a; b = path b; β = unstandardized coefficients; SE = standard error; CI = confidence interval. *p < .05; **p < .01; ***p < .001. 10,000 bootstrap samples.

Table 3. Mediation models (pre-post). PROCARE-PROCARE+ comparison

Model	X	M	Y	a		b		R ²	Total effect c		Direct effect c'		Indirect effect a × b	
				β (SE)	t (p)	β (SE)	t (p)		β (SE)	t (p)	β (SE)	T (p)	β (SE)	95% CI
5	EG2	CDRISC	SDQ-A	0.220 (0.194)	1.131 (.260)	-0.543 (0.082)	-6.578 (.000***)	.040	-0.405 (0.194)	-2.083 (.039*)	-0.285 (0.165)	-1.73 (0.086)	-0.119 (0.117)	[-0.391, 0.069]
6	EG2	CDRISC	SDQ-P	0.220 (0.194)	1.131 (.260)	-0.210 (0.093)	-2.260 (.025**)	.036	-0.375 (0.189)	-1.984 (.049*)	-0.328 (0.186)	-1.762 (0.081)	-0.046 (0.047)	[-0.155, 0.034]
7	EG2	CDRISC	KIDSCREEN	0.220 (0.194)	1.131 (.260)	0.576 (0.081)	7.071 (.000***)	.000	0.029 (0.196)	0.149 (0.881)	-0.097 (0.162)	-0.598 (0.550)	0.126 (0.116)	[-0.088, 0.374]
8	EG2	CDRISC	RCADS-t	0.220 (0.194)	1.131 (.260)	-0.398 (0.093)	-4.269 (.000***)	.006	-0.165 (0.200)	-0.825 (0.411)	-0.077 (0.186)	-0.414 (0.679)	-0.087 (0.083)	[-0.269, 0.006]

Note. X = independent variable: Experimental Group 2: PROCARE-PROCARE+ (EG2); M = mediator variable: CDRISC (The 10-Item Connor-Davidson Resilience Scale); Y = dependent variable: SDQ-A (Emotional Subscale Self-Report SDQ, The Strengths and Difficulties Questionnaire Adolescents); SDQ-P (Emotional Subscale Parent SDQ, The Strengths and Difficulties Questionnaire Parents); RCADS-t (The Revised Child Anxiety and Depression Scale); KIDSCREEN (The KIDSCREEN-10 Index); a = path a; b = path b; β = unstandardized coefficients; SE = standard error; CI = confidence interval. *p < .05; **p < .01; ***p < .001. 10,000 bootstrap samples.

Table 4. Mediation models (pre-postbooster). Active control condition-PROCARE+ comparison

Model	X	M	Y	a		b		R ²	Total effect c		Direct effect c'		Indirect effect a × b	
				β (SE)	t (p)	β (SE)	t (p)		β (SE)	t (p)	β (SE)	T (p)	β (SE)	95% CI
9	EG1	CDRISC	SDQ-A	0.888 (0.190)	4.666 (.000***)	-0.599 (0.084)	-7.095 (.000***)	.127	-0.730 (0.194)	-3.756 (.000***)	-0.198 (0.175)	-1.131 (.260)	-0.532 (0.143)	[-0.835, -0.276]
10	EG1	CDRISC	SDQ-P	0.888 (0.190)	4.666 (.000***)	-0.237 (0.096)	-2.449 (.016*)	.176	-0.849 (0.186)	-4.558 (.000***)	-0.638 (0.201)	-3.175 (.002**)	-0.210 (0.094)	[-0.417, -0.048]
11	EG1	CDRISC	KIDSCREEN	0.888 (0.190)	4.666 (.000***)	0.355 (0.090)	3.923 (.000***)	.153	0.764 (0.182)	4.196 (.000***)	0.448 (0.188)	2.384 (.019*)	0.315 (0.098)	[0.138, 0.524]
12	EG1	CDRISC	RCADS-t	0.888 (0.190)	4.666 (.000***)	-0.653 (0.085)	-7.672 (.000***)	.095	-0.644 (0.201)	-3.196 (.001***)	-0.064 (0.176)	-3.64 (.716)	-0.580 (0.149)	[-0.899, -0.315]

Note. X = independent variable: Experimental Group 1: ACC versus PROCARE+ (EG1); M = mediator variable: CDRISC (The 10-Item Connor-Davidson Resilience Scale); Y = dependent variable: SDQ-A (Emotional Subscale Self-Report SDQ, The Strengths and Difficulties Questionnaire Adolescents); SDQ-P (Emotional Subscale Parent SDQ, The Strengths and Difficulties Questionnaire Parents); RCADS-t (The Revised Child Anxiety and Depression Scale); KIDSCREEN (The KIDSCREEN-10 Index); a = path a; b = path b; β = unstandardized coefficients; SE = standard error; CI = confidence interval. *p < .05; **p < .01; ***p < .001. 10,000 bootstrap samples.

For model 12, we observed a statistically significant indirect effect. The negative sign of the coefficient β indicated that participating in the PROCARE+ condition reduced anxiety and mood symptomatology as measured by the RCADS-30 to a greater extent (β = -0.36, SE = 0.14, 95% CI [-0.899, -0.315]). The results demonstrated a total mediation effect on the change in resilience because of the nonsignificant direct effect of the experimental

condition on changes in RCADS-30 (c' = -0.06, SE = 0.17; p = .71). Thus, the PROCARE+ program generated an improvement in resilience (a = 0.88, SE = 0.19); p = .000), and this greater resilience reduced anxiety and mood symptomatology (b = -0.65, SE = 0.08; p = .000).

The following results were reported for the pre-post booster mediation effects (see Table 5) for the PROCARE vs. PROCARE+ comparison (EG2). For model 13, the results

Table 5. Mediation models (pre-postbooster). PROCARE-PROCARE+ comparison

Model	X	M	Y	a		b		Total Effect c			Direct effect c'		Indirect effect a × b	
				β (SE)	t (p)	β (SE)	t (p)	R ²	β (SE)	t (p)	β (SE)	t (p)	β (SE)	95% CI
13	EG2	CDRISC	SDQ-A	0.610 (0.175)	3.470 (.000)	-0.622 (0.072)	-8.573 (.000)	.015	-0.215 (0.169)	-1.272 (.206)	0.164 (0.137)	1.192 (.235)	-0.379 (0.111)	[-0.599, -0.161]
14	EG2	CDRISC	SDQ-P	0.610 (0.175)	3.470 (.000)	-0.341 (0.095)	-3.564 (.000)	.040	-0.378 (0.181)	-2.088 (.039)	-0.170 (0.181)	-0.478 (.633)	-0.208 (0.089)	[-0.416, -0.067]
15	EG2	CDRISC	KIDSCREEN	0.610 (0.175)	3.470 (.000)	0.430 (0.094)	4.555 (.000)	.023	0.293 (0.184)	1.588 (.115)	0.030 (0.179)	0.172 (.863)	0.262 (0.097)	[0.091, 0.472]
16	EG2	CDRISC	RCADS-t	0.610 (0.175)	3.470 (.000)	-0.599 (0.078)	-7.668 (.000)	.006	-0.142 (0.174)	-0.814 (.417)	0.223 (0.148)	1.508 (.134)	-0.365 (0.119)	[-0.619, -0.150]

Note. X = independent variable: Experimental Group 2: PROCARE-PROCARE+ (EG2); M = mediator variable: CDRISC (The 10-Item Connor-Davidson Resilience Scale); Y = dependent variable: SDQ-A (Emotional Subscale Self-Report SDQ, The Strengths and Difficulties Questionnaire Adolescents); SDQ-P (Emotional Subscale Parent SDQ, The Strengths and Difficulties Questionnaire Parents); RCADS-t (The Revised Child Anxiety and Depression Scale); KIDSCREEN (The KIDSCREEN-10 Index); a = path a; b = path b; β = unstandardized coefficients; SE = standard error; CI = confidence interval. * $p < .05$; ** $p < .01$; *** $p < .001$. 10,000 bootstrap samples.

showed a statistically significant indirect effect, and, since the sign of the coefficient β was negative, participating in the PROCARE+ condition reduced adolescents' self-reported emotional risk, as assessed by change in the emotional subscale of the SDQ-A, to a greater extent. These effects were mediated through an improvement in resilience, as measured by the CD-RISC ($\beta = -0.37$, $SE = 0.11$, 95% CI [-0.599, -0.161]). Furthermore, the results displayed a total mediation effect of change in resilience, given the nonsignificant direct effect of the experimental condition on changes in the emotional subscale of the SDQ-A ($c' = 0.16$, $SE = 0.13$; $p = .23$). Thus, PROCARE+ generated an improvement in resilience ($a = 0.61$, $SE = 0.17$); $p = .000$), and this greater resilience produced improvements in adolescents' self-reported emotional state ($b = 0.62$, $SE = 0.07$; $p = .000$).

For model 14, the results exhibited a statistically significant indirect effect. Because the sign of the coefficient β was negative, participating in the PROCARE+ condition further reduced parent-reported emotional risk, as assessed by change in the emotional subscale of the SDQ-P. These effects were mediated through an improvement in change in resilience, as measured by the CD-RISC ($\beta = -0.20$, $SE = 0.08$, 95% CI [-0.416, -0.067]). Furthermore, the results indicated a total mediation effect of change in resilience, because of the nonsignificant direct effect of the experimental condition on changes in the emotional subscale of the SDQ-P ($c' = 0.17$, $SE = 0.18$; $p = .63$). Thus, PROCARE+ generated an improvement in resilience ($a = 0.61$, $SE = 0.17$); $p = .000$), and this greater resilience enhanced the change in parent-reported emotional state ($b = 0.34$, $SE = 0.09$; $p = .000$).

For model 15, the results revealed a statistically significant indirect effect, so participating in the PROCARE+ condition improved quality of life, as assessed by the KIDSCREEN-10, to a greater extent. These effects were mediated by the improvement in the CD-RISC changes ($\beta = 0.26$, $SE = 0.09$, 95% CI [0.091, 0.472]). Additionally,

the results showed a total mediation effect of change in resilience, given the nonsignificant direct effect of the experimental condition on change in the KIDSCREEN-10 ($c' = 0.03$, $SE = 0.17$; $p = .17$). PROCARE+ generated an improvement in resilience ($a = 0.61$, $SE = 0.09$; $p = .000$), and this greater resilience led to improvements in change in quality of life ($b = 0.43$, $SE = 0.09$; $p = .000$).

For model 16, we observed a statistically significant indirect effect. The negative sign of the β coefficient indicated that participating in the PROCARE+ condition reduced anxiety and mood symptomatology as assessed by the RCADS-30 to a greater extent ($\beta = -0.36$, $SE = 0.11$, 95% CI [-0.619, -0.150]). The results revealed a total mediation effect of the change in resilience, as measured by the CD-RISC, because of the nonsignificant result of the direct effect of the experimental condition on the change in the RCADS-30 ($c' = -0.22$, $SE = 0.14$; $p = .13$). Thus, the PROCARE+ program generated an improvement in resilience ($a = 0.61$, $SE = 0.17$; $p = .000$), and this greater resilience reduced anxiety and mood symptomatology as assessed by the RCADS-30 ($b = -0.59$, $SE = 0.07$; $p = .000$).

Discussion

This study elucidates the mediating mechanisms within PROCARE+ treatment, focusing specifically on the role of resilience, through simple mediation models regarding emotional risk, general anxiety, mood symptomatology, and quality of life. In the pre-post measures, we found no mediation effects of resilience in any of the variables analyzed when we looked at the comparisons between ACC, PROCARE, and PROCARE+. This could initially suggest an absence of mediating effects on the variables; however, a longitudinal analysis reveals that this conclusion is premature, in line with previous research that examined the mediating role of resilience, which found that

improvements increase over time (Turan & Canbulat, 2023; Wu et al., 2020; Yu et al., 2015). This also relates to the findings of Vivas-Fernandez et al. (2023b), who found more significant improvements over time.

On pre-post booster measures, the reduction in parent-rated emotional risk and improved quality of life were partially mediated by an improvement in resilience compared to PROCARE+ and the ACC intervention. Furthermore, the results suggest that the improvement in resilience fully mediates the reduction in adolescents' self-reported emotional risk and the decrease in anxious-depressive symptomatology in those who received the PROCARE+ intervention compared to the ACC psychoeducational intervention. This role of resilience as a mediator of the benefits obtained in psychological treatments was previously present in the literature, where increased resilience led to improvements in anxious-depressive symptoms and well-being (Cheng et al., 2023; Jiménez-Vázquez et al., in press; Prins & Ollendick, 2003; Reuben et al., 2012).

When we compare the PROCARE+ and PROCARE groups on the pre-post booster measures, we observe full mediation of resilience on all measures, suggesting that booster sessions may have played a positive part in maintaining positive outcomes in the long term, as demonstrated by studies analyzing the effects of booster sessions, which conclude that interventions involving this session are more effective (Gearing et al., 2013, Jiménez-Vázquez et al., in press; Vivas-Fernandez et al., 2023b). On the other hand, the main feature of PROCARE+ compared to PROCARE is the presence of specific modules targeting risk factors detected in adolescents, generating more improvements in resilience, leading to significant improvements in quality of life and emotional symptomatology. These findings enhance the evidence in personalized medicine (Aparicio & Méndez, 2020; Holmes et al., 2018), demonstrating how incorporating resilience-enhancing elements into prevention strategies can enhance treatment outcomes. Additionally, PROCARE+'s ability to target specific risk factors in adolescents underscores its alignment with the evolving trends in personalized medicine and psychology (Ghandour et al., 2019; Stockings et al., 2016), highlighting the program's capacity to tailor interventions to the unique needs of each individual.

Resilience becomes a decisive component in selective prevention interventions based on the transdiagnostic approach. The increases in resilience appear to be the mechanism underlying a significant part of the positive effects observed in prevention programs (Babić et al., 2020; Fletcher & Sarkar, 2013; Southwick & Charney, 2012; Windle, 2011). This aligns with previous literature, which suggests that resilient adolescents are less likely to experience anxiety or depression. In this regard, some have suggested that designing programs with a specific focus on

strengthening resilience may be an effective approach to mitigating emotional symptoms in the adolescent population (Fergus & Zimmerman, 2005; Luthar et al., 2020; Masten, 2014; Masten & Tellegen, 2012).

The PROCARE+ program is notable for its focus on enhancing adolescent resilience and potentially reducing the risk of emotional problems. This approach includes a unique feature of involving parents in the treatment process, aligning with the insights from various psychological studies (Barmish & Kendall, 2005; Yee et al., 2017). At the core of PROCARE+ lies its aim to foster resilience in adolescents, which may improve their quality of life and decrease the risk of emotional disorders. The resilience-related benefits observed after treatment appear to be maintained over the long term, especially with the addition of a booster session. This suggests the potential long-lasting influence of resilience-based interventions in the field of adolescent mental health care and highlights PROCARE+'s role in contributing to the development of mental health treatments for young people.

In conclusion, the results indicate that resilience plays a significant role in mediating the effects of the intervention. Thus, it appears to be a key element in the effectiveness of PROCARE+. This improvement in resilience could differentiate PROCARE+ as a selective preventive treatment, going beyond psychoeducation and considering the risk factors evidenced in adolescents. Importantly, these improvements in the PROCARE+ transdiagnostic selective preventive intervention were found after a booster session, suggesting that the role of these booster sessions is crucial to consolidating learning and ensuring the long-term effectiveness of psychological prevention treatments. Consequently, one can claim that booster sessions may play a fundamental role in consolidating therapeutic benefits and may be essential in maintaining adolescents and parents in a healthy emotional state in the long term.

The results of this study shed light on how PROCARE+ works and how to improve its effectiveness by identifying resilience as a key mediator in reducing the risk of developing emotional disorders and improving quality of life. These findings reinforce the importance of promoting resilience in psychological treatments to improve their effectiveness and benefits for at-risk youth.

A limitation of this study is the sample size, which may have influenced the statistical power to detect mediation effects. Additionally, the study relied on self-report measures, which are subject to biases and may not accurately reflect participants' emotional states. Furthermore, we conducted the study in a specific cultural context, so the results may not generalize to other populations. Another limitation is the focus on adolescents with comparatively lower resilience, which may limit the applicability of the findings to a broader adolescent population. This selection criterion

could impact the variability and correlations in our study. Finally, although the study found evidence for the efficacy of the PROCARE+ intervention, its long-term effects beyond the follow-up period are unclear. For future research, it would be beneficial to replicate this study with a larger sample size to increase statistical power and improve the generalizability of the results. In addition, future studies could incorporate multiple data-collection methods, such as physiological measures, to provide a more comprehensive assessment of participants' emotional states. To address the cultural specificity of the study, it would be necessary to explore the efficacy of the PROCARE+ intervention in diverse cultural contexts.

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History

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Conflict of Interest

The authors declare no conflict of interest.

Publication Ethics

PROCARE received Institutional Review Board approval and followed the American Psychological Association Standards and Guidelines for the Practice of Telepsychology (Joint Task Force for the Development of Telepsychology Guidelines for Psychologists, 2013). All assessments were performed in an online format through a secure platform. This study was approved by the Bioethics Committee of the University of Jaén, ID: GEN-3461-aab8-41a3-85c2-ca28-5102-cdda-8d53. Consent for publication was not needed.

Open Science


The open data and the open material are available on request from the corresponding author.

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