

An Internet-Based Intervention for Depressive Symptoms: Preliminary Data on the Contribution of Behavioral Activation and Positive Psychotherapy Strategies

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Abstract. Depression is one of the most prevalent mental disorders worldwide. Cognitive Behavioral Therapy is a well-known evidence-based therapy. However, interventions are multi-component, and we do not know the specific mechanisms responsible for the change produced by depression therapies. Therapeutic components of most interventions have focused on reducing negative symptoms rather than on improving positive affect, well-being, and character strengths. Positive Psychotherapeutic strategies (PPs) are designed to fill this gap. These PPs have shown efficacy in improving depressive symptoms. Nonetheless, we do not know the specific contribution of a PPs component. Internet-based interventions are effective in treating depression. Using a dismantling design, we are currently carrying out a randomized controlled trial with the objective of evaluating the efficacy of an Internet-based protocol for depressive symptoms (including Behavioral Activation and PPs), the protocol without the PPs component, and the protocol without the BA component. In the present paper, we present preliminary results of nine participants randomized to one of the three conditions, exploring the pre-treatment to post-treatment changes and presenting the qualitative data on the participants' opinions of the BA and PPs. Participants in the intervention groups with the BA component presented greater improvements in their negative affect and depression; and participants in the PPs improved their positive affect and resilience. Regarding usefulness, the BA group pointed to the improvement in their relationships and to knowing that the activity is related to their mood, and the PPs learned about their psychological strength and saw the positive side of things more.

Keywords: Depression · Dismantling studies · Internet-based intervention · Behavioral Activation · Positive Psychotherapy strategies

1 Introduction

Major Depressive Disorder (MDD) is one of the most prevalent and disabling mental disorders in the general population [1, 2]. The total estimated number of people living with depression increased by 18.4% between 2005 and 2015, and in the case of Spain, prevalence data show that 5.2% of the population suffers from depression [3]. Among the many interventions for depression treatment, the evidence supporting Cognitive Behavioral Therapy (CBT) [4–6] is well known. Numerous randomized controlled studies have shown that CBT is superior to wait-list, non-specific controls, or treatment as usual [7]. CBT for MDD is based on promoting change in certain patterns of maladjusted thinking, focusing not only on the use of cognitive techniques, but also on the use of behavioral procedures, which are fundamental in this change [8].

Among the components of CBT, the literature shows that the Behavioral Activation (BA) component is essential in the treatment of depression, indicating that its efficacy is equivalent to that of the complete treatment [9, 10]. Many "behavioral activation" interventions, as formulated by Jacobson [11], are considered well-established treatments for major depression [6, 12].

As mentioned above, the BA component has been found to be important in depression treatment. However, interventions for MDD are multi-component, and we do not know much about the specific mechanisms responsible for the change produced by depression therapies [13, 14].

Furthermore, therapeutic components of most depression interventions have focused on reducing negative symptoms (depressive and anxiety symptoms, negative affect, anxiety, etc.), rather than on improving positive affect, well-being, and character strengths [15]. Depressive symptoms often involve lack of engagement and a lack of purpose in life, as well as low levels of positive emotions. Consequently, low levels of positive affect are more strongly linked to depression than to other emotional disorders [16]. For this reason, Positive Psychotherapeutic strategies (PPs) are designed to fill this gap. These interventions, particularly in depression, have shown efficacy in improving depressive symptoms and enhancing well-being [17, 18]. Therefore, many authors defend the need for positive interventions that promote gratitude, resilience, positive affect, and positive functioning [15], as important elements of depression treatments [19, 20].

Nonetheless, as in the case of the BA component, we do not know the specific contribution of a PPs component to the change experienced by patients in depression therapies [13, 14]. Carrying out component studies (dismantling or additive) may provide a more direct way to identify the active ingredients in psychotherapy [21], and find out whether a specific active ingredient in psychotherapy contributes to differential outcomes [22].

In addition, one of the most important challenges in CBTs for depression is to design new ways to apply treatments in order to maximize their efficiency and dissemination [23, 24]. The results obtained for Internet-based interventions show that these interventions are effective in treating depression [25–27]. Nevertheless, most Internet-based intervention programs for depression are also multi-component, and it is

important to make progress in investigating the contribution of each isolated component to the intervention.

In order to find out the contribution of PPs in effective interventions for depression and improve their dissemination through Internet-based programs, our research group developed an Internet-based CBT program that also includes PPs for depressive symptoms. Its efficacy has been shown in different RCTs [28–30]. However, we do not know the specific contribution of each of its therapeutic components. A dismantling strategy could help us to identify the contribution of the main therapeutic components of the intervention to the therapeutic change. There are few studies with a dismantling design in interventions for depression [31]. A recent comprehensive systematic review and meta-analysis of dismantling studies of psychotherapies for adult depression included only 16 studies [32]. None of them used an Internet-based intervention or an intervention with a PPs component [32].

Using a dismantling design, we are currently carrying out a randomized controlled trial to evaluate the efficacy of this Internet-based Global protocol for depressive symptoms developed by our research group (including motivation, psychoeducation, cognitive restructuring, BA, PPs, Relapse prevention) [28–30]; the protocol for depressive symptoms without the PPs component; and the protocol for depressive symptoms without the BA component. All of them are administered through the Internet.

The purpose of the present article is to show the preliminary results we obtained in nine participants randomized to one of the three conditions. The objectives are to explore the pre-treatment to post-treatment changes in some different positive and negative functioning measures in the three intervention conditions and observe the differences between them. Furthermore, we also present the qualitative data on the opinions of the patients in the BA and PPs components.

2 Method

2.1 Design

The study presents preliminary data from a three-armed, simple-blinded, randomized controlled clinical trial with a dismantling design. Nine participants were randomly allocated to one of the three experimental conditions: Internet-based Global protocol condition (IGc), Internet-based BA protocol condition (IBAc), Internet-based PPs protocol condition (IPPc). This study is ongoing, and we are continuing to recruit participants. The participants' randomization was stratified according to levels of severity of depression symptomatology. Therefore, the randomization to each condition was carried out within each stratum in order to ensure that all the levels of depression were equally represented in the three intervention conditions. This study is being conducted following the CONSORT statement (Consolidated Standards of Reporting Trials, http://www.consort-statement.org) [33, 34], CONSORT-EHEALTH guidelines [35] and the SPIRIT guidelines (Standard Protocol Items: Recommendations for Interventional Trials) [36, 37]. The study has been approved by the Ethics Committee of University Jaume I (Castellon, Spain, approval number: 4/2017). The trial is registered at clinicalstrials.gov as NCT03159715.

2.2 Participants

The nine participants who have taken part in the study and carried out the treatment programs consist of five women and four men who contacted the Emotional Disorder Clinic at Universitat Jaume I. The average age of the nine participants was 45 years (SD = 13.30); 44.44% of the participants were single, and 55.56% were married. Regarding the level of studies, 77.78% of the participants had university studies, and 22.22% had secondary studies. The mean on the BDI-II at pre-treatment before starting the treatment program was 19 (SD = 6.67). Table 1 shows the main participant sociodemographic characteristics in each condition.

	IGc (n = 4)	IBAc (n = 3)	IPPc $(n = 2)$
Average	48.25	36.33	51.5
Sex	2 male, 2 female	2 male, 1 female	2 female
Marital status	2 single, 2 married	2 single, 1 married	2 married
Education	3 university studies, 1 secondary studies	2 university studies, 1 secondary studies	2 university studies

Table 1. Participants' sociodemographic characteristics by intervention conditions.

The following specific inclusion and exclusion criteria were required for enrollment. Inclusion criteria are: (a) age between 18 and 65 years old; (b) ability to understand and read Spanish; (c) access to the Internet at home and an email address; (d) Internet use: user level; and (e) experiencing depressive symptoms (no more than 28 on the Beck Depression Inventory-II [BDI-II]).

Exclusion criteria are: (a) receiving a psychological treatment during the study; (b) suffering from a severe Axis I mental disorder: alcohol and/or substance dependence disorder, psychotic disorder, or dementia; (c) the presence of ideation or a significant suicide plan (assessed by the MINI and item 9 on the BDI-II).

2.3 Interventions

The three intervention protocols we developed for this study present some distinctive features. Nonetheless, they share some aspects, such as a "Welcome" initial module that provides the participant with general information about the protocol and its objectives, as well as recommendations for benefiting from it. After this "Welcome" module, initial online questionnaires are presented as the pre-treatment assessment.

The three intervention conditions we developed are briefly described below:

Internet-Based Global Protocol Condition (IGc). We carried out a treatment protocol for depressive symptoms called "Sonreír es Divertido" (Smiling is Fun). It is an Internet-based treatment protocol developed within the framework of the European online predictive tools for intervention in mental illness project [28]. Smiling is Fun includes traditional therapeutic components of evidence-based treatments for depression:

Motivation for change, Psychoeducation, Cognitive Therapy, BA, and Relapse Prevention. The program also includes a PP component, offering strategies to enhance positive mood and promote psychological strengths. The intervention protocol consists of eight interactive modules. Four of them are based on CBT, three on PPs, and one on Relapse prevention. For more information about the specific intervention content see [29, 38].

Internet-Based Behavioral Activation Protocol Condition (IBAc). This intervention protocol has the CBT components of the original protocol (IGc), mentioned above, but the PP component is not included in this protocol. The intervention protocol consists of eight interactive modules. Four of them are based on CBT, three on BA, and one on Relapse prevention. The modules related to the BA component in this intervention condition teach the same tools and strategies as the module dedicated to the BA component in IGc.

Internet-Based Positive Psychotherapy Protocol Condition (IPPc). This intervention protocol has the CBT components from the original protocol (IGc), mentioned above, but the BA component is not included in this protocol. The intervention protocol consists of eight interactive modules. Four of them are based on CBT, three on PPs, and one on Relapse prevention. The modules related to the PPs component in this intervention condition teach the same tools and strategies as the module dedicated to the PPs component in IGc.

All the modules are delivered through a web platform designed by our research group (https://www.psicologiaytecnologia.com/). The web platform has different transversal tools that accompany the person throughout the entire intervention process. These transversal tools are: "Home" (the starting point of the protocol); "Calendar" (allows the participant to know where he/she is in the program); "How am I?" (offers several graphs that make it possible to monitor the participant's progress); "Diary register" (collects the everyday data about different variables and shows them graphically on the "How am I?" tool; "Review" (used to review the treatment modules already completed).

Moreover, we provide human and ICT support to all participants. In the case of human support, one trained pre-doctoral student in our group makes several brief phone calls at four points in time: an initial telephone session (diagnostic interview); an initial telephone call in the Welcome module (encouraging participants); a brief phone call when the participants reach the mid-point of the intervention; and a final post-call after the post assessment (qualitative assessment). ICT support consists of several multiple-choice questions about the contents seen in each module in order to provide the participant with the correct feedback for their responses and a detailed explanation. Furthermore, the participants receive an automated email encouraging them to continue with the modules if they have not accessed the program for a week.

2.4 Measures

Diagnostic Interview

Mini International Neuropsychiatric Interview Version 5.0.0 (MINI): The MINI [39] is a short, structured clinical interview that enables researchers to make diagnoses

of psychiatric disorders according to the DSM-IV or ICD-10. It was designed to be used by clinicians or even by nonclinical personnel after brief training. It has an administration time of approximately 15 min, The MINI has excellent interrater reliability (K = .88-1.00), and it has been translated and validated in Spanish [40].

Self-assessment Measures

Beck Depression Inventory (BDI-II): The BDI-II is a 21-item self-report multiple-choice inventory that is widely used to detect and assess depression severity. On each item, the person has to choose from four alternatives, ranging from less to more severity, the statement that best describes his/her state in the past two weeks, including the day the person completes the inventory. The items are scored on a scale ranging from 0 to 3, and they cover the different symptoms characterizing major depression disorder in the DSM-IV [41]. The scores on the scale range from 0 to 63 (0–13 minimal depression, 14–19 mild depression, 20–28 moderate depression, 29–63 severe depression). The internal consistency of the BDI-II is high (alpha = 0.76 to 0.95), and for the Spanish version of the instrument (alpha = 0.87), for both general and clinical populations (alpha = 0.89) [42].

Positive and Negative Affect Scale (PANAS). The PANAS [43] is a brief self-report questionnaire and one of the most widely used measures of affectivity. It consists of two 10-item mood scales, one that measures positive affect (PA) and the other that measures negative affect (NA). Each scale contains 20 items, and scores range from 10 to 50 (the maximum score). The PANAS has excellent psychometric properties, internal consistency (alpha between 0.84 and 0.90), and convergent and divergent validity. The Spanish version has also demonstrated high internal consistency ($\alpha = 0.89$ and 0.91 for PA and NA in women, respectively, and $\alpha = 0.87$ and 0.89 for PA and NA in men, respectively) in college students [43].

Connor-Davidson Resilience Scale (CD-RISC). The CD-RISC [44] is a brief scale that consists of 25 items. The person must indicate to what extent each statement has been true for him/her in the past month on a scale from 0–4, where 0 = "has not been true at all" and 4 = "true almost always". The total scores range from 0 to 100; higher scores indicate greater resilience. Previous studies have shown that the CD-RISC has good internal consistency (Cronbach alpha above 0.70) [45, 46].

Qualitative Interview. A qualitative semi-structured interview with open-ended questions was developed ad hoc for the present study to ask participants their opinions about the therapeutic components of the program (Motivation for change, Psychoeducation, Cognitive Therapy, BA, PPs component, and Relapse Prevention). In the interview, the opinion about the main components of each intervention is assessed through three questions: aspects of the specific component that have been *useful*; satisfaction with the component; and *recommending* the component to other people.

In the IBAc and IPPc conditions, where one of the components is not included, first the participants are informed about the main characteristics and strategies of the component that is not in their intervention. After that, the participants are asked whether it would have been useful for them to have this component, satisfactory, and whether they would recommend it. This qualitative semi-structured interview was developed based on the principles specified in the Consensual Qualitative Research (CQR) guidelines [47]. One of the main objectives of the CQR is to gather diverse information within certain thematic areas. As in other qualitative semi-structured interviews, we ask questions that allow us to delve into the participant's opinion [48].

2.5 Procedure

First, the adult volunteer participants contacted the Clinic of Emotional Disorders at Universitat Jaume I by phone or by sending an email to a specific address created for the study. Then, the participants completed a short evaluation on the Internet (https:// www.surveymonkey.com) to find out if they met the exclusion and inclusion criteria. After that, the Mini International Neuropsychiatric Interview Version 5.0.0 (MINI) was administered by telephone by experienced clinical psychologists (with at least a master's degree or PhD) trained in CBT and with extensive experience in treatments using Internet-based interventions. After being assured that they were potential participants for the study, they signed an informed consent and were randomized to one of the three experimental conditions using a computer-generated random number sequence to ensure that we obtained a homogeneous distribution across the conditions. This randomization was performed by an independent researcher who was unaware of the characteristics of the study and communicated the allocation schedule to the study researchers by phone. Participants do not know to which intervention condition they have been assigned, and they are informed that they can withdraw from the treatment or the study without giving any explanation.

Regarding the data presented in the present study (9 participants), four participants were assigned to the IGc, three to the IBAc and two to the IPPc. After randomization, they were registered in the online treatment program, and they performed the pre-evaluation before starting the program. After the pre-treatment assessment, participants started the intervention modules. The treatment program lasts approximately 4 months (16 weeks), and the participants were advised to advance through the program by completing a module every two weeks. When they finished the program, they performed the post-treatment assessment within the web platform, and they were called to complete the qualitative interview. As mentioned above, the study is ongoing, and the total sample size needed, considering an additional 30% to anticipate potential dropouts, is 191 participants (63 per intervention group). Sample size calculations were carried out with the statistical program G*Power 3.1.9.2 [49].

2.6 Data Analysis

To estimate the clinical importance of the changes shown in the post-treatment, the clinically significant change (CSC) was calculated using the Jacobson and Truax index for all measures. This method involves, firstly, establishing a cut-off score that the patient must achieve in order to move from a dysfunctional to a functional distribution. Secondly, the method implies estimating whether the change indicated by the scores of the instruments is not due to its measurement error but reflects a reliable real change in the patient's symptomatology. Regarding that, these authors proposed the reliable change index (RCI) [50]. Moreover, participants were classified in one of the groups

proposed by Kupfer: "Recovered", "Improved", "Stable", and "Deteriorate" [51]. "Recovered" group includes participants who showed a CSC in the outcome measure and had a score in the post within the functional or normal population range. In the "Improved" group were the participants who have achieved a CSC but are within dysfunctional or clinical population range. If the participants did not achieve CSC, or this CSC was in the direction of greater dysfunctionality, they were classified in "Stable" and "Deteriorate" group, respectively.

3 Results

3.1 Differences from Pre-treatment to Post-treatment in the Assessment Measures in the Different Conditions

Table 2 shows the results obtained at pre-treatment and post-treatment in each condition on the different assessment measures (negative functioning measures and positive functioning measures). The scores correspond to the means, standard deviations, and differences in the mean pre to post treatment. The results show improvements on all the assessed measures.

	Measure	IGc n = 4		IBAc n = 3		IPPc n = 2				
		M	SD	Difference	M	SD	Difference	M	SD	Difference
				pre-post			pre-post			pre-post
				(M)			(M)			(M)
Negative	BDI									
functioning	Pre	22.0	5.6	14.25	20.3	5.50	13	11.0	5.7	5.5
measures	Post	7.8	6.1		7.3	6.80		5.50	.71	
	NA									
	Pre	31.5	2.9	9.25	23.7	1.52	8.67	19.5	.70	4.5
	Post	22.3	5.7		15.0	6.08		15.0	7.1	
Positive	PA									
functioning	Pre	19.5	4.7	-2.75	26.7	11.5	-5.66	28.0	2.8	-9
measures	Post	22.3	2.6		32.3	10.8		37.0	9.9	
	CD-RISC	,								
	Pre	32.3	15.6	-9.75	49.0	17.4	-5.67	53.5	3.5	-19.5
	Post	42.0	12.8		54.7	11.1		73.0	4.2	
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Table 2. Pre-post scores in each condition in the assessment measures.

Note. BDI-II: Beck Depression Inventory, PA: positive affect, NA: negative affect, CD-RISC: Connor-Davidson Resilience Scale, M: Mean, SD: Standard Deviation, IGc: Internet Global protocol condition, IBAc: Internet-based Behavioral Activation protocol condition, IPPc: Internet-based Positive Psychotherapy protocol condition

Regarding the negative functioning measures (BDI-II and negative affect in PANAS scale), the participants in the IGc and IBAc showed similar improvements in depressive symptoms (pre-post score differences respectively 14.25 and 13). In the case of the IPPc, the results showed less improvement in depressive symptoms (pre-post

score differences 5.5). Furthermore, the improvements in negative affect were similar in the IGc and IBAc conditions: 9.25 in the IGc, and 8.67 in the IBAc. In this case, participants in the IPPc showed less improvement in negative affect (pre-post score differences 4.5).

Regarding the positive functioning measures (positive affect on the PANAS scale and CD-RISC), on positive affect, the participants who received the protocol based on the PPs component (IPPc) showed a greater increase (pre-post score differences 9), compared to the other two conditions (IGc 2.75 and IBAc 5.66). In the case of resilience, both participants in the conditions with the PP component (IGc and IPPc) improved more than the participants in the IBAc (9.75 and 19.5, respectively, compared to 5.67 in the IBAc). It is important to mention that the improvement in resilience was greater in the participants in the IPPc (pre-post score differences 19.5).

The RCI analyses are shown graphically in Fig. 1. The results showed that no participants of the three conditions were in the "Deteriorate" group in any clinical variable.

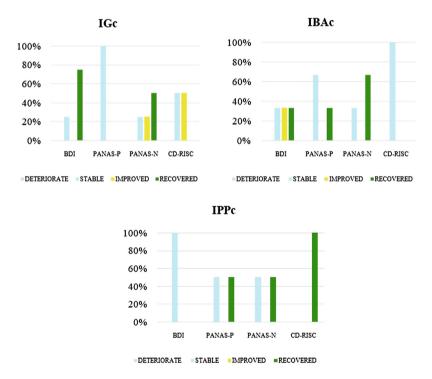


Fig. 1. Pre-treatment to post-treatment clinically significant change (CSC) in the assessed measures. (Note. BDI-II: Beck Depression Inventory; PANAS -: Negative affect of the Positive and Negative affect Scale; PANAS +: Positive affect of the Positive and Negative affect Scale, CD-RISC: Connor-Davidson Resilience Scale, IGc: Internet Global protocol condition, IBAc: Internet-based Behavioral Activation protocol condition; IPPc: Internet-based Positive Psychotherapy protocol condition.)

Regarding negative functioning measures, participants in the IGc and IBAc showed a clinically significant decrease in depressive symptoms. Specifically, 75% of participants in the IGc, and 33% in the IBAc were in the "Recovered" group. Furthermore 33% of the participants in the IBAc were in the "Improved" group. In the IPPc, participants did not achieve this CSC, being in the "Stable" group.

Regarding the negative affect, participants of the three conditions showed a clinically significant decrease in this measure. In the IGc and IPPc, 50% were in the "Recovered" group, and 63% of the participants in IBAc were also in this "Recovered" group". Furthermore, 25% of the participants in the IGc were in the "Improved" group.

Regarding positive functioning measures, the results showed that only the participants of the IBAc and IPPc had a CSC in positive affect: 33% of the participants in the IBAc and 50% in the IPPc were in the "Recovered" group. In the IGc the 100% of the participants were in the "Stable" group.

In resilience measure, the results showed a CSC in the IPPc: the 100% of the participants were in the "Recovered" group. Furthermore, 50% of the participants in the IGc achieved a CSC, coming into the "Improved" group. In the IBAc all the participants were in the "Stable" group.

3.2 Qualitative Opinions

Table 3 shows the qualitative data on the opinions about the BA and PPs components in the three conditions (IGc, IBAc and IPPc).

BA Component Opinion: The IGc and IBAc participants who had the BA component in their intervention mentioned the following things about its <u>usefulness</u>: being more aware of the relationship between mood and activity and the importance of doing not only activities, but also activities that are important to them and satisfy them. Taking satisfaction into account, one of the main aspects participants mentioned is the importance and benefit of doing activities with others and improving their relationships; and regarding their <u>recommendations</u>, participants highlighted that they want to recommend it because it helps them to learn tools for an active life, and it also makes them realize that their mood varies if they are more active.

In the IPPc condition where the BA component is not included, participants mentioned similar ideas to those of the other two conditions: Regarding <u>usefulness</u>, they said it would help them to improve their emotions. In the case of <u>satisfaction</u>, they pointed out that it would have been useful for talking to and knowing other people. We observe that in the IPPc, the participants emphasized that they would <u>recommend</u> it because it would help them to have more practice interacting with others.

PPs Component Opinion: The main things the IGc and IPPc participants who had the PPs component in their intervention mentioned with regard to its <u>usefulness</u> were: learning to recognize not only their weaknesses, but also their strengths, and thinking about the good parts of each person. In the case of <u>satisfaction</u>, participants pointed out the importance of knowing their own strengths. They wanted to recommend it because they learned that everybody has strengths, which can help more in bad times, and they have learned to see the positive side of things more. In the IBAc in which the PPs component is not included, participants said it would have been useful for learning to

Table 3. Qualitative information regarding the BA and PP components in each condition.

Component		IGc	IBAc	IPPc
BA	• Utility	"More aware of my mood in relation to what I had done during the week" "The importance of the action to feel better and carry out activities that satisfy you"	• "Sometimes you think that your mood is not going to improve. whatever you do. but if you do nice things, it improves" "It has been useful not only to do activities, but also to do activities that I like especially"	 "It would have benefited me more by having more activity" "It would have helped me to be better emotionally"
	• Satisfaction	"Identify the tasks and activities I like, and I can do to improve my selfesteem and thinking". "I can do something to improve" "Realize what carrying out these activities generates and how important people's support is"	Thas encouraged me to do a little more activity? "Improving my relationships with people who I did not have a relationship with before?"	Twould have had more security" "More practice talking and knowing others"
	Recommendation	"Yes. It gives simple tools to improve your mood" "Yes. Because knowing the activities that are satisfactory to you strengthen you for the future"	• "Yes. Realize that the mood varies if you get more activity and do things that are nice to you" • "Yes. An active life helps you in your relationships and to feel better about yourself"	• "Yes. Because by doing that you can have more practice, and that helps you to have more emotional strength" • "Yes. To have more practice interacting with others"
PP	• Utility	The concept of flow". It helped me understand that state" It helped me see that I saw weaknesses in strengths, and identifying your strengths is beneficial"	"It would have been good for me. because I am negative. and to learn to be more positive" "I would have taken advantage of it. because it's important to know each self"	To move forward if a problem arises, to do things that satisfy" "To think about the good in each person"
	Satisfaction	To be able to give a word to that emotion? To know you more. The satisfaction of being aware that you have your strengths too and not all of this are weaknesses?	own emotions and knowing	 "Get up, move, to feel better despite having a problem" "Finding myself better doing things that I like with people who happen the same that happen to me"
	Recommendation	"Yes. Because it is very useful to identify your strengths and not just your weaknesses. It helps you more in the moments when you are emotionally worse" "Yes. So that each person can see what he/she can contribute to society through his/her strengths"	Tiguess so. To have more security and think more positively" Tyes. To know your own strengths and look more at them and work on them, not the weaknesses so much"	 "Yes. To be better" "Yes. To look more at the positive side and not at the negative side of things"

be more positive. Regarding <u>satisfaction</u>, participants pointed out the importance of knowing their own emotions and strengths and learning to have more self-confidence. Finally, they wanted to recommend it because it could help them to have more security, to think more positively, and to know their own strengths.

4 Discussion

The present work shows the preliminary results for 9 participants with depressive symptoms who were randomly assigned to one of three conditions in a dismantling randomized controlled trial (IGc, IBAc or IPPc). First, we examine the pre- to post-treatment changes in the different variables assessed in the three intervention conditions and the CSC. Furthermore, qualitative data on the opinions about the BA and PP components are reported.

Regarding the first objective, in the case of the negative functioning measures, the results showed that they improved in the three intervention conditions. Specifically, on depressive symptoms, there was less improvement in the participants in the IPPc condition than in the other two conditions, as these participants didn't show a CSC in this symptomatology. However, it is important to mention that, in this condition, the participants had lower levels of depressive symptoms at pre-treatment, which means there was less room for improvement. In addition, there are only 2 participants in this condition. The ongoing RCT will allow us to have the same level of severity in the three conditions at pre-treatment because the randomization is stratified by levels of depression severity.

The same pattern occurred in the case of negative affect. Participants of the three conditions showed a clinically significant decrease in this measure, but the least improvement occurred in the IPPc. Nevertheless, the participants in this condition also had lower levels of negative affect at pre-treatment. However, it is important that participants in all three conditions improved their depressive symptomatology and negative affect, essential aspects of depression treatment. With a larger sample, differences in these measures among the three groups can be further explored. The results are consistent with the line of research on the efficacy of Internet-based interventions in improving clinical symptomology [25, 52].

Regarding positive functioning measures, the biggest improvement is in the IPPc. Positive affect improves substantially more in the IPPc than in the other two conditions. Regarding resilience, it is important to consider that the biggest changes occurred in the two conditions that include the PP component (IGc and IPPc). The RCI analysis showed that there is a clinically significant change in these conditions where the PPs component is worked. However, there is a much greater improvement in the IPPc, as in this condition all participants were in the "Recovered" group. In this condition there are four specific modules in which the PP component is worked on in greater depth.

Because it is well known that depression often involves low levels of positive affect [15, 53], and that these low levels increase the severity of the problem [54], it is important to have treatment that works on these aspects (as the IGc and IPPc). It is essential to continue to work in this direction because current psychological treatments for depression focus largely on reducing excessive affect, rather than on specifically

improving deficits in positive affect and well-being [17, 53]. The interventions need to have strategies that directly and primarily build positive emotions, positive affect, character strengths, and meaning [55, 56], considering well-being and positive functioning to be core elements of the treatment for depression.

Regarding resilience, it is worth noting that a great change occurs in the IPPc condition, where the PP strategies are learned in a deeper way. Resilience refers to an individual's ability to properly adapt to stress and adversity, overcome the negative effects of risk exposure, or cope successfully with traumatic experiences [57]. It is also essential for maintaining quality of life, emotional well-being, and functional independence. Thus, it is relevant to see the effects of the PP strategies on resilience in the preliminary results. The PP component could help patients to directly build up positive resources in order to counteract negative symptoms and buffer against their future reoccurrence. However, we should wait to obtain more conclusive results after analyzing these measures in a broader sample.

Regarding the qualitative data, we observe that, in general terms, the participants in the three conditions agree on the main ideas about the usefulness, satisfaction, and recommendations about the two main components, BA and PP.

Taking the BA component into account, we observed that the importance of carrying out meaningful activities with other people is an idea highlighted by the participants who carry out the intervention with the BA component, and this is something the participants in the IPPc (without BA component) would like to work on more. We know that carrying out significant activities is a key aspect of depression treatment and helps with symptom improvement [58]. It is important to know that the intervention programs with the BA component help patients to do these meaningful activities.

Focusing on the aspects worked on in the PP modules, the qualitative data showed that learning to be more positive and knowing how to identify one's own strengths, and not only the weaknesses, are main ideas when we ask participants. This aspect is also pointed out by the participants in the IBAc, where the PP component was not included.

We observe that working on positive aspects is something demanded by the participants, and this is consistent with developing interventions that improve positive affect, well-being, and character strengths [15], rather than components focused on reducing negative symptoms [17, 18]. We can observe that the qualitative data presented in this article only give us a general idea because they correspond to a sample of 9 participants. We have only analyzed the topics shared in the participants' opinions in a subjective way. Our objective in the future is to carry out more exhaustive qualitative analyses with a larger sample of participants, following the lines of the Consensual Qualitative Research (CQR) developed by Hill, Thompson and Nutt-Williams [59]. CQR is considered a viable qualitative method [47] whose structure includes two essential aspects. The first is to set up a team with at least three members, two judges who analyze the data from multiple perspectives and the auditor who supervises the work done by the judges. The second aspect is to follow specific steps to establish the domains, core ideas, and cross categories to classify and analyze the data. At the moment, the qualitative interviews are being recorded, after receiving informed consent from the participants, in order to later carry out their transcription and analyze the data following this methodology and draw more solid conclusions [60].

The dismantling design of the study we are carrying out will allow us to explore the contribution of each treatment component. More specifically, it will allow us to know how PPs and emotional regulation strategies centered on positive affect function, resulting in a significant shift towards optimizing treatments for depression. In addition, with the ongoing study, it will be possible to analyze the mediators of changes in depressive symptoms and the acceptability of each intervention. Moreover, this study is consistent with one of the most important challenges in the field of depression treatment, which is to design new ways to apply treatments to maximize their therapeutic efficiency. Undoubtedly, the use of technology and the Internet can help to achieve this goal and contribute to the dissemination and accessibility of evidence-based treatments.

The present study has some limitations. The sample size is small; for this reason it was not possible to perform statistical analyses, and so the results are only exploratory. Because of the small sample size in the present study, no analysis of differences among groups in baseline depressive symptomatology was conducted. However, as the recruitment is on-going, the sample size is going to increase, and we will be able to carry out these analyses. Another aspect is that, regarding the qualitative data, we do not ask about aspects of the main components of the treatment (BA and PP) that have not been useful and satisfactory, and if there is any reason they would not recommend them. Because this is also important, we are going to include these aspects in the qualitative interview. Furthermore, we do not have data on the participants at the 3-, 6-, and 12-month follow-ups. Moreover, because we only have two participants in the IPPc, the BDI-II severity in this condition was lower than the other two conditions. Our aim is to continue to increase the sample size of the study in order to draw firmer conclusions and include the data from the different follow-ups in order to observe whether the results obtained are maintained in the long term.

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