



## From art to insight: The role of a creative arts therapies group workshop on college students' well-being, self-awareness, and loneliness

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### ABSTRACT

This study examined the effects of a three-hour Creative Arts Therapies (CATs) group workshop on perceived well-being, self-awareness, and loneliness among college students. Using a within-subjects design, participants completed surveys before and after the workshop and during a follow-up phase. Each workshop, facilitated by two certified art therapists, involved groups of 5 to 13 students. The workshops included 89 students aged 18–51 years, 87 responded after the workshop and 59 during the follow-up. Results indicated a short-term increase in subjective well-being, characterized by heightened positive emotions, life satisfaction, and reduced negative affect. Additionally, the workshop reduced state anxiety and enhanced awareness, fostering both inward self-awareness of feelings and thoughts and outward environmental awareness. A decrease in concerns about social judgments and feelings of loneliness suggested greater self-acceptance and social connection. Predictors of these changes included the perceived therapeutic value of the workshop and group cohesion. Moreover, depressive symptoms were associated with both negative affect and public self-awareness changes. However, follow-up revealed that increases in life satisfaction and loneliness were transient, returning to initial levels, suggesting the need for ongoing interventions and further research on the effects of CATs in group settings.

### Introduction

Mental health is an important phenomenon across multiple societies, with major social and economic impacts. According to the World Health Organization (WHO, 2005), mental health is not merely the absence of mental health disorders or disabilities, involving social, psychological, and physical well-being, to allow individuals to be able to function optimally by coping with the stress of their lives, working productively,

and contributing to society. Mental health can be considered in a continuum ranging from a state of *languishing*, characterized by negative emotional states and poor psychological functioning, to a moderate and *flourishing state*, involving higher emotional well-being and higher psychological functioning (Keyes, 2010). Efforts to promote mental health should focus on ways to foster flourishing functioning across the lifespan and in all contexts.

Research has shown that college students face multiple determinants

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of mental health, including academic pressures, and work responsibilities (Pedrelli et al., 2015), with epidemiologic studies indicating that the onset of mental disorders is more likely at the beginning of adulthood, particularly during college years (Auerbach et al., 2018; Silveira et al., 2011). The typical college student is in a developmental stage of emergent adulthood (Arnett, 2016), characterized by features such as identity exploration, instability, and self-focus, that may predict poor mental health (Arnett et al., 2014). Recent studies and meta-analyses have also reported an increase in students' levels of anxiety, depression, and stress, particularly in young students (Auerbach et al., 2018; Cao et al., 2020; Maia & Dias, 2020), which places college students as a vulnerable group in need of intervention. In addition, loneliness has been associated with overall poor mental health, and with increased anxiety, stress, and depression among undergraduate students over time (e.g., Richardson et al., 2017). A study in UK representative samples has also shown that being a student was a moderate risk for loneliness before the pandemic and increased to a greater risk factor during the pandemic (Bu et al., 2020).

In light of this evidence, there is a growing awareness of the need to enhance college students' mental health through interventions to improve their well-being and reduce loneliness (Auerbach et al., 2018; Brunner et al., 2014; Price & Swan, 2020; Sequeira et al., 2022; Sonnone & Rochford, 2020). Self-awareness, involving being conscious of one's thoughts and feelings, understanding one's strengths and limitations, and being aware of the physical and social environment (Govern & Marsch, 2001; Jack & Miller, 2008) also emerges as an important ability for promoting mental health and improved psychological resilience (Jack & Miller, 2008; Price & Swan, 2020). However, research on preventive mental health interventions for college students remains limited. Tight academic schedules also complicate the implementation and adherence to such programs, even if they are brief (Brunner et al., 2014). The challenges amplified by the pandemic underscore the need for a collaborative effort between researchers and practitioners, with universities required to play a pivotal role in this domain (Burns et al., 2020). This paper addresses these challenges by studying the impact of a Creative-Arts Therapies (CATs) group workshop on students' well-being, self-awareness, and loneliness indicators.

### Creative arts therapies as a mental health intervention

Creative Arts Therapies (CATs) is a broad term used for mental health interventions that blend a wide range of therapeutic approaches integrating creative and expressive arts, such as art therapy, music therapy, dance/movement therapy, drama therapy, or poetry therapy (National Coalition of Creative Arts Therapies Associations, 2016). The multidimensional, multimodal, and multisensory nature of CATs aims to achieve diverse therapeutic outcomes, not requiring any prior artistic experience from participants (Levine & Levine, 2004). Several authors highlight the role of CATs in providing opportunities for individuals to express and transform their personal narratives and enhance self-awareness using non-verbal and symbolic language, which can be important for growth, transformation, and well-being (Malchiodi, 2020; Levine & Levine, 2004; Shafir et al., 2020). CATs can also be conducted in group settings, where its collaborative nature - through creative exploration and aesthetic experiences - can foster a sense of shared purpose and connectedness (Sonnone & Rochford, 2020). This may enhance group cohesion and strengthen interpersonal relationships, which are relevant to therapy effectiveness (Moon, 2003; Sonnone & Rochford, 2020; Yalom & Leszcz, 2020). Therapists also play a crucial role in creating a supportive atmosphere and facilitating a positive group climate to foster personal growth, transformation, and positive therapeutic outcomes (e.g., Gazit et al., 2021). They should be well-versed in art therapy principles, comfortable using art materials in a group setting, and skilled in developing a bond with participants to achieve therapeutic goals (Boldt & Paul, 2010; Gazit et al., 2021; Norcross, 2010). Such relationships have also been strongly related to how

participants value the artistic process (e.g., Corem et al., 2015; Gazit et al., 2021).

For college students, a CATs group may provide an effective opportunity to address their personal and interpersonal concerns by merging traditional group processes with expressive arts involvement in a nonjudgmental space (Boldt & Paul, 2010; Sonnone & Rochford, 2020). The introspective artistic exploration and the collective interaction may facilitate group cohesion, which in turn may enhance the feelings of belonging and reduce perceived loneliness (Boldt & Paul, 2010; Brown et al., 2001; Kymissis et al., 1996; Veach & Gladding, 2006). The experience of feeling accepted and valued by others may affect their acceptance and sense of self-worth, even in the absence of cognitive gains (Sonnone & Rochford, 2020; Yalom & Leszcz, 2020). Thus, a small therapeutic group setting for college students may present an opportunity for mutual support, peer role modeling, and resource development. Moreover, students may perceive these group-based interventions as more engaging than traditional individual sessions. Assuming that these CATs group sessions are facilitated in a secure environment, they hold the promise of allowing students to express and explore their thoughts and feelings through creative expression in groups. In addition, it is important to consider some of the intervening factors that might affect the therapeutic outcomes, including participants' experiences within the group and how they value the therapeutic intervention (e.g., Corem et al., 2015; Gazit et al., 2021; Snir & Regev, 2013; Rankanen, 2016; Snir & Regev, 2013).

### Empirical review on creative arts-based therapies

Evaluating the effectiveness of CATs can be challenging. For example, Reynolds et al. (2000) reviewed the effectiveness of art therapy up to 1999 which included many studies that combined art therapy with other interventions. They also noted broad variations in target participants and their ages, diverse therapy goals and durations, limited sample sizes, and a variety of outcome measurements, including anxiety and depression symptoms, social and emotional functioning, and group cohesion. Although there was overall evidence of a positive impact of art-based therapy, the variety in study designs and measures made it difficult to isolate and understand the specific effects of art therapy. Since then, several studies analyzed these interventions on particular outcomes and populations. For example, Abbing et al. (2018) reviewed the effectiveness of art therapy for adult anxiety, finding only three studies focused on anxiety symptoms. Due to the limited research, they concluded that studies on art therapy for anxiety are still in their early stages. Out of these studies, two involved college students: one addressing exam-related stress (Sandmire et al., 2012), and the other students suffering Post-Traumatic Stress Disorder (PTSD) (Henderson et al., 2007). Sandmire et al. (2012) found that a single 30-min. session had positive effects on both state and trait anxiety levels compared to an inactive control group. Conversely, Henderson et al. (2007) found no immediate effect from trauma-focused art-making after three sessions, although a decline in PTSD severity was observed at a one-month follow-up. Additionally, Aaron et al. (2011) observed that participating in art activities reduced anxiety among undergraduates, whether in individual or group projects, compared to a non-art control group. Brown et al. (2001) also showed that both an art-focused group condition and a comparison condition of group discussion reduced loneliness among students living on a college campus, but no differences were found between conditions. Similarly, Zimmermann and Mangelsdorf (2020) found that both creative movement and art-focused interventions contributed to increases in positive affect, and decreases in negative affect and stress, which led them to conclude that short-term participation in either activity could provide psychological benefits for college students. Elkis-Abuhoff et al. (2022) studied the effects of nature-based art therapy on subjective well-being, examining life satisfaction and affective states in two phases. Phase I involved in-person interventions with college students before the COVID-19 pandemic, while Phase II was

conducted virtually, involving researchers and their networks. The study found a positive impact on overall well-being, but significant improvements in life satisfaction and affect were observed only in Phase II, which had a diverse sample. These findings suggest that variations in the setting, differences in direct access to nature, and sample characteristics may have influenced the outcomes.

Several other CATs interventions have been conducted but without thorough evaluations. For example, Boldt and Paul (2011) described their experience with a CATs group at a university counseling center, relying on clinical impressions and self-reports from group members. Similarly, Sonnone and Rochford (2020) detailed their group AT approach at a university counseling center, noting its role in reducing anxiety and enhancing insight, self-expression, self-disclosure, and social connection, yet without formal assessment. Potash and Gyimah-Boadi (2021) have also highlighted the positive impacts of creative arts-based interventions on intergroup dialogues and self-awareness, although their work lacked quantitative evaluations. Additionally, Price and Swan (2020) proposed an eight-week expressive arts group for first-year college students, providing a detailed description of the sessions but failing to assess their effectiveness.

In summary, while publications on CATs underscore its benefits—from reducing anxiety, stress, and loneliness to enhancing self-awareness and well-being—research focusing on college students is limited and yields inconsistent findings. These limitations, combined with the known vulnerability of this population to mental health challenges, emphasize the importance of conducting targeted studies on college students with proper assessments.

#### Goals and hypotheses of the present study

Building on the need to address the requirement for tailored interventions for college students, our study was designed to examine the effects of a CAT group workshop on subjective well-being, self-awareness, state anxiety, and perceived loneliness.

Based on prior studies, we hypothesize that the CATs workshop will increase subjective well-being immediately after the intervention (H1) (e.g., Aaron et al., 2011; Elkis-Abuhoff et al., 2022; Gruber & Oepen, 2018; Sandmire et al., 2012; Zimmermann and Mangelsdorf, 2020). By adopting Diener et al. (1999) tripartite conceptualization of subjective well-being (SWB), we expect a decrease in negative affect (H1a), and an increase in positive affect (H1b) and life satisfaction (H1c) after participating in the CATs workshop. We also hypothesize an immediate increase in private self-awareness (H2a) and awareness of immediate surroundings (H2b), based on prior literature (e.g., Braus & Morton, 2020; Potash & Gyimah-Boadi, 2021). Additionally, we will explore changes in public self-awareness between the pre- and post-workshop phases.

Regarding negative mental states, we also expect that the CATs workshop will decrease state anxiety (H3) following the intervention, as evidenced by prior research (e.g., Aaron et al., 2011; Henderson et al., 2007; Sandmire et al., 2012). Additionally, we hypothesize that the workshop will temporarily reduce feelings of loneliness (H4), based on the premise that the interpersonal relationships developed during the workshop may reduce feelings of isolation (Braus & Morton, 2020; Brown et al., 2001). We also conducted a follow-up to examine its impact on life satisfaction and loneliness. However, given that we implemented a single workshop, these analyses will be exploratory.

In addition, we collected data on group cohesion and students' evaluations of the activities to explore their roles as predictors of changes in the main outcomes. We also assessed mental health indicators before the intervention, such as perceived depression, anxiety, and stress, to characterize our sample at baseline and explore whether they predict the short-term changes resulting from the workshop.

## Method

### Participants and procedures

The Ethics Committee of the Iscte-University Institute of Lisbon approved the study protocol [Ref. 90/2022], which follows the Declaration of Helsinki regarding research ethics involving humans. The workshop was then disseminated through university channels to the student community by the Pedagogical Commission of the University. Attendance at the workshop was free and participation in the research was completely voluntary with the requirement of speaking the Portuguese language. After their initial consent to participate, students made their registration for the CATs workshop by providing some basic demographic data. A within-subjects design was then implemented, consisting of three phases: pre-workshop, post-workshop, and follow-up. On the day of the workshop, after providing informed consent, participants completed two online surveys on the Qualtrics platform: one before, and another immediately after the workshop at the university. For the follow-up phase, another online survey link was sent to all participants two to three weeks after the workshop. The use of online surveys allowed the items to be randomized for each measure. To ensure anonymity and track participants across the three phases, each survey used a unique code to conceal identifiable information. On average, participants took approximately 10–15 min to complete each survey.

Ten workshops were conducted, divided into two phases: during the spring ( $n = 23$ ) and the fall ( $n = 66$ ) semesters. The workshops were evenly distributed, with five held in the morning ( $n = 42$ ) and another five in the afternoon ( $n = 47$ ). Six certified art therapists from the Portuguese Society of Art Therapy (SPAT) designed and implemented the workshops, with two therapists facilitating each session. Each workshop group consisted of 5 to 13 students and lasted three hours. A total of 89 Portuguese-speaking participants were involved in the workshops, but only 87 were considered in the analyses due to two not completing the post-intervention survey. At follow-up, responses were received from 59 of these participants (completion rate of 68 %).

### Intervention: the creative art therapy workshop

The intervention, a single CATs group session for college students, followed a thematic approach (Carvalho, 2019) with predetermined objectives to facilitate emotional expression, self-awareness, and interpersonal communication, aiming to increase group cohesion, and well-being, and reduce anxiety and loneliness. The CATs workshop integrated multiple artistic resources and activities, such as sound, guided imagination, visual arts (collage, drawing, painting), creative writing, and dramatic enactment. These were selected to foster an expansive and immersive experience and to enhance insight and imagination (Levine & Levine, 2017). A group setting was chosen based on prior assumptions and evidence underscoring their advantage to facilitate insight through mutual support, interpersonal communication, and empathy (e.g., Kymissis et al., 1996; Veach & Gladding, 2006). It was structured around the metaphor of a "Tree," aiming to facilitate self-knowledge, by connecting participants with the tree's symbolic meanings of growth and connection (Moon, 2007).

The CATs workshop comprised six phases. Initially, following the welcoming of the group and a brief introduction to the workshop, participants introduced themselves by producing sounds using the available musical instruments. This activity was designed to enhance receptivity, promote group rhythm, and facilitate communication and connection (Hinz, 2009). Throughout the workshop, background music featuring nature sounds was played to support an immersive environment. The second phase involved guided imagery to foster body awareness and relaxation (Hass-Cohen & Carr, 2008), also commonly used in prevention programs for reducing anxiety and stress in college students (Rith-Najarian et al., 2019). In the third and fourth phases, participants crafted and described their own "Tree" using visual arts and creative

writing techniques (Bolton, 1999). The fifth phase featured dramatic enactment, with participants pairing up to role-play as their trees. This activity aimed to enhance self-expression, stimulate reflective thinking, and cultivate narrative and communication skills while promoting social interaction, group cohesion, and empathy (Bailey, 2009). The group was then asked to arrange the trees in a circle, sit down next to their respective trees, and verbally share their workshop experiences. Finally, the therapists provided a closing reflection on the group's overall experience and concluded the workshop with a collective musical improvisation. A detailed description of the session (Table 1S) and examples of the visual art creations (Fig. 1S) are presented in the supplementary document.

### Measures

Measures are organized into retrospective and prospective categories, covering baseline sociodemographic data and mental health status, process measures, and intervention outcomes.

#### Retrospective measures

**Sociodemographic data.** Before the workshop, participants were asked to indicate their age, gender, nationality, current level of education, academic course, health conditions, involvement in professional activities related to arts or culture, and participation in group activities (artistic/cultural, social, religious, self-help, or community groups).

**Depression, anxiety, and stress.** To screen for mental health symptoms at baseline we used the Portuguese version of the Depression, Anxiety, and Stress Scale with 21 items (DASS-21; Lovibond & Lovibond, 1995; Pais Ribeiro et al., 2004). Students were asked to report how they felt over the past week on each item using a 4-point scale ranging from 0 (Did not apply to me at all) to 3 (Applied most of the time). The DASS-21 has been adapted to several languages and has demonstrated acceptable reliability and validity in both clinical and non-clinical populations (e.g., Henry & Crawford, 2005). Each of the three scales has seven items, which are summed to provide a total score for each measure. Higher scores indicate greater severity of negative symptoms of Depression, Anxiety, and Stress. It is possible to use cutoff scores to classify the severity in each scale. For depression (e.g., "I felt that I had nothing to look forward to"), scores of 0–4 are normal, 5–6 mild, 7–10 moderate, 11–13 severe, and 14 + extremely severe. For anxiety (e.g., "I felt scared without any good reason"), scores 0–3 are normal, 4–5 mild, 6–7 moderate, 8–9 severe, and 10 + extremely severe. Regarding stress ("I found it hard to wind down"), scores fall into the following categories: 0–7 are normal, 8–9 mild, 10–12 moderate, 13–16 severe, and 17 + extremely severe. In our study, reliability scores were high for the three dimensions (Depression:  $\alpha = .93$ ; Anxiety:  $\alpha_{pre} = .84$ ; Stress:  $\alpha_{pre} = .90$ ).

**Process measures: group cohesion and therapeutic value.** To capture participants' retrospective reflections shortly after the workshop about their perception of group cohesion and their feelings about the therapeutic value of the workshop, we used three scales in the post-intervention phase. Group cohesion was assessed with two measures adapted from the second study by Reddish et al. (2013): Entitativity, referring to the extent to which they perceived their group as a coherent, unified entity (4 items; e.g., "How much did you experience a feeling of togetherness with the other participants?"); and Synchrony, referring to their sense of coordination and harmony within their group (3 items: e.g., "How much did you feel you were coordinated with the others?"). All items were responded to on a 7-point scale, ranging from 1 (Strongly disagree) to 7 (Strongly agree). Because these two measures were also highly correlated in our study,  $r(87) = .78, p < .001$ , we combined them into a single measure of group cohesion, by averaging the 7 items ( $\alpha = .89$ ). In addition, we used the "therapeutic value" subscale of the

Art-based Intervention Questionnaire (ABI; Snir & Regev, 2013) to evaluate participants' experiences with their artistic activities, focusing on the perceived therapeutic benefits and overall pleasantness of the workshop. It is composed of 10 items (e.g., "I learned about myself in the process"), answered on a 7-point scale, ranging from 1 (Not at all true) to 7 (Is true to a great extent). This subscale was the most reliable in the original study (Snir & Regev, 2013) and showed similar reliability in our study ( $\alpha = .93$ ).

**Perceived impact of the workshop on personal development.** Assessed during the follow-up phase by asking participants whether the workshop contributed to 1) their creativity in approaching life's challenges; 2) their interpersonal relations; and 3) their self-knowledge. For each question, they could choose from three response options: "contributed negatively", "contributed positively", or "no contribution".

#### Prospective measures

As the main outcomes of this study, we assessed participants' subjective well-being, situational self-awareness, state anxiety, and loneliness. Because emotions, state anxiety, and situational self-awareness are highly transitory, they were only assessed before and immediately after the workshop by asking participants to consider how they feel "right now, at this moment". To determine if the single CATs workshop had both an immediate and lasting impact, we measured life satisfaction and loneliness in all three phases (pre- and post-workshop, and follow-up).

**Positive and negative affect.** Measured using the modified Differential Emotions Scale (mDES; Fredrickson, 2013). The mDES comprises 20 items, divided into 10 items each for positive emotions (e.g., "grateful, appreciative, or thankful") and negative emotions (e.g., "sad, downhearted, or unhappy"), rated on a 5-point scale from 0 (Not at all) to 4 (Extremely). The scale showed good reliability ( $\alpha = .91$  for positive and .88 for negative affect pre-workshop, and .92 for positive and .82 for negative emotions post-workshop). Average scores for each affective state were calculated for each phase.

**Self-awareness.** Measured with the Situational Self-Awareness scale (SSA; Govern & Marsch, 2001). SSA includes nine items across the following three dimensions with three items each: (a) Private self-awareness, which has an inward focus by assessing consciousness about one's thoughts, feelings, and personal reflections about life (e.g., "I am conscious of my inner feelings"); (b) Awareness to Immediate Surroundings, which focuses outwardly assessing consciousness of one's immediate physical and social environment (e.g., "I am keenly aware of everything in my environment"); and (c) Public awareness, which measures awareness of how one is perceived by others, including concerns about social judgments related to the impressions one creates to others ("I am concerned about the way I present myself"). Each item is rated on a 7-point scale, ranging from 1 (Totally disagree) to 7 (Totally Agree). To achieve adequate reliability in the Public Self-awareness subscale, it was necessary to remove the item "I am self-conscious about the way I look". This item is not explicit about the concern for one's presentation to others compared to the other two items in the subscale. The adjusted scales presented satisfactory reliability in both phases (Private  $\alpha_{pre} = .76$  and  $\alpha_{post} = .77$ ; Immediate Surroundings  $\alpha_{pre} = .86$  and  $\alpha_{post} = .92$ ; Public  $\alpha_{pre} = .69$  and  $\alpha_{post} = .76$ ), so averages for each subscale were computed.

**State-anxiety.** Measured with the Portuguese version of the State-Trait Anxiety Inventory, Form Y (STAI-Y-State; Spielberger, 1983; Silva & Campos, 1998). This instrument consists of 20 items (e.g., "I feel tense", "I feel strained") with participants asked to rate each item on a 4-point scale, ranging from 0 (Not at all) to 3 ("Very much so"). Reliability analyses indicated high reliability of the instrument before and after the workshop ( $\alpha_{pre} = .91$ ;  $\alpha_{post} = .92$ ), allowing the calculation of average

scores in each phase.

**Life satisfaction.** Measured with the Portuguese version of the Satisfaction with Life Scale (SLS; Diener et al., 1985; Neto, 1993, 1999). Participants were asked to indicate how each of the five items characterizes their life (e.g., “I am satisfied with my life”) using a 5-point rating scale, ranging from 1 (Disagree a lot) to 5 (Agree a lot). In Portugal, this measure has been used with different populations (Neto, 1993, 1999), and has shown good reliability and validity in different countries (Jovanović et al., 2022). We found adequate reliability in all phases ( $\alpha_{pre} = .80$ ,  $\alpha_{post} = .82$ ,  $\alpha_{follow-up} = .79$ ).

**Loneliness.** Assessed with the Three-Item Loneliness Scale (TILS), proposed by Hughes et al. (2004), from the Portuguese-validated version (Neto, 1992, 2014). This scale includes the 3-items with the highest loadings in the loneliness factor of the Revised UCLA Loneliness Scale (Russell et al., 1980) (e.g., “I feel that you lack companionship?”). Participants were asked to indicate how often they feel each item, rated on a 4-point scale, ranging from 1 (Never) to 4 (Several times). Cronbach’s  $\alpha$  showed adequate reliability in the three phases ( $\alpha_{pre} = .77$ ;  $\alpha_{post} = .83$ ;  $\alpha_{Follow-up} = .71$ ).

**Interest and recommendations for future workshops.** Assessed during the post-workshop phase, by asking participants to rate their interest in engaging in future workshop sessions on a 5-point scale from 1 (No interest) to 5 (High interest) and to indicate whether they would recommend the workshop to others with “yes” or “no” options.

**Results**

All statistical analyses were conducted using the IBM SPSS statistics software (v.25), and RStudio (v. 2023.06.2) was used for data visualization.

*Descriptive analyses*

Table 1 presents sociodemographic information about the participants who responded to the surveys during the pre- and post-workshop phases, and the follow-up phase. Participants who completed both pre- and post-intervention were aged between 18–51 years ( $M = 25.20$ ;  $SD = 8.15$ ). The majority identified as women (86.2 %), nine as men, and three did not specify a gender. They were either in the first cycle of higher education (50.6 %) or at the postgraduate level (49.3 %). Many were from the field of Psychology (50 %), though several other academic fields were represented. Most of the students were Portuguese (82.8 %) and single (83.9 %). The majority reported no involvement in arts or cultural activities (86.2 %), no participation in artistic or cultural groups (77 %), and no engagement in other group activities such as social, religious, or community groups (79.2 %). We also assessed demographic differences between participants completing both pre- and post-intervention questionnaires and those who did not complete the follow-up. To compare ages, we used the *t*-test, and for categorical variables, we applied the Pearson Chi-square test, the Fisher’s exact test, or the Fisher-Freeman-Halton exact test, depending on statistical assumptions. We only found gender differences in the distribution (Exact  $p = .009$ ), with fewer males (four out of the initial nine) and no participants who did not specify their gender completing the follow-up. Concerning health conditions, the majority (65.2 %) reported not being diagnosed with any health condition. Among those diagnosed, mental disorders such as depression and anxiety were the most common (24.7 %), with no statistical differences when compared to those who did not respond in the follow-up phase. Based on the DASS-21 scores, while about half of the sample reported “normal” levels of depression (55.2 %) and stress (52.9 %), a considerable portion of participants reported mild to severe symptoms, including of anxiety levels (50.5 %),

**Table 1**

Descriptive Statistics for Sociodemographic and Health Conditions in Pre-Post Workshop, and Follow-Up Phases.

Variables	Pre-Intervention (N = 87)		Follow-Up (N = 59)	
	n	%	n	%
Gender				
Women	75	86.2	55	93.2
Men	9	10.3	4	6.8
Other	3	3.4	0	0
Nationality				
Portuguese	72	82.8	52	88.1
Other <sup>a</sup>	15	17.2	7	11.9
Marital Status				
Single	73	83.9	49	83.1
Married / Cohabiting	11	12.6	7	11.9
Divorced / Widowed	3	3.4	3	5.1
Level of education				
Bachelor’s degree	44	50.6	33	55.9
Postgraduation	43	49.4	26	44.1
Professional art activities <sup>b</sup>	12	13.9	12	20.3
Participation in artistic groups <sup>b</sup>	20	23.0	15	25.4
Participation in other groups <sup>b</sup>	18	20.7	12	20.3
Health problems				
None	58	68.2	36	62.1
Mental health	15	17.6	13	22.4
Physical	6	7.1	4	6.9
Mental & Physical	6	7.1	5	8.6
Depression (DASS)				
Normal	48	55.2	-	-
Mild	14	16.1	-	-
Moderate	12	13.8	-	-
Severe / Extremely Severe	13	14.8	-	-
Anxiety (DASS)				
Normal	43	49.4	-	-
Mild	15	17.2	-	-
Moderate	11	12.6	-	-
Severe / Extremely Severe	18	20.7	-	-
Stress (DASS)				
Normal	46	52.9	-	-
Mild	9	10.3	-	-
Moderate	13	14.9	-	-
Severe / Extremely Severe	19	21.8	-	-
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	25.20	8.15	25.73	9.20

Note. DASS = Depression Anxiety Stress Scales.

<sup>a</sup> Other Nationalities: Brazilian, Cape Verdean, Angolan, Guinean, Spanish, Italian, and Mexican.

<sup>b</sup> Corresponds to the number and percentage of participants who answered “yes” to this question.

highlighting mental health challenges within our sample.

*Hypotheses testing: workshop effects on subjective well-being, self-awareness, state anxiety, and loneliness*

To select the appropriate statistical tests for testing our hypotheses, we checked data and residual normality to ensure adherence to the guidelines by Kline (2011), who recommended that Skewness should not exceed 3 and Kurtosis should not surpass 10. Most scales met these criteria (Skewness < 1.45; Kurtosis < 1.77). However, the negative affect scale showed a positive skewness (Pre = 2.16; Post = 4.28) and a leptokurtic distribution (Kurtosis pre = 5.56; post = 24.59) due to the low negative affect reported in both phases (Pre:  $M=0.47$ ;  $SD=0.55$ ; Post: range  $M=0.18$ ;  $SD=0.33$ ). Consequently, we employed the non-parametric Wilcoxon Signed-Rank test when comparing the changes in negative affect from pre- to post-phases because it is more robust to non-normal distributions and outliers. For the remaining outcomes two repeated measures multivariate analyses of variance (RM-MANOVAs) were conducted: the first investigated pre-post workshop results on positive emotions, the three measures of self-awareness, and state anxiety, whereas the second RM-MANOVA compared the three

phases on life satisfaction and loneliness. The results of the RM-MANOVAs are provided in Table 2. Fig. 1 and Fig. 2 depict the data distribution with mean values and Confidence Intervals (95 % CI).

Results showed a significant decrease in negative affect between the pre- and post-phases [ $Z = -5.85, p < .001, r = -.63$ ], with 56 participants reporting higher negative affect in the pre-phase compared to the post-phase ( $M_{rank} = 33.21$ ), in line with our first hypothesis (H1a). However, there were 24 reporting no changes and 7 reporting increased negative affect in the post-phase ( $M_{rank} = 22.29$ ). The results from the RM-MANOVA indicated an overall significant effect of the workshop on post-outcomes, Wilks' Lambda  $F(5, 82) = 31.16, p < .001, \eta_p^2 = .65$ , suggestive of a large effect. Follow-up contrast comparisons between pre- and post-workshop measurements showed statistically significant changes across all five outcomes. As hypothesized, there was an increase in positive affect (H1b),  $F(1, 86) = 116.45, p < .001, \eta_p^2 = .66$ , private self-awareness (H2a),  $F(1, 86) = 18.82, p < .001, \eta_p^2 = .18$ , and awareness to immediate surroundings (H2b),  $F(1, 86) = 10.41, p = .002, \eta_p^2 = .11$ . In contrast, there was a decrease in public self-awareness,  $F(1, 86) = 25.48, p < .001, \eta_p^2 = .23$ . Finally, as hypothesized in H3, there was also a decrease in state anxiety between pre- and post-workshop,  $F(1, 86) = 94.90, p < .001, \eta_p^2 = .53$ .

The results of the second RM-MANOVA comparing the three phases (pre-post workshop and follow-up) on life satisfaction and loneliness, also showed an overall statistically significant effect, Wilks' Lambda  $F(4, 55) = 4.38, p = .004, \eta_p^2 = .24$ . Subsequent post-hoc comparisons have shown effects of phase on both life satisfaction,  $F(1.64, 95.34) = 4.03, p = .028, \eta_p^2 = .07$ , and loneliness,  $F(2, 116) = 4.58, p = .012, \eta_p^2 = .07$ . Pairwise comparisons within phase indicated an increase in life satisfaction immediately after the workshop ( $p = .017$ ), supporting Hypothesis H1c, but a decrease in the follow-up phase ( $p = .012$ ), with no significant differences between the pre-phase and the follow-up ( $p = .389$ ). Similarly, for loneliness, there was also a decrease from pre- to post-workshop ( $p = .007$ ) as hypothesized (H4), but an increase in the follow-up phase ( $p = .019$ ), and no significant differences between the pre-phase and the follow-up ( $p = .861$ ).

*Exploratory predictors of the outcome changes between pre-post workshop*

Given the significant changes from pre- to post-workshop in all our outcomes, we explored which factors contributed to these changes. Score differences (post minus pre-workshop) were calculated for each participant, with higher scores indicating an increase from pre- to post-outcomes. As potential baseline predictors of these changes, we considered baseline anxiety, stress, and depression (measured during the pre-workshop phase), and the contextual factors of perceived social cohesion and value of the therapeutic activities (measured immediately after the workshop). This approach reduces the possibility that the association between the predictors and the magnitude of change is affected by the correlations of pretest scores at baseline (e.g., Allison,

1990; Farmus et al., 2019).

Before running the analysis, we checked the statistical assumptions. Linear relationships between the predictors and the changes in the outcomes were inspected through the examination of partial regression plots, and zero-order Pearson correlations were conducted to ensure that the regression analyses included predictors that present statistically significant linear correlations with the outcome ( $ps < .05$ ). These results are displayed in Table 3 and indicated that perceived therapeutic value and group cohesion were positively related to positive emotions, life satisfaction, and private self-awareness, and negatively to state anxiety and public self-awareness. Baseline depression levels were also related to both public self-awareness and negative affect changes. Additionally, a higher perception of group cohesion was related to an increase in awareness of surroundings. Thus, based on these results, regression analyses were not conducted for changes in negative affect, awareness of surroundings, and loneliness. Regarding negative affect only depression showed a significant association,  $r(87) = -.25, p = .021$ , and awareness of surroundings was only related to group cohesion,  $r(87) = .25, p = .019$ . Additionally, no predictors were statistically associated with changes in loneliness (all  $p > .05$ ).

For the remaining outcome changes, five regression analyses were performed to understand the contributions of each predictor, while controlling for the other variables in each model. For changes in positive emotions, state anxiety, and life satisfaction, we included group cohesion and perceived therapeutic value as predictors. For changes in public self-awareness, we included baseline depression levels, in addition to group cohesion and therapeutic value. Before running the regressions, all the predictors were centered. Residuals independence, inspected with the Durbin-Watson test, was in the normal range of 1.5 to 2.5 values, suggesting no concern (Field, 2018). Values of the Variance Inflation Factor were below 1.50, and the Tolerance values were higher than .66, suggesting no cause for multicollinearity (Myers, 1990). Homoskedasticity evaluated using Koenker (1981) using the macro HeteroskedasticityV3 for SPSS (Daryanto, 2020) indicated homoskedasticity for all tests, with  $p > .05$ . Regression coefficients, standard errors, probability values, and 95 % confidence intervals (95 % CI),  $F$  values and  $R^2$  can be found in Table 4.

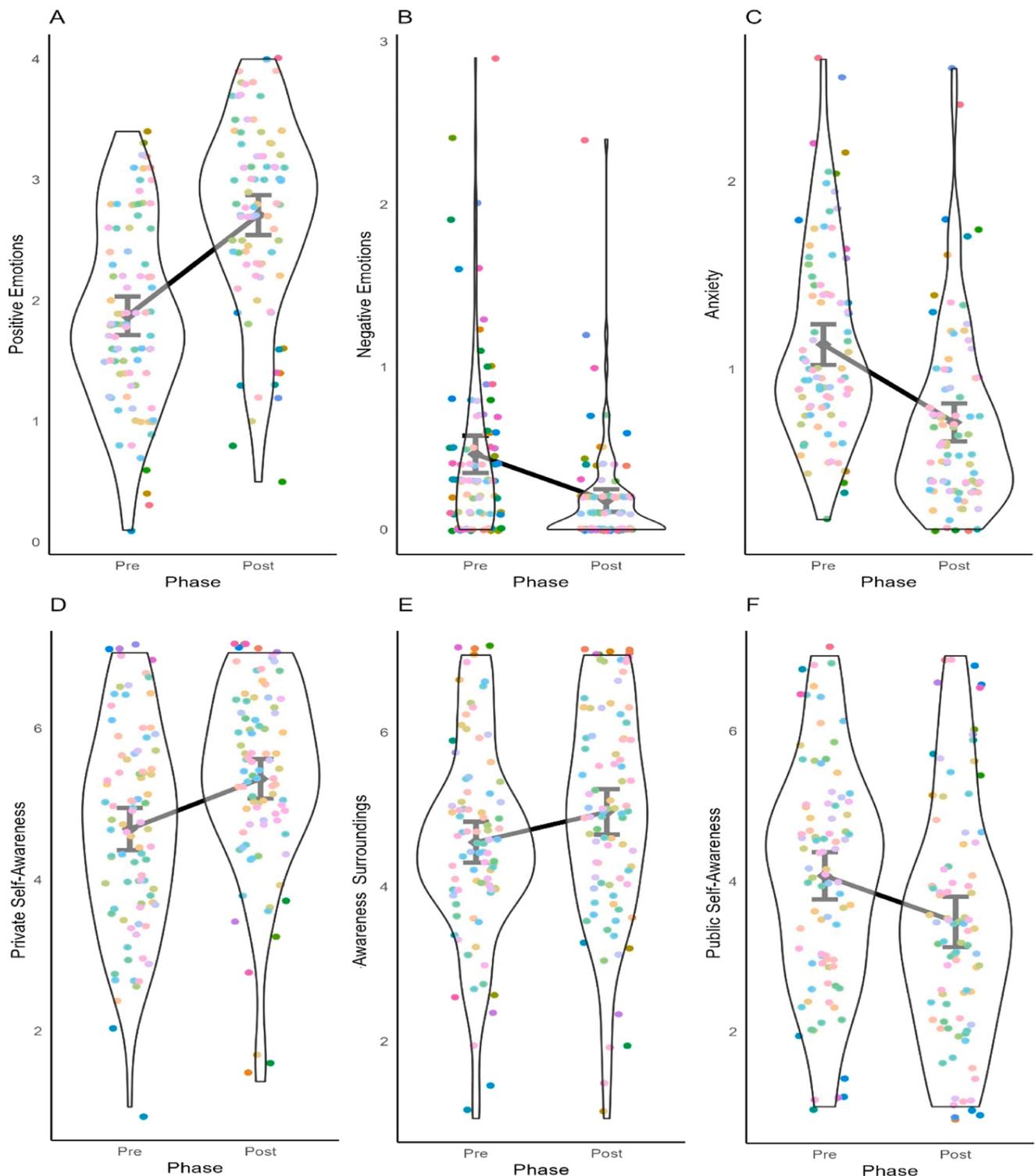
As can be seen in Table 4, the full regression model predicting the changes in positive emotions was significant and explained 18 % of the variance. However, only perceived therapeutic value remained a significant positive predictor ( $\beta = .34, p < .001$ ), with cohesion not emerging as a predictor when controlling for therapeutic value. The regression model for life satisfaction changes was significant, accounting for 10 % of the variance, but only cohesion remained a significant predictor ( $\beta = .27, p = .031$ ). For self-awareness, the regression models showed distinct results. For private self-awareness changes, the model explained 13 % of the variance, with the therapeutic value of the workshop kept as a significant predictor ( $\beta = .26, p = .039$ ), but the relation with cohesion was not statistically significant when adjusted for

**Table 2**  
Means, Standard Deviations, and Multivariate (MANOVA) Statistics for Main Outcomes.

Main outcomes	Pre-Workshop M (SD)	Post- Workshop M (SD)		$F(5, 82)$	$p$	$\eta_p^2$
(Multivariate Test)				31.16	< .001	.655
Positive affect (0-4)	1.88 <sup>a</sup> (0.76)	2.71 <sup>b</sup> (0.78)		116.45	< .001	.575
Private Awareness (1-7)	4.71 <sup>a</sup> (1.31)	5.33 <sup>b</sup> (1.24)		18.82	< .001	.180
Awareness to Surroundings (1-7)	4.61 <sup>a</sup> (1.22)	4.97 <sup>b</sup> (1.39)		10.41	.002	.108
Public Awareness (1-7)	4.12 <sup>a</sup> (1.47)	3.46 <sup>b</sup> (1.59)		25.48	< .001	.229
State Anxiety (0-3)	1.13 <sup>a</sup> (0.52)	0.72 <sup>b</sup> (0.48)		94.00	< .001	.525
Main outcomes	Pre-Workshop M (SD)	Post- Workshop M (SD)	Follow-up M (SD)	$F(2, 57)$	$p$	$\eta_p^2$
(Multivariate Test)				4.35	.004	.24
Life Satisfaction (1-5)	3.73 <sup>a</sup> (0.73)	3.84 <sup>b</sup> (0.76)	3.67 <sup>a</sup> (0.79)	4.03	.027	.065
Loneliness (1-4)	2.42 <sup>a</sup> (0.64)	2.24 <sup>b</sup> (0.69)	2.41 <sup>a</sup> (0.61)	4.58	.012	.073

Note. Within the "Main Outcomes" column, the parentheses indicate the possible range of scores for each variable.

<sup>a,b</sup>Within a row, means without a common superscript differ ( $p < .05$ ), indicating a significant change due to the workshop.



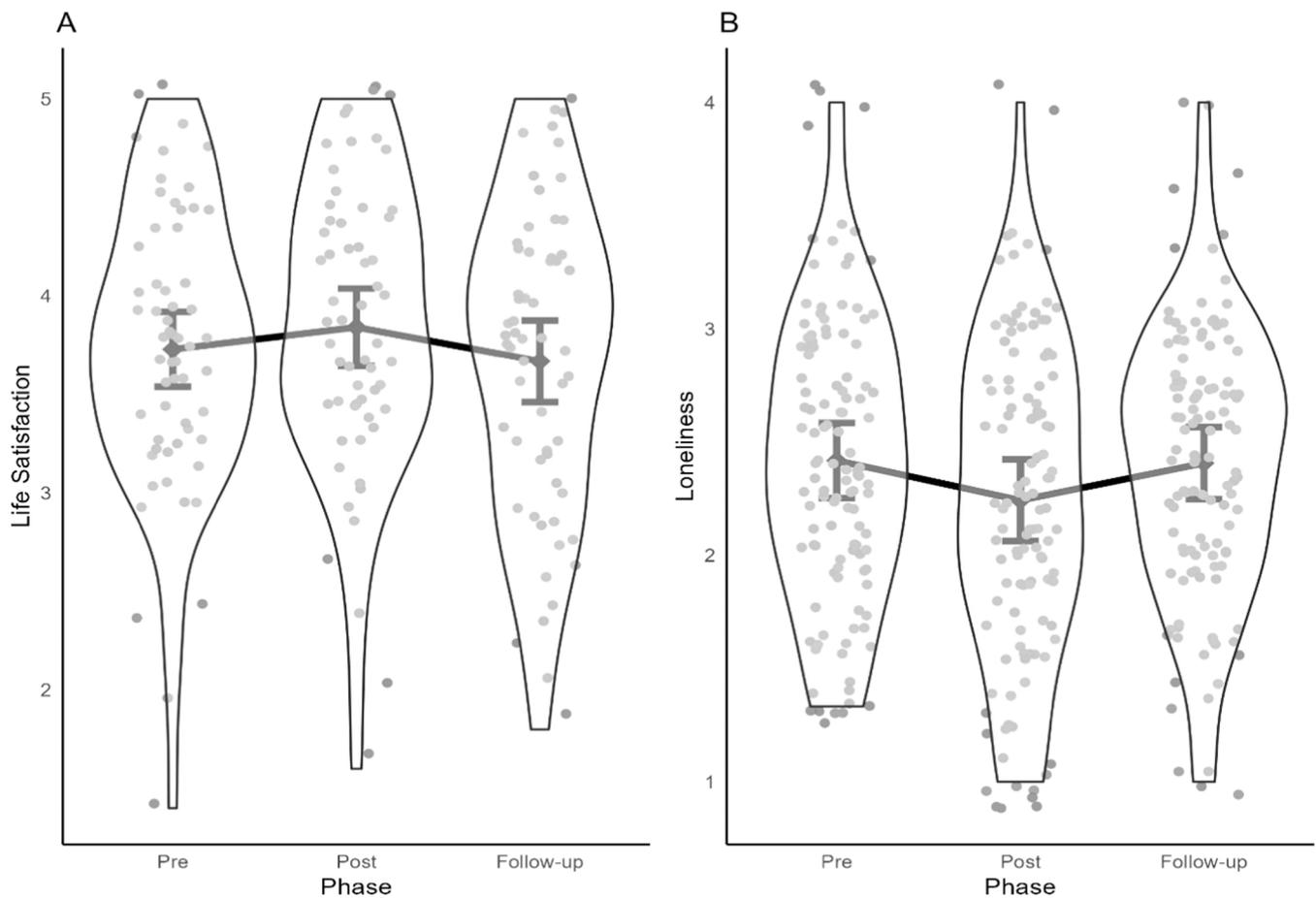
**Fig. 1.** Short-term Changes of Affective States and Self-Awareness across Pre and Post Workshop Phases Note. Each graph displays mean values with confidence intervals (95 % CI), individual jittery points, and violin plots representing data distribution for positive emotions (A), negative emotions (B), anxiety (C), private self-awareness (D), awareness of surroundings (E), and public self-awareness (F).

the therapeutic value. For public awareness changes, the model accounted for 21 % of the variance, indicating that both higher depression ( $\beta = .23, p = .025$ ) and lower cohesion ( $\beta = -.35, p = .004$ ) were predictors, while the therapeutic value showed no significant association when controlling for the above variables. Finally, for changes in state anxiety, the overall regression explained 18 % of the variance. However, only the therapeutic value of the workshop remained a

significant negative predictor ( $\beta = -.28, p = 0.019$ ).

*Additional exploratory findings*

Among those surveyed about the workshop, only one person was not interested in attending more sessions or recommending them. In the follow-up, of those who responded ( $n = 56$ ), the majority noted



**Fig. 2.** Changes in Life Satisfaction and Loneliness across Pre, Post, and Follow-up Phases. Note. Each graph displays mean values with confidence intervals (95 % CI), individual jitter points, and violin plots representing data distribution for life satisfaction (A) and loneliness (B).

**Table 3**

Intercorrelation Between Baseline Depression, Anxiety, Stress, Perceived Group Cohesion, and Therapeutic Value on Outcome Changes in the Post-Workshop Phase.

Predictors	Δ Subjective Well-Being			Δ Awareness			Δ State Anxiety	Δ Loneliness
	Positive Emotions	Negative Emotions	Life Satisfaction	Surroundings	Private	Public		
Depression (DASS)	.07 [-.14,.28]	-.25* [-.44, -.04]	-.01 [-.22,.20]	-.02 [-.23,.20]	-.02 [-.23,.20]	.29** [.09,.47]	-.10 [-.31,.11]	.02 [-.19,.23]
Anxiety (DASS)	-.01 [-.22,.20]	-.02 [-.23,.19]	-.02 [-.23,.20]	-.08 [-.29,.13]	-.10 [-.30,.11]	.16 [-.04,.36]	.03 [-.18,.24]	-.07 [-.28,.14]
Stress (DASS)	.03 [-.18,.24]	-.19 [-.38,.03]	-.04 [-.25,.18]	-.06 [-.26,.16]	-.11 [-.31,.11]	.17 [-.05,.36]	-.05 [-.26,.16]	-.04 [-.25,.17]
Group cohesion	.31*** [.11,.49]	-.12 [-.33,.09]	.31*** [.11,.49]	.25* [.04,.44]	.30*** [.09,.48]	-.40*** [-.57, -.21]	-.35*** [-.52, -.15]	-.18 [-.37,.04]
Therapeutic value	.41*** [.21,.57]	-.16 [-.36,.05]	.22* [.01,.41]	.21 [-.01,.40]	.34*** [.14,.52]	-.23* [-.42, -.02]	-.39*** [-.55, -.19]	-.17 [-.37,.04]

Note. DASS = Depression, Anxiety, and Stress Scale. Values in square brackets represent the 95 % confidence interval for each correlation.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

improvements in creativity for life’s challenges and interpersonal relationships ( $n = 31$ ; 55.4 %), and in self-knowledge ( $n = 52$ ; 92.9 %).

**Discussion**

Aligned with a holistic perspective on mental health (WHO, 2005) and the need for preventive interventions (e.g., Burns et al., 2020; Sequeira et al., 2022), we designed and assessed the effects of a CATs group workshop on well-being, self-awareness, and feelings of loneliness among university students.

Consistent with our hypotheses, the results indicated that the CATs group workshop was effective at improving subjective well-being in the

short term, as evidenced by a decrease in negative affect (H1a) and an increase in both positive affect (H1b) and life satisfaction (H1c). It also reduced state anxiety (H3) from before to after the workshop. These findings align with previous literature (e.g. Aaron et al., 2011; Gruber & Oepen, 2018; Sandmire et al., 2012; Zimmermann and Mangelsdorf, 2020) indicating that CATs, even with only one session, make an important contribution to student’s mental health by uplifting their affective states and life satisfaction, and by reducing overall negative affect and state anxiety. It is also important to note that although the overall scores for positive affect were not extremely high, all measured items scored above the midpoint of the scale. This indicates that students experienced gratitude, calmness, inspiration, happiness, hope, pride,

**Table 4**

Results of Linear Regressions Predicting Changes from Pre- to Post-Workshop on Positive Emotions, Life Satisfaction, Private and Public Self-Awareness, and State Anxiety.

Predictors	B	SE	$\beta$	t	p	95 % CI	
						LL	UL
$\Delta$ Positive emotions							
(Constant)	0.82	0.07		11.74	< .001	0.684	0.963
Group cohesion	0.07	0.07	.12	1.04	.302	-0.068	0.217
Therapeutic value	0.21	0.07	.34	2.84	.006	0.062	0.354
$F(2, 84) = 8.89, p < .001, R^2 = .18$							
$\Delta$ Life Satisfaction							
(Constant)	0.17	0.04		4.06	< .001	0.088	0.257
Group cohesion	0.10	0.04	.27	2.20	.031	0.009	0.181
Therapeutic value	0.03	0.04	.07	0.56	.574	-0.063	0.113
$F(2, 84) = 4.67, p = .012, R^2 = .10$							
$\Delta$ Private Self-Awareness							
(Constant)	0.63	0.14		4.61	< .001	0.357	0.900
Group cohesion	0.18	0.14	.16	1.28	.204	-0.099	0.455
Therapeutic value	0.30	0.14	.26	2.10	.039	0.016	0.583
$F(2, 84) = 6.47, p = .002, R^2 = .13$							
$\Delta$ Public Self-Awareness							
(Constant)	-1.24	0.18		-6.89	< .001	-1.599	-0.883
Group cohesion	-0.55	0.19	-.35	-2.96	.004	-0.926	-0.182
Therapeutic value	-0.03	0.19	-.02	-0.17	.869	-0.406	0.344
Depression	0.08	0.04	.23	2.29	.025	0.011	0.158
$F(3, 83) = 21.06, p < .001, R^2 = .21$							
$\Delta$ State Anxiety							
(Constant)	-0.42	0.04		-10.61	< .001	-0.493	-0.337
Group cohesion	-0.06	0.04	-.19	-1.62	.109	-0.144	0.015
Therapeutic value	-0.10	0.04	-.28	-2.38	.019	-0.179	-0.016
$F(2, 84) = 9.02, p < .001, R^2 = .18$							

Note. CI = Confidence Interval; LL = Lower Limit; UL = Upper Limit.

curiosity, love, admiration, and fun following the workshop, with gratitude, calmness, and inspiration being the most intensively reported. In contrast, both the overall negative affect and anxiety levels were minimal after the workshop.

In addition, as expected, the CATs workshop had positive effects on awareness, by increasing students' inward focus on their feelings and thoughts (H2a) and an outward focus on their immediate surroundings (H2b), which are consistent with prior work (Braus & Morton, 2020; Potash & Gyimah-Boadi, 2021). These findings suggest a dual facilitating effect of the CATs group workshop on awareness: internally, enabling students to connect more deeply with themselves, and externally, making them more connected to the environment. Furthermore, there was a decrease in students' concerns regarding how they are perceived by others. This reduction suggests a decrease in the need for social validation, potentially aligned with students' acceptance of their limitations and own strengths (Braus & Morton, 2020), and with an increase in the balance between their self-view and their conceptions of external judgments (Azevedo & Filipovich, 2020).

Another noteworthy finding was the decrease in perceived loneliness following the workshop, supporting our hypothesis (H4). Feelings of loneliness correspond to how the person perceives their social connections, rather than the actual number of social interactions since it is possible to have several interpersonal relations but still feel lonely if unfulfilling (Russell et al., 1980). For this reason, we expected that CATs might reduce feelings of loneliness due to the social connection among students (Braus & Morton, 2020; Brown et al., 2001). Moreover, the transient increase in well-being might also elevate an individual's general assessment of their life and connections with others. However, these temporary feelings may not change in the long term if the underlying feelings of loneliness and life satisfaction are not continuously fulfilled. In fact, when assessed in a follow-up phase, the student's self-assessment of life satisfaction and loneliness reverted to their baseline levels, indicating that these benefits had no lasting impact. Although the CATs group workshop involved a sequence of artistic activities designed to enhance sharing and cooperation, it was a brief, single-session intervention. This limited timeframe did not allow the groups to fully develop

through the typical stages of group development, such as forming, storming, group cohesion (norming), functional role-relatedness (performing), and adjourning (mourning), as proposed by Tuckman and Jensen (1977), and highlighted by Yalom and Leszcz (2020) for group therapies. Our single session likely affected the outcomes, especially group cohesion, and loneliness in the follow-up, since a minimum of ten sessions is generally necessary for these group stages to develop (Yalom & Leszcz, 2020). Thus, to achieve more consistent results, it will be necessary to implement CATs group interventions that extend over a longer duration. Nevertheless, it is important to acknowledge that at this follow-up phase many participants felt that the CATs workshop enhanced knowledge about themselves, and positively affected their perceived relationship with others. Also relevant, is that the magnitude of the short-term effects across the different outcomes ranged from moderate to large. The CATs workshop had a stronger impact on increasing positive affect and reducing state anxiety, and moderate effects for the remaining outcomes, with the highest moderate effect observed for public self-awareness and the lowest for awareness of immediate surroundings.

In our study, we also explored additional factors that might have contributed to the perceived temporary changes, by considering the student's report of their mental health symptoms of depression, anxiety, and stress, and their perceived evaluation of the workshop and their relationship with colleagues. We found that perceiving value in the therapeutic process of the workshop was relevant in explaining the increase in private self-awareness, positive affect, and the decrease in state anxiety. These findings suggest that perceiving the CATs workshop as having meaningful therapeutic value can be relevant for emotional well-being and the development of internal resources related to being aware of one's thoughts and feelings. Furthermore, the collective cohesion and unity felt during the workshop seemed instrumental in increasing the student's awareness of their surroundings while simultaneously decreasing their concerns about being judged by others. In addition, it also predicted an increase in student's life satisfaction. Overall, these findings underscore the importance of perceiving therapeutic value and group cohesion during the CATs group intervention in shaping changes

in affect and self-awareness. Therefore, for similar interventions to be successful, fostering a sense of cohesion and recognizing the therapeutic value of CATs groups seem to be important. The evaluation of therapeutic value and group cohesion were high ( $M_s > 5$  on a scale 1–7), which may also explain the positive impact of the CATs workshop. Regarding the baseline symptomatology, only depression predicted changes in negative affect and public self-awareness, indicating that individuals with higher initial levels of depression experienced smaller reductions in negative emotions and increases in public self-awareness. These findings suggest that evaluating depression among attendees is important for tailoring these interventions more effectively, especially if the intended outcomes include reducing negative affect and managing concerns about how they are perceived by others. Thus, understanding and addressing depression is crucial to better meet the needs of participants and enhance the effectiveness of CATs group interventions.

It is also important to acknowledge that, although some of our predictors were significant, the explained variance for the changes varied, ranging from 21 % for public awareness to 6 % for awareness of the immediate surroundings. This indicates the importance of incorporating variables in future research to better explain and improve CATs group interventions. Exploring factors related to the context of CATs and individual differences may enhance our understanding of how students respond to CATs groups. Other factors might include the students' ability for self-expression and emotion regulation within CATs groups (Haeyen et al., 2018), as well as their relationship with their creative productions (Snir & Regev, 2013; Gazit et al., 2021) and with the therapists (Corem et al., 2015; Gazit et al., 2021; Rankanen, 2016). Concerning individual differences, personality traits such as "openness to experience" might be important, as it has been associated with a disposition to undergo positive growth when dealing with challenging events, and with being more open to new external and internal experiences (Forgeard, 2018). Other factors include the students' motivations and expectations.

In our study, we had students motivated to enroll in the workshop since they all volunteered by expressing willingness to participate. However, they had diverse characteristics in terms of health conditions and perceived mental health symptoms. They were randomly assigned to various groups, as we sought to understand the impact of a workshop structured to accommodate distinct preferences (Kimport & Robbins, 2012). To better address the diversity of students' characteristics, we also integrated a variety of activities and tools. However, we must recognize that "one size does not fit all" - each individual brings their unique experiences, needs, and strengths to the therapeutic process. Therefore, designing future CATs groups with a more tailored approach to the students may maximize their effectiveness. Such tailoring will require screening beyond mental health, potentially considering evaluations of their traits, needs, goals, and preferences.

Despite the variability in students' characteristics, some factors were common, which can have implications in terms of generalizing the results. Notably, we had a predominant number of female participants in the CATs group workshop, and in the follow-up, there was an even greater reduction in male participants. This imbalance in gender ratio aligns with patterns identified in prior studies. As pointed out by Rith-Najarian et al. (2019) in their systematic review, female students have been consistently overrepresented in the evaluation of prevention programs across various studies and countries. This may indicate their inclination to be more engaged in help-seeking behaviors and to use mental health services, although it does not necessarily reflect the needs across genders. Future research should also develop strategies to increase engagement in health prevention programs and adherence in follow-up phases among male students and those of other gender identities. This will not only address the needs of students irrespective of their gender but can provide opportunities to compare the efficacy of interventions across gender.

Another limitation was the choice to employ a pre-post design without including a control group. While a pre-post design offers some

advantages, allowing the identification of the changes occurring in the three phases, and providing insights into the feasibility and the expected outcomes of the intervention, future studies should incorporate a control group to enable more robust causal inferences. By doing so, researchers can be more confident about the observed changes due to the CATs intervention itself, rather than potential external factors or natural changes that might occur over time (Reynolds et al., 2000).

Our article detailed the CATs group activities during the three-hour session, explaining the specific aims and reasoning behind each choice. This description aids replicability. The structured activities, using varied techniques, were chosen assuming that their combined use might increase efficacy (e.g., Levine & Levine, 2017). This approach also seemed especially pertinent for a single workshop considering diverse student needs. However, we cannot determine the specific impact of each technique, only the overall impact of the set of activities implemented. Nonetheless, we recognize the importance of future studies incorporating comparison groups to further investigate the impact of artistic techniques available for implementation in CATs groups, as emphasized by Gruber and Oepen (2018). We also acknowledge that we did not manipulate mechanisms such as the relationship with the therapist, engagement with art materials, the artistic product, self-expression, and emotional regulation, which could influence participant changes (e.g., Snir & Regev, 2013; Haeyen et al., 2018). Future research should isolate or measure these variables to better understand their specific contributions to the outcomes of CATs.

The methodological approach of asking students to make evaluations after the CATs workshop has both advantages and limitations. On one hand, post-workshop assessments allow for a more reflective analysis of their experiences. It also minimizes potential disruptions to students' engagement during the workshop, thereby preserving their immediate experience. In contrast, real-time assessments during the workshop could capture in-the-moment responses and provide an understanding of how participants engage with the content and with each activity. Nevertheless, such assessments may disrupt the flow of the workshop, potentially influencing students' feelings, behaviors, and responses. Striking the right balance between these methodological choices is crucial to ensure that evaluations yield meaningful insights while respecting the authenticity of their experience during CATs groups.

Despite the limitations, our findings showed the advantages of a single CATs group workshop within a university context at psychological and social levels. We hope that our workshop description can serve as a valuable resource for practitioners and researchers interested in enhancing at least temporary well-being, self-awareness, and the reduction of feelings of loneliness among students, although a sustained engagement in a CATs group may lead to lasting effects. Furthermore, our research highlights the relevance of perceived group cohesion and therapeutic value within the process. This underscores the importance of proposing creative group activities within safe and positive interventions, such as CATs, to facilitate internal growth and interpersonal relations. Encouraging universities to continue organizing programs like our proposal holds promise for promoting students' mental health.

#### CRediT authorship contribution statement

**Patricia Arriaga:** Writing – review & editing, Writing – original draft, Visualization, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Magda Prata Simões:** Writing – review & editing, Writing – original draft, Resources, Methodology, Conceptualization. **Helena Dias Pinto:** Writing – review & editing, Writing – original draft, Resources, Methodology. **Maria Paula Prior:** Writing – review & editing, Writing – original draft, Resources, Methodology. **Sibila Marques:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Raquel Freitas:** Writing – review & editing, Writing – original draft, Resources, Methodology, Conceptualization. **Sílvia Jerónimo Candeias:** Writing – review & editing, Writing

– original draft, Resources. **Margarida Vicente Rodrigues:** Writing – review & editing, Writing – original draft, Resources.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.aip.2024.102188](https://doi.org/10.1016/j.aip.2024.102188).

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