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Visual and Performing Arts as Non-Pharmacological Interventions for Mental Health Support

Mohamed Merza Khalil Ebrahim Al.Rayes[1*], Muhammad Shariful Islan[2]

[1] Physiotherapy, College of Health Sciences, University of Bahrain, Ahlia University, Manama, Bahrain;
[2] Pharmacy, Government City College, Rajshahi University, Chittagong, 6205, Bangladesh;

*** Corresponding author:** phd.mmkrayes@gmail.com.

ABSTRACT: Psychological distress and diminished mental well-being often coexist with social disconnection, disrupted routine, and limited participation, yet the independent contribution of visual- and performing-arts components remains uncertain. This study estimated factorial main effects in a three-center, assessor-blinded 2×2 randomized controlled trial. We allocated 280 adults aged 18–65 years with mild-to-moderate distress equally to 12 weeks of visual arts, performing arts, combined arts, or attention- and time-matched social-wellbeing programming. CORE-OM distress and WEMWBS well-being at week 12 were co-primary outcomes. An a priori Monte Carlo power analysis selected 70 participants per cell to provide approximately 81%–84% power for the factor-level joint co-primary success rule under minimally important standardized main effects of 0.30, baseline adjustment, repeated post-baseline measurement, anticipated attrition, clustered delivery, and multiplicity control. Intention-to-treat factorial multilevel models incorporated post-baseline time, center, delivery group, facilitator, and participant effects, with baseline entered once as a covariate, multiple imputation, and sensitivity analyses. Visual arts produced adjusted week-12 effects of −0.20 CORE-OM points and +3.3 WEMWBS points; performing arts produced effects of −0.24 and +3.8 points. Both factors met the prespecified success rule. Visual-by-performing interactions were exploratory and imprecise, showing no detected departure from additivity. Benefits attenuated but remained detectable at the remotely collected 12-month assessment. Exploratory process analyses were consistent with overlapping associations through emotion regulation, behavioural activation, creative self-efficacy, and social identification. Framework Analysis linked improvement to meaning-making, renewed activity, creative agency, and group belonging, while overload, self-consciousness, cultural mismatch, and access constraints limited engagement. Manualized visual and performing arts provided credible, supervised complements to usual mental-health support in the studied population.

Keywords: visual arts; performing arts; psychological distress; mental well-being; factorial randomized trial.

I. INTRODUCTION

Psychological distress is a major source of disability across adulthood and is frequently accompanied by reduced participation, impaired functioning, loneliness, poor sleep, and repeated use of health services. The global burden of depressive and anxiety disorders increased during periods of social disruption, reinforcing the need for accessible support that complements established psychological, social, and medical care [1]. Mild-to-moderate symptoms are clinically important because they can persist, recur, and interfere with employment, education, relationships, self-care, and community participation even when specialist treatment is not indicated. Service capacity, stigma, cost, geographical access, and personal preference also influence whether people receive timely support. Interventions delivered in community settings that

accommodate different communication styles and address emotional, behavioral, and relational dimensions are therefore relevant to both mental-health practice and population health.

Arts participation is increasingly evaluated as one such approach, but broad claims about its benefits outpace the certainty of the evidence. Creative-arts reviews report reductions in stress and improvements in emotional functioning across art, music, movement, and drama, but they also note small samples, inconsistent intervention definitions, weak comparators, and selective outcome reporting [2]. Visual-arts programs offer a non-verbal, materially grounded means of externalizing experience, revising representation, and developing mastery through image-making. Reviews of art therapy describe possible benefits for expression, identity, insight, and relational safety, but the evidence remains heterogeneous across diagnoses, settings, facilitator qualifications, and intervention intensity [3]. A randomized trial in adult women with anxiety reported symptom improvement and demonstrated the importance of manualisation, therapist competence, adherence assessment, and credible comparator conditions [4]. These methodological considerations matter especially when researchers evaluate visual activity as a health intervention rather than general recreation.

Performing arts may engage partly different but overlapping processes. Music therapy has shown short-term benefits for depression, although estimates vary by dose, provider training, intervention function, and comparator strength [5]. Dance/movement therapy combines embodied expression, rhythmic organization, and interpersonal attunement, with meta-analytic evidence suggesting small-to-moderate psychological effects [6], [7]. Drama, music, voice, and movement can support role experimentation, coordinated action, emotional rehearsal, and shared achievement. These processes may help when distress is maintained by inactivity, avoidance, reduced confidence, or weakened social identity. They may also increase public visibility, sensory demand, fear of error, and fatigue; consequently, acceptability and safety cannot be inferred from average improvement alone.

The pathways linking arts participation with mental health extend beyond distraction or enjoyment. Artistic activity can support emotion regulation through approach, reappraisal, self-development, and continuity; the ERS-ACA scale formalised these strategies across visual and performing activities [8]. Community arts-on-prescription programs report improved anxiety, depression, and well-being, but observational designs cannot separate artistic content from attention, expectancy, group contact, and ordinary behavioral activation [9]. Reviews of music and singing similarly identify positive well-being outcomes alongside demographic selectivity and limited knowledge about differential response and long-term maintenance [10]. Recent syntheses of active visual-art interventions have reinforced the possibility of modest health benefits while documenting substantial heterogeneity and variable study quality [11]. Collectively, this literature supports rigorous evaluation but does not establish which arts components contribute independently, whether combined delivery offers more than the sum of its parts, or how benefits are sustained after structured sessions end.

A 2×2 factorial design offers an efficient, analytically transparent way to estimate the average effects of visual-arts and performing-arts components while testing whether combined delivery departs from additivity. The design does not assume that the combined condition is superior. Greater modality breadth can broaden choice and create multiple routes into participation, but it can also divide practice time, increase cognitive or sensory load, and reduce depth within one activity. Equal-duration modular delivery is therefore essential: the visual module must remain equivalent in the visual-only and combined cells, the performing module must remain equivalent in the performing-only and combined cells, and credible non-arts modules must replace absent factors. This architecture also permits direct separation of confirmatory component effects from secondary interaction, process, implementation, and qualitative questions.

The present study compared 12 weeks of visual arts, performing arts, combined visual-and-performing arts, and non-arts social-wellbeing programming among adults aged 18–65 years with mild-to-moderate psychological distress. We selected CORE-OM distress and WEMWBS well-being as co-primary outcomes to capture both symptom burden and positive mental functioning. Secondary outcomes covered depression, anxiety, functioning, loneliness, connectedness, sleep, quality of life, attendance, fidelity, and adverse events. We examined four mid-intervention process measures—emotion regulation, behavioral activation, creative self-efficacy, and social identification—before the primary endpoint. We integrated quantitative, qualitative,

implementation, and safety evidence while preserving the distinction between confirmatory component effects and secondary explanatory analyses.

1. RESEARCH PROBLEM

Existing trials commonly compare one arts activity with waiting-list, usual-care, or minimally active conditions, leaving arts-specific effects confounded with attention, expectation, social contact, facilitator support, and general activation. Heterogeneous labels also obscure whether visual making, music, drama, voice, and movement represent distinct therapeutic functions or merely different formats for a shared social intervention. Studies frequently report short-term symptom change without parallel assessment of positive well-being, functioning, harms, fidelity, or maintenance. Consequently, current evidence offers limited guidance about which components contribute independently, whether combining modalities improves outcomes, and whether apparent advantages reflect artistic processes, delivery quality, participant preference, or nonspecific group effects.

The central research problem was therefore to estimate the average main effects of visual arts and performing arts beyond an attention- and time-matched social-wellbeing program while preserving equivalent component doses across factorial cells. An exploratory problem concerned the precision of the visual-by-performing interaction: the study examined whether combined delivery departed from additivity without interpreting a nonsignificant interaction as proof of equivalence or synergy. The evaluation also addressed whether effects persisted through 12 months and how implementation quality, facilitator processes, cultural fit, access constraints, adverse experience, and temporally ordered process measures contributed to a defensible multidisciplinary interpretation. Confirmatory effectiveness estimates were kept analytically distinct from explanatory and exploratory findings.

2. RESEARCH AIM AND OBJECTIVES

The primary aim was to estimate the week-12 main effects of visual arts and performing arts on CORE-OM psychological distress and WEMWBS mental well-being. Secondary aims addressed the visual-by-performing interaction, maintenance, broader outcomes, implementation, safety, process associations, and participant and facilitator experience.

- To estimate visual-arts and performing-arts main effects on CORE-OM and WEMWBS at week 12 using a prespecified four-test Holm family-wise and joint factor-level success rule.
- To estimate the visual-by-performing interaction and describe the precision of possible departure from additivity without treating the analysis as confirmatory.
- To evaluate selected psychological, functional, social, sleep, quality-of-life, attendance, fidelity, and adverse-event outcomes through 12 months.
- To examine week-6 changes in emotion regulation, behavioral activation, creative self-efficacy, and social identification as correlated model-based pathways without claiming confirmatory mediation.
- To integrate outcome estimates with Framework Analysis of participant and facilitator accounts concerning engagement, limited response, deterioration, cultural relevance, adaptation, and sustained everyday use.

3. RESEARCH QUESTIONS

- What were the week-12 visual-arts and performing-arts main effects on CORE-OM psychological distress and WEMWBS mental well-being?
- What did the exploratory visual-by-performing interaction estimates indicate about possible departure from additivity, recognizing that the reduced study was not powered to rule out small interactions?
- How did selected psychological, functional, social, sleep, quality-of-life, implementation, and safety outcomes develop through 12 months?
- What exploratory associations linked week-6 changes in emotion regulation, behavioral activation, creative self-efficacy, and social identification with week-12 outcomes?
- How did participants and facilitators explain engagement, improvement, limited response, adverse experience, cultural relevance, and the transfer of arts practices into everyday life?

4. RESEARCH GAP AND ORIGINAL CONTRIBUTION

The central evidence gap concerned the absence of adequately powered factorial trials that preserved component dose through matched replacement modules, used co-primary distress and well-being outcomes, followed participants beyond the intervention period, and evaluated implementation and harms alongside effectiveness. The study addressed this gap through component-level estimands, a credible social-wellbeing comparator, 12-month follow-up, multilevel modelling of group delivery, mid-intervention process measurement, and integrated qualitative explanation.

II. LITERATURE REVIEW AND INTEGRATED PROGRAMME THEORY

The literature review covered controlled visual-arts interventions, performing-arts modalities, multimodal programs, active-comparator research, shared psychological processes, and implementation scholarship. The critical synthesis prioritized evidence that can inform component attribution, clinical relevance, accessibility, and sustained use, rather than treating all arts participation as a single exposure.

1. CONTROLLED EVIDENCE FOR VISUAL ARTS

Visual making can slow attention, create manageable distance from difficult experience, and make choice visible and revisable. Controlled studies describe potential improvements in anxiety, depression, self-regulation, and social adjustment, but effects vary substantially by population, facilitator qualification, comparator condition, intervention dose, and the extent to which therapeutic functions are specified [3], [4]. A 2024 meta-analysis of active visual art therapy found modest aggregate benefit alongside marked heterogeneity and generally low study quality, reinforcing the need for stronger randomization, credible active controls, and transparent reporting [11]. Visual interventions also differ in whether they emphasize free expression, structured skill development, symbolic reflection, interpersonal processing, or simple engagement with materials. Without clear manuals and fidelity criteria, these functions cannot be linked confidently to outcomes. The present visual module therefore used structured invitations, non-judgemental exploration, permission not to disclose symbolic meaning, graded material choice, and equivalent delivery when used alone or within the combined cell.

2. PERFORMING ARTS: MUSIC, DRAMA, AND MOVEMENT

Performing arts engage action, timing, voice, posture, imagination, and interpersonal responsiveness. Music can organise arousal through rhythm and repetition; drama can support role experimentation and perspective-taking; movement can connect bodily sensation with affect and social presence. A systematic review of active group arts for adults with primary anxiety or depression found promising outcomes across dance, music therapy, art therapy, and theatre, but also highlighted small samples and uneven comparator quality [12]. Drama-based meta-analysis likewise suggested mental-health and well-being benefits while documenting wide variation in population, intervention content, facilitator expertise, and methodological quality [13]. Performing activities may increase behavioural activation and social identification through coordinated action, yet they can also generate exposure, fear of evaluation, sensory strain, or cultural discomfort. These findings support treating the performing arts as a coherent factorial component, while recognizing that music, drama, voice, and movement are not interchangeable and that modality fit remains clinically relevant.

3. MULTIMODAL DELIVERY, ACTIVE CONTROLS, AND FACTORIAL LOGIC

Multimodal programs can allow movement between private reflection and public enactment, broaden participant choice, and create continuity between image, sound, movement, and narrative. Adding modalities can also increase fatigue, sensory load, transitions, and competition for practice time. Controlled creative-arts evidence in trauma populations remains limited and heterogeneous, illustrating why multimodal breadth cannot be treated as automatic benefit [14]. Recent visual-art synthesis similarly shows that positive average effects coexist with null findings and substantial between-study heterogeneity [15]. The factorial question is therefore not whether the combined programme has the lowest observed mean, but whether the joint effect differs from the sum of the average component effects. In the present architecture,

each arts module retained the same duration, core functions, materials, and position schedule when present, while a time-matched non-arts module replaced it when absent. Main effects estimated average component contributions across the other factor, and the interaction estimated departure from additivity rather than superiority of the combined cell.

4. SHARED AND MODALITY-WEIGHTED PROCESSES

The integrated framework treated emotion regulation, behavioral activation, creative self-efficacy, and social identification as correlated and overlapping rather than modality-exclusive. Social connectedness was distinguished from identification: connectedness concerns perceived interpersonal closeness and belonging, whereas identification concerns self-definition through group membership [16]. Emotion regulation involved recognizing, expressing, modulating, and reappraising emotions [17]. Behavioral activation involved re-engaging with valued activities and reducing avoidance [18]. Social identification can improve health when group membership becomes meaningful and supportive [19], while creative self-efficacy concerns confidence in generating and adapting creative ideas through mastery and encouragement [20]. The program theory placed greater visual emphasis on symbolic regulation and creative agency, and greater performance emphasis on activation and shared identity. Each process remained plausible across both modalities and was analysed as a correlated pathway.

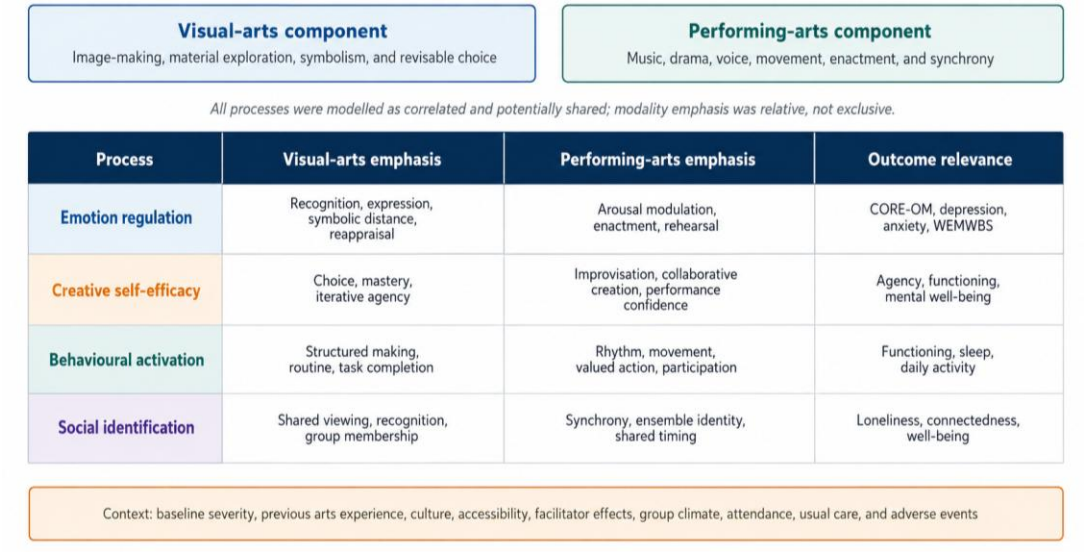


FIGURE 1. Integrated Emotion Regulation–Behavioral Activation–Social Identity Framework. The matrix presents modality-weighted emphases while treating all four processes as correlated and potentially shared.

5. CULTURE, ACCESSIBILITY, FACILITATOR EFFECTS, AND HARMS

Social meanings shape arts interventions involving materials, music, voice, movement, touch, public performance, and disclosure. Activities experienced as private and low-risk in one setting may be unfamiliar or unacceptable in another. Facilitator competence, pacing, room accessibility, group climate, and usual-care changes can influence participation independently of the nominal modality. Harms also require explicit assessment: emotional activation, shame, sensory overload, fatigue, minor musculoskeletal symptoms, or perceived pressure to disclose may be clinically relevant even when serious events are absent. The MRC complex-intervention framework supports evaluating interactions among program theory, implementation, context, and outcomes [21]. Fidelity was therefore defined as preservation of core functions and dose, not rigid repetition of surface activities.

6. CENTRAL EVIDENCE GAP

The unresolved question was whether visual and performing components each contributed to distress reduction and well-being beyond a credible social-wellbeing programme, and whether their combination produced a detectable interaction. No adequately powered evaluation had brought together matched module replacement, component-level co-primary estimands, long follow-up, facilitator and group structure, psychometric testing, selected secondary-outcome monitoring, process measurement before the primary endpoint, and mixed-methods examination of access and adverse experience. The operationalization matrix is provided in Supplementary Table S1.

III. METHODS

1. TRIAL ARCHITECTURE, CENTRES, REGISTRATION, AND REPORTING

We conducted a multicentre, assessor-blinded, 2×2 factorial, parallel-group randomized controlled trial with an embedded longitudinal mixed-methods process evaluation. Three accessible centers participated: one community mental-health hub, one primary-care network, and one arts-in-health center serving metropolitan, regional, and mixed urban-rural catchments. Each center provided an accessible group room, a private risk-assessment area, secure connectivity, and an established referral pathway. A central coordinating unit managed recruitment inquiries, eligibility tracking, randomization, electronic data capture, masked outcome assessment, and data-quality monitoring. The program was delivered over 18 months, with assessments at baseline, week 6, week 12, six months, and a remotely collected 12-month follow-up. The treatment-policy estimand compared assignment to visual and performing components regardless of attendance or permitted usual-care change. The trial was prospectively recorded as VPA-MH-2022-01 in the Multicentre Arts and Mental Health Trials Register. We finalized protocol version 2.1 and statistical analysis plan version 1.2 before database lock. Trial reporting followed CONSORT 2010 and the non-pharmacological extension [22], [23]. Protocol reporting followed SPIRIT 2013, and intervention description followed TIDieR [24], [25]. The process evaluation was structured using MRC complex-intervention guidance [21].

2. PARTICIPANTS, RECRUITMENT, AND USUAL CARE

We recruited adults aged 18–65 years through a central study portal linked to general practices, community mental-health services, social-prescribing pathways, universities, employers, voluntary organizations, and public advertisements. Central research staff completed telephone prescreening and electronic consent procedures, while center staff conducted risk and accessibility checks. Eligibility required a CORE-OM mean item score of 1.0–2.4, capacity to consent, and ability to participate safely in all four conditions with reasonable adjustments. Exclusion criteria were acute suicide risk requiring urgent intervention, current psychosis or mania, severe substance dependence, cognitive impairment precluding consent, inpatient psychiatric treatment, or concurrent structured arts therapy. Stable medication, psychotherapy, occupational therapy, and social care were permitted. We recorded medication changes, psychological-treatment contacts, social-prescribing activity, and crisis or emergency contacts at week 12 and follow-up, and included them in sensitivity analyses.

3. FACTORIAL INTERVENTION ARCHITECTURE AND MODULE-ORDER CONTROL

All conditions comprised twelve weekly 120-minute group sessions with eight to twelve participants. Sessions contained a 15-minute arrival and safety check, two 45-minute modules, and a 15-minute closing reflection. The visual factor included guided image-making, drawing, painting, collage, clay or assemblage, visual metaphor, and reflective viewing. The performing factor included rhythm, collaborative music-making, drama-based enactment, voice, movement, improvisation, and ensemble reflection. Visual-only participants received one visual and one non-arts module; performing-only participants received one non-arts and one performing module; combined participants received both arts modules; controls received two distinct non-arts modules on communication, routines, problem solving, community resources, and general well-being. Module order alternated weekly according to a schedule fixed before recruitment, and single-

factor replacement modules were yoked to the corresponding combined-session position. We matched room quality, materials budget, group size, breaks, facilitator contact, reflection time, and home-practice invitations. Full TIDieR descriptions, scripts, and the 12-session map are supplied in the supplement.

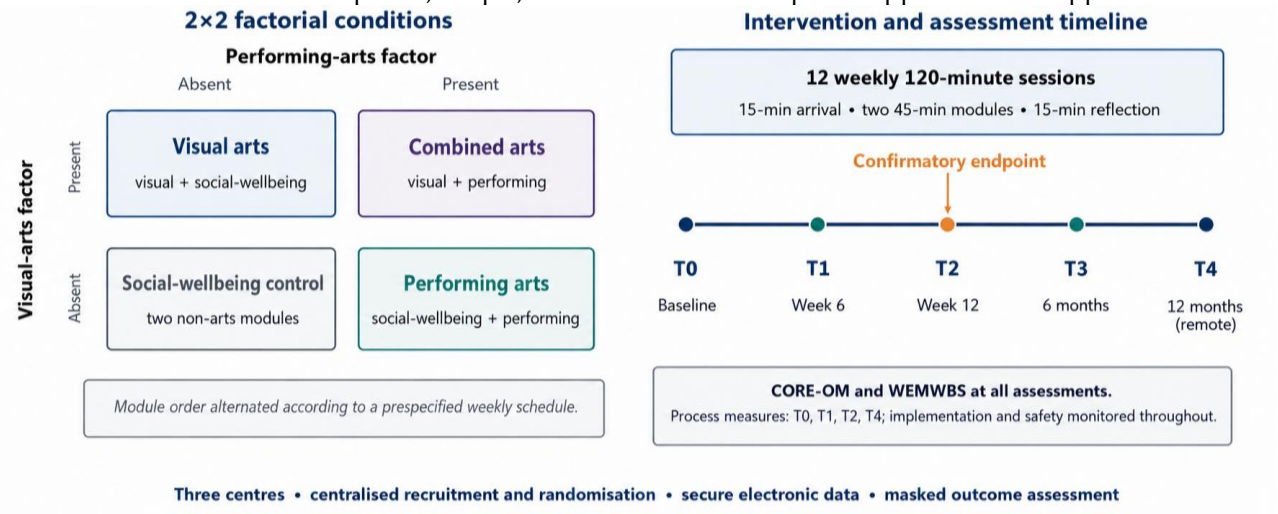


FIGURE 2. Factorial programme architecture and assessment sequence. We retained the same 45-minute arts module when a factor was present, and replaced it with a prespecified non-arts module when it was absent.

Table 1. Factorial intervention content and matched delivery characteristics. Full manuals and module-equivalence evidence are provided in Supplementary File 1.

Condition	Module 1	Module 2	Matched delivery	Primary emphasis
Visual arts	Visual image-making and reflective viewing	Non-arts social-wellbeing	120 min; matched group size, breaks, contact, and reflection	Symbolic expression and creative mastery
Performing arts	Non-arts social-wellbeing	Music, drama, voice, and movement	Same duration and module position schedule	Embodied activation and synchrony
Combined arts	Visual image-making and reflection	Music, drama, voice, and movement	Same dose for both arts modules	Multimodal choice and integration
Social-wellbeing control	Communication, routines, and problem solving	Community resources and general well-being	Same duration, reflection, and home-practice invitation	Attention, social contact, and credible non-arts support

4. *RANDOMISATION, ALLOCATION IMPLEMENTATION, AND MASKING*

An independent statistician prepared the computerised allocation sequence using variable blocks of eight and twelve, stratified by centre, CORE-OM severity, age group, and current psychological treatment. A central web-based system released allocation only after eligibility confirmation and baseline completion. An independent data manager held the allocation list; center recruiters could not access unreleased assignments. Participants completed electronic questionnaires through a secure central platform, and masked assessors conducted week-12 and six-month interviews by video or telephone when in-person assessment was impracticable. The 12-month assessment was collected remotely. Participants and facilitators were not

masked, but all programs were presented as credible approaches to social and emotional well-being. Assessors documented treatment guesses and accidental disclosures after each follow-up. The primary statistician used masked factor labels until confirmatory estimates and multiplicity adjustments were finalized.

5. SAMPLE SIZE AND POWER

An a priori Monte Carlo power analysis selected a target of 280 participants, equivalent to 70 per factorial cell. The power analysis evaluated 10,000 Monte Carlo trial replications under the planned baseline-adjusted, four-post-baseline mixed-effects model. Assumptions included a baseline-to-week-12 correlation of 0.70, an AR(1) within-participant correlation of 0.60 across week 6, week 12, six-month, and 12-month outcomes, a cross-outcome correlation of −0.58, three centres, 28 delivery groups averaging ten participants, a group ICC of 0.015, a facilitator ICC of 0.005, and 15% attrition by week 12. The minimally important main effect was set at d=0.30 for each co-primary outcome. Under the planned four-test Holm procedure, estimated power was 89%–92% for the individual factorial main-effect tests and 81%–84% for the stricter factor-level decision requiring both co-primary outcomes to be significant in the beneficial direction. The main effects compare approximately 140 participants with factor presence against 140 with factor absence, and baseline adjustment materially reduced residual variance. The target of 280 was therefore the smallest feasible sample that preserved at least 80% power for the joint co-primary success rule while allowing for attrition and clustered delivery. Estimated power was approximately 45% for an interaction of d=0.30 and below 30% for interactions of d=0.20 or smaller; interaction, mediation, condition-specific process, and moderator analyses were consequently classified as exploratory.

6. FACILITATORS, COMPETENCE, FIDELITY, ACCESSIBILITY, AND SAFETY

Twelve trained part-time facilitators delivered 28 groups, with three facilitators and seven groups allocated to each condition. Arts facilitators held relevant professional qualifications or documented advanced practice in arts and mental health; control facilitators had backgrounds in psychology, social work, occupational therapy, or community health. Eligibility required at least three years of group experience, 18 hours of trial training, and a competence score of at least 80% before independent delivery. Facilitators worked in one condition only. Centralized fortnightly supervision addressed scope of practice, cultural fit, accessibility, expectancy neutrality, contamination, psychological safety, and adverse-event response. Fidelity combined session checklists, facilitator logs, participant module recall, and independent remote or in-person observation of 30% of sessions. We coded adaptations as access-preserving, preference-responsive, safety-related, or protocol-deviating. The full fidelity instrument, competence anchors, contamination rules, and harms definitions appear in Supplementary File 2.

7. OUTCOMES, SCALE SCORING, AND PSYCHOMETRIC CHECKS

CORE-OM psychological distress and WEMWBS mental well-being were co-primary outcomes at week 12 [26], [27]. The reduced secondary set comprised PHQ-9 depression, GAD-7 anxiety, WSAS functioning, the three-item UCLA loneliness scale, the 20-item Social Connectedness Scale-Revised, PROMIS Sleep Disturbance, and EQ-5D-5L dimension profiles with the EQ visual analog scale [28]–[33]. Emotion-regulation difficulty used DERS-16 and behavioural activation used BADS-SF [34], [35]. We used the three-item scale for creative self-efficacy and a validated single item supplemented by three belonging items for social identification [20], [36]. We retained attendance, fidelity, expectancy, alliance, satisfaction, co-interventions, and adverse events as implementation or safety measures. All scoring directions and ranges are specified in Supplementary File 3. We estimated internal consistency at each wave and examined longitudinal configural, metric, and scalar invariance for the co-primary outcomes and exploratory process measures before interpreting change scores.

We prespecified a CORE-OM reduction of at least 0.50 as a conservative practical-response threshold, approximating one-half of the baseline SD and exceeding routine measurement noise. A WEMWBS increase of at least three points represented a modest distribution-based improvement relative to the baseline SD. These thresholds supplemented continuous analysis and did not determine confirmatory success.

Table 2. Streamlined outcome, process, implementation, and safety measurement schedule.

Measure/domain	T0	T1 week 6	T2 week 12	T3 6 months	T4 12 months (remote)
CORE-OM and WEMWBS	✓	✓	✓	✓	✓
PHQ-9, GAD-7, WSAS	✓	✓	✓	✓	✓
Loneliness, SCS-R, sleep, EQ-5D-5L	✓	—	✓	✓	✓
DERS-16, BADS-SF, creative self-efficacy, social identification	✓	✓	✓	—	✓
Expectancy, alliance, satisfaction	—	Session 1 / week 6	✓	—	—
Attendance, fidelity, adaptations, co-interventions, adverse events	Ongoing	Ongoing	Ongoing	Follow-up	Follow-up

8. QUALITATIVE STRAND AND RESEARCHER POSITIONING

Maximum-variation sampling selected 32 participants after week 12, eight per condition, and retained 24 for remotely conducted 12-month interviews. Variation covered center, age, gender, ethnicity, employment, baseline severity, previous arts participation, attendance, improvement, limited response, deterioration, and adverse experience. We invited and interviewed all 12 facilitators. Framework Analysis combined program-theory domains with inductively developed categories [37]. One lead analyst was a clinical psychologist without professional arts practice; the second was an arts-in-health researcher with visual and performing experience but no delivery role in the trial. We independently charted six transcripts to establish the initial matrix, then refined the framework through team meetings, case summaries, and disconfirming-case review. Twenty-five per cent of the final charts were audited against recordings and transcripts. Bilingual researchers translated three interviews conducted with accredited interpreters and back-checked them against the source recording. A quotation matrix linked each extract to participant or facilitator code, condition, center, time point, and outcome trajectory.

9. ETHICS AND DATA GOVERNANCE

The Multicentre Arts and Mental Health Research Ethics Committee approved the protocol (084; 17 December), with local governance authorization at each center. Participants received accessible written and verbal information and provided written informed consent to participate in the trial, complete questionnaires, participate in interviews, be audio-recorded, provide de-identified quotations, and receive follow-up contact. Participation was voluntary, activity-level opt-out was permitted, and withdrawal did not affect usual care. We stored identifiers separately from coded research records. We encrypted electronic files, restricted access by role, and maintained audit logs; we stored paper records in locked facilities. We reviewed quotations to minimize deductive disclosure, and risk-sensitive referral procedures operated throughout.

10. QUANTITATIVE ESTIMANDS AND STATISTICAL ANALYSIS

Analyses followed intention-to-treat principles in R 4.3.2. Let V indicate visual-factor presence and P indicate performing-factor presence. The week-12 visual main-effect estimand was $E(Y12|V=1)-E(Y12|V=0)$, averaged over P; the performing estimand was $E(Y12|P=1)-E(Y12|P=0)$, averaged over V; and the interaction was $[E(Y12|V=1,P=1)-E(Y12|V=1,P=0)]-[E(Y12|V=0,P=1)-E(Y12|V=0,P=0)]$. The repeated response vector contained only post-baseline observations at week 6, week 12, six months, and 12 months. The baseline value of the relevant outcome was entered once as a covariate and was not also modeled as a repeated response. Longitudinal mixed models included V, P, V×P, categorical post-baseline time, all factor-by-time terms, baseline outcome, center, severity stratum, age stratum, and current psychological treatment. Random

intercepts represented participant, facilitator, and delivery group nested within facilitator; post-baseline residuals followed AR(1). Restricted maximum likelihood and Kenward–Roger degrees of freedom were used.

The four week-12 main-effect tests—visual and performing effects on CORE-OM and WEMWBS—formed one Holm-controlled family at family-wise α=.05. A factor was declared confirmatorily supported only if both its CORE-OM and WEMWBS adjusted tests were significant and beneficial. The reduced sample was powered primarily for the four factorial main-effect tests. The two co-primary interaction tests were exploratory and reported with Holm-adjusted, confidence-compatible p-values; they did not support confirmatory claims about synergy or equivalence. Secondary outcome families used Benjamini–Hochberg false-discovery-rate control. Reports included cell means, factorial effects, 95% confidence intervals, pooled-baseline standardized effects, exact adjusted p- or q-values, response probabilities, and numbers needed to treat. We examined model adequacy using convergence, singularity, residual, influence, heteroscedasticity, covariance, and multicollinearity diagnostics.

11. MISSING DATA, PROCESS MODELS, AND SENSITIVITY ANALYSES

We addressed missing data using multiple imputation by chained equations across 50 completed datasets, including allocation, center, repeated outcomes, demographics, treatment, selected process measures, attendance, adverse events, and recorded missingness reasons. Trace plots, distributional overlap, Monte Carlo error, relative efficiency, and fraction of missing information were reviewed. Sensitivity analyses included complete cases, attendance of at least nine sessions, alternative covariance structures, center as a fixed or random effect, protocol deviations, contamination, co-interventions, expectancy, alliance, and delta-adjusted missing-not-at-random assumptions. Exploratory process models estimated visual and performing associations through week-6 changes in the four correlated processes, adjusted for baseline outcome and process values, with cluster-robust standard errors and 5,000 group bootstrap resamples. Additional adjustment for concurrent week-6 outcomes assessed reverse temporal ordering. Interaction, mediation, condition-specific process, and moderator estimates were interpreted as exploratory, model-dependent associations .

12. MIXED-METHODS INTEGRATION

Integration used connected sampling, aligned case identifiers, cross-condition Framework matrices, and a question-specific joint display. We compared quantitative effects, process associations, participant explanations, facilitator accounts, fidelity, and adverse events for convergence, complementarity, expansion, and divergence. Personal accounts informed interpretation of how change was experienced; they were not used to verify statistical pathways.

IV. RESULTS

1. TRIAL PROFILE AND MEASUREMENT PERFORMANCE

Of 432 adults assessed, 280 met eligibility criteria, completed baseline assessment, and were randomized equally. We observed week-6 data for 270 participants, week-12 data for 258, six-month data for 239, and remotely collected twelve-month data for 224. Week-12 retention was 92.9% in visual arts, 91.4% in performing arts, 94.3% in combined arts, and 90.0% in control. The principal reasons for non-assessment were withdrawal, unrelated illness, scheduling or caring constraints, and loss of contact. All randomized participants contributed to the intention-to-treat analysis through multiple imputation. After adjustment, missingness was associated with baseline sleep disturbance, caring responsibilities, and lower attendance, but not independently with factorial exposure.

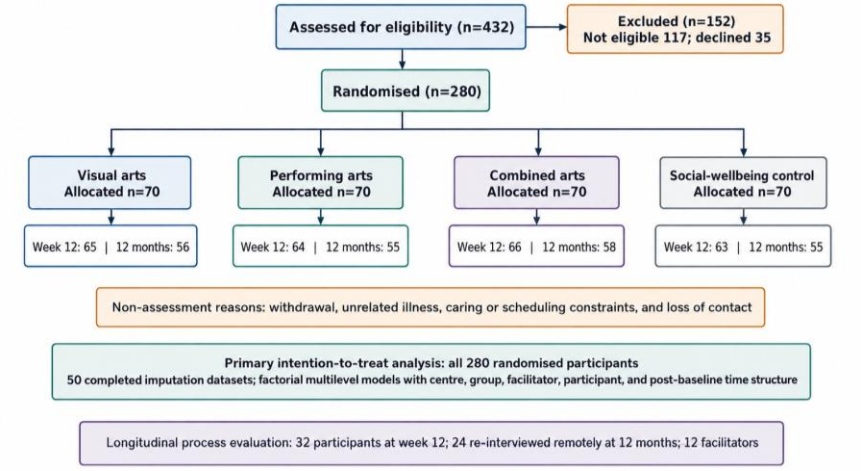


FIGURE 3. Participant flow through centralised screening, factorial allocation, repeated follow-up, intention-to-treat analysis, and longitudinal process sampling.

Baseline characteristics were balanced. The mean age was 41.9 years, 62.5% identified as women, 35.4% as men, and 2.1% as non-binary or another gender. Approximately 28% lived alone, 27% used antidepressant medication, and 36% reported organized arts participation during the previous five years. Mean CORE-OM scores were approximately 1.71 and WEMWBS scores approximately 39.4. Coefficient omega ranged from .87 to .94 for CORE-OM and .85 to .92 for WEMWBS across waves; retained secondary scales ranged from .78 to .93. Longitudinal configural and metric invariance was supported for the co-primary outcomes and exploratory process measures; scalar results were acceptable but less precise because of the reduced sample (maximum ΔCFI=.009; maximum ΔRMSEA=.007). Full psychometric results appear in Supplementary Table S6.

Table 3. Selected baseline participant characteristics by randomized factorial cell. The full baseline profile is reported in Supplementary Table S2.

Characteristic	Visual arts (n=70)	Performing arts (n=70)	Combined arts (n=70)	Control (n=70)
Age, years, mean (SD)	41.8 (12.1)	42.0 (11.8)	41.7 (12.0)	42.1 (11.9)
Women, n (%)	44 (62.9)	44 (62.9)	43 (61.4)	44 (62.9)
Employed or studying, n (%)	41 (58.6)	40 (57.1)	42 (60.0)	41 (58.6)
Living alone, n (%)	20 (28.6)	20 (28.6)	19 (27.1)	20 (28.6)
Current antidepressant, n (%)	19 (27.1)	19 (27.1)	20 (28.6)	19 (27.1)
Previous organised arts participation, n (%)	25 (35.7)	24 (34.3)	26 (37.1)	25 (35.7)
CORE-OM, mean (SD)	1.71 (0.58)	1.70 (0.57)	1.71 (0.59)	1.70 (0.58)
WEMWBS, mean (SD)	39.4 (8.3)	39.5 (8.1)	39.3 (8.2)	39.5 (8.2)

2. *CONFIRMATORY FACTORIAL EFFECTS*

At week 12, adjusted CORE-OM means were 1.30 for visual arts, 1.24 for performing arts, 1.02 for combined arts, and 1.46 for control. The visual main effect was −0.20 points (95% CI −0.31 to −0.09; t = -3.64; df = 24.6; Holm-adjusted p = .0013; d = 0.34), and the performing main effect was −0.24 (−0.35 to −0.13; t = -

4.36; df = 24.1; adjusted p = .0006; d = 0.41). Adjusted WEMWBS means were 45.5, 46.0, 49.7, and 42.6. The visual main effect was +3.3 points (1.7 to 4.9; t=4.02; df=25.2; adjusted p=.0009; d=0.40), and the performing main effect was +3.8 (2.2 to 5.4; t=4.63; df=24.8; adjusted p=.0004; d=0.46). Both factors met the prespecified requirement that both co-primary outcomes remain significant after Holm adjustment, although confidence intervals were wider than in a large-scale trial.

The exploratory visual-by-performing interaction was −0.04 CORE-OM points (−0.20 to 0.12; adjusted p=.63) and +0.8 WEMWBS points (−1.8 to 3.4; adjusted p=.55). These imprecise estimates showed no detected departure from additivity but could not exclude interactions of practical interest. A CORE-OM reduction of at least 0.50 occurred in 51.4%, 55.7%, 67.1%, and 34.3% of visual, performing, combined, and control participants. A WEMWBS increase of at least three points occurred in 58.6%, 61.4%, 72.9%, and 41.4%, respectively. The combined cell had the most favorable response distribution, but we could not attribute its superiority to a positive interaction.

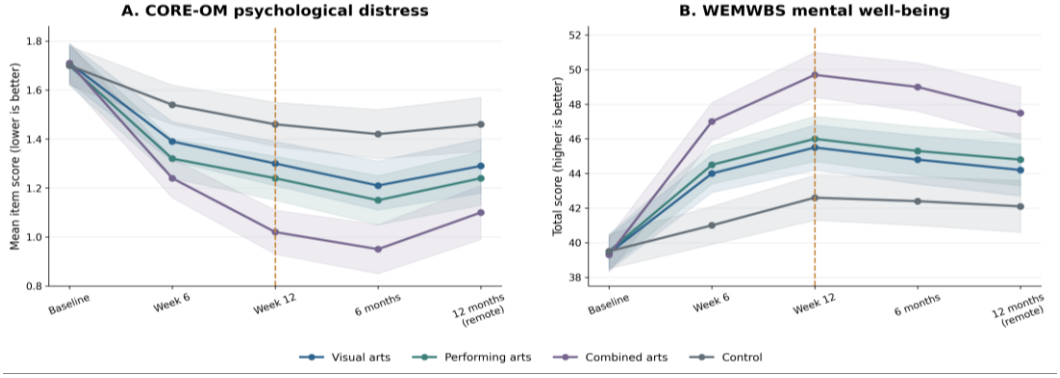


FIGURE 4. CORE-OM and WEMWBS trajectories through 12 months. Baseline points are observed descriptive means; post-baseline points are model-adjusted estimates with approximate 95% confidence bands. Week 12 was the confirmatory endpoint.

Table 4. Co-primary cell means, factorial effects, practical-response estimates, and 12-month maintenance.

Outcome / estimate	Visual arts	Performing arts	Combined arts	Control
Week-12 CORE-OM adjusted mean	1.30 (1.20–1.40)	1.24 (1.14–1.34)	1.02 (0.92–1.12)	1.46 (1.36–1.56)
CORE-OM factorial effect	Visual: −0.20 (−0.31, −0.09); pHolm=.0013; d=0.34	Performing: −0.24 (−0.35, −0.13); pHolm=.0006; d=0.41	Exploratory interaction: −0.04 (−0.20, 0.12); pHolm=.63	Reference cell
Week-12 WEMWBS adjusted mean	45.5 (43.9–47.1)	46.0 (44.4–47.6)	49.7 (48.1–51.3)	42.6 (41.0–44.2)
WEMWBS factorial effect	Visual: +3.3 (1.7, 4.9); pHolm=.0009; d=0.40	Performing: +3.8 (2.2, 5.4); pHolm=.0004; d=0.46	Exploratory interaction: +0.8 (−1.8, 3.4); pHolm=.55	Reference cell
CORE-OM decrease ≥0.50	51.4% (40.0–62.8)	55.7% (44.1–66.8)	67.1% (55.5–77.0)	34.3% (24.2–46.0)
WEMWBS increase ≥3	58.6% (46.9–69.4)	61.4% (49.7–72.0)	72.9% (61.5–81.9)	41.4% (30.6–53.1)

Outcome / estimate		Visual arts	Performing arts	Combined arts	Control
12-month main effect	CORE-OM	−0.14 (−0.25, −0.03)	−0.17 (−0.28, −0.06)	Interaction −0.02 (−0.18, 0.14)	—
12-month main effect	WEMWBS	+2.2 (0.3, 4.1)	+2.8 (0.9, 4.7)	Interaction +0.5 (−2.4, 3.4)	—

3. DELIVERY, EXPOSURE, ACCEPTABILITY, AND SAFETY

All 28 groups commenced. Mean attendance ranged from 9.3 to 9.8 sessions, and 75.7%–80.0% completed at least nine sessions. Core fidelity ranged from 91.8% to 94.1%, while prohibited cross-condition content occurred in 1.6% of observed module elements. Early expectancy was comparable. Alliance and satisfaction were higher in arts conditions, and the combined condition produced slightly more sensory and cognitive overload. Thirteen mild related events—emotional activation, minor musculoskeletal discomfort, fatigue, dizziness, voice strain, skin irritation, or self-consciousness—resolved through pacing, alternative activity, rest, or clinical review. No serious related event occurred. Five participants received additional clinical review following increased risk or symptom escalation; referral rates did not differ materially by condition, and ongoing psychotherapy or medication was not displaced.

Table 5. Condensed implementation, fidelity, acceptability, and safety findings.

Indicator	Visual arts	Performing arts	Combined arts	Control
Groups / facilitators	7 / 3	7 / 3	7 / 3	7 / 3
Sessions attended, mean (SD)	9.7 (2.3)	9.8 (2.2)	9.4 (2.5)	9.3 (2.5)
Completed ≥9 sessions, %	78.6	80.0	77.1	75.7
Core fidelity, % (95% CI)	93.0 (88.5–97.5)	94.1 (89.9–98.3)	92.3 (87.4–97.2)	91.8 (86.8–96.8)
Early expectancy, 0–100	67.8 (15.2)	68.3 (14.9)	68.7 (15.0)	66.9 (15.6)
Group alliance, 1–5	4.10 (0.55)	4.18 (0.52)	4.16 (0.54)	3.82 (0.61)
Satisfaction, 8–32	26.1 (3.6)	26.5 (3.4)	25.8 (3.8)	24.2 (4.0)
Mild related adverse events	3	3	5	2
Serious related adverse events	0	0	0	0

4. SECONDARY OUTCOMES AND MAINTENANCE

Visual and performing factors produced modest improvements in depression, anxiety, functioning, loneliness, social connectedness, sleep, and quality of life. Performing estimates were numerically larger for loneliness and connectedness, while creative self-efficacy improved most when visual arts were present. The combined cell generally had the most favourable adjusted means, but exploratory interaction confidence intervals remained compatible with positive, null, or negative departures from additivity. Full raw and adjusted secondary estimates are provided in Supplementary Table S3.

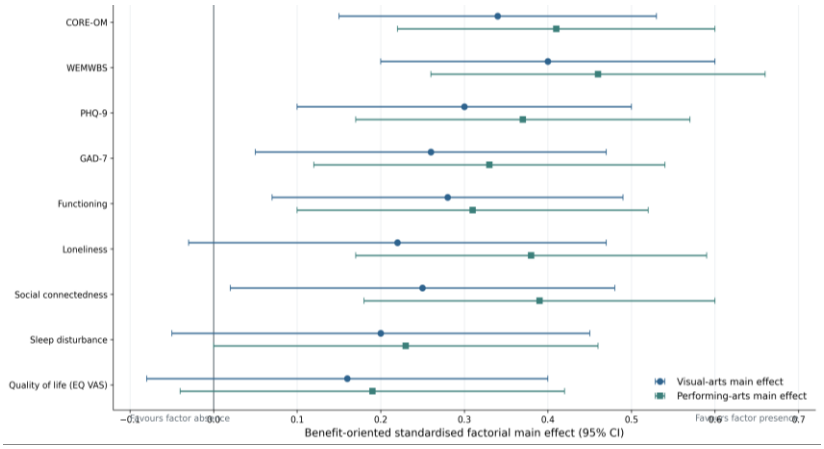


FIGURE 5. Benefit-oriented week-12 factorial main effects across selected outcomes. Positive standardized values favor the presence of the arts component; confidence intervals are shown for each factor.

5. *SECONDARY PROCESS AND MODERATOR ANALYSES*

Exploratory process models yielded attenuated and imprecise estimates. For the visual main effect on CORE-OM, the total association was −0.20, the combined week-6 indirect estimate was −0.06 (95% group-bootstrap CI −0.12 to −0.01), and the residual direct estimate was −0.14. Creative self-efficacy and emotion regulation contributed most. For the performing main effect, the corresponding estimates were −0.24, −0.09 (−0.16 to −0.03), and −0.15; behavioral activation, social identification, and emotion regulation contributed most. WEMWBS models attributed approximately 30% of the visual and 35% of the performing associations statistically to the four processes. Adjustment for concurrent week-6 outcomes attenuated combined estimates by 28%–34%. No moderator remained below q=.05, and attendance associations were descriptive because attendance occurred after randomisation. These analyses were not powered for confirmatory mediation or subgroup inference. Detailed models and Supplementary Figure S1 are provided in the supplement.

6. *FRAMEWORK ANALYSIS*

Framework Analysis produced five cross-condition themes. 'Externalizing and revising experience' described visual materials as a way to organize emotion without immediate verbal explanation. A visual-arts participant stated, 'I could move the marks around until the feeling made more sense; I did not have to explain it straight away' (VA-P12, week 12). 'Acting before motivation returned' captured performing-arts experiences of entering activity through rhythm, role, or coordinated movement: 'Once the group started the beat, joining in felt easier than deciding on my own to do something' (PA-P07, week 12). 'Recognition through shared attention' described belonging across arts conditions. 'Choice versus transition demand' characterized combined delivery; one participant valued the alternatives but found changing activity midway tiring (CA-P03, week 12). 'Practices that remained usable' focused on transferring brief drawing, music, breathing, movement, and contact routines into daily life.

Facilitators emphasized function-preserving adaptation. A visual facilitator described replacing paint with objects and photographs while retaining choice and perspective-taking (VA-F04). A performing facilitator reported that participation improved when entry into ensemble work was gradual rather than immediate (PA-F02). A control facilitator noted that structured social discussion could also increase routine and connection, strengthening the comparator's credibility (CT-F03). Disconfirming cases included visual exposure, dislike of specific music or drama conventions, fear of public error, fatigue, sensory overload, and cultural discomfort with group synchrony. Quotes were retained only when traceable through the consented transcript and quotation matrix supplied in Supplementary File 4.

7. INTEGRATED INTERPRETATION AND ROBUSTNESS

Integration converged on independent component contributions, partially differentiated process profiles, and strong contextual influence. Visual arts were associated with symbolic regulation and creative confidence; performing arts were associated with activation and group identification; both influenced distress and well-being. Quantitative effects represented fully delivered components, including facilitator relationship, expectancy, and group climate. Primary models converged without singularity. Group ICCs were .028 for CORE-OM and .024 for WEMWBS; facilitator variance estimates were small but imprecise because only 12 facilitators contributed. AR(1) correlations were .62 and .60. Marginal and conditional R^2 values were .32 and .67 for CORE-OM and .30 and .65 for WEMWBS. Fraction of missing information ranged from .08 to .20, relative efficiency exceeded .995, and Monte Carlo error was below 6% of each pooled standard error. Complete-case, per-protocol, alternative covariance, center-specification, contamination, co-intervention, expectancy, alliance, and delta-adjusted analyses preserved the direction and substantive interpretation of the factorial main effects.

Table 6. Mixed-methods joint display separating quantitative association, personal explanation, implementation evidence, and interpretive limits.

Integrated domain	Quantitative evidence	Participant/facilitator evidence	Interpretive limit
Visual meaning-making	Visual main effects on CORE-OM, WEMWBS, and creative self-efficacy	Participants described revisable images and choice without compulsory disclosure	Symbolic distance and mastery were plausible contributors within the full component
Performing activation	Performing main effects on distress, activation, loneliness, and connectedness	Participants described rhythm, coordinated action, and gradual entry into ensemble work	Embodied action and shared timing were plausible contributors
Combined delivery	Best cell means; interactions small and imprecise	Choice increased for some participants; transitions and overload constrained others	No detected departure from additivity; synergy was not demonstrated
Facilitator and alliance effects	Alliance adjustment attenuated but did not remove estimates	Facilitators described pacing, competence, and psychological safety	Effects cannot be attributed solely to artistic content
Safety and maintenance	No serious related events; partial maintenance through remote 12-month follow-up	Brief practices transferred more often than complex group activities	Adaptation and continuity of usual care remained necessary

V. DISCUSSION

This reduced, three-centre factorial trial identified independent average contributions of visual and performing components to reduced CORE-OM distress and improved WEMWBS well-being. Both factors met the prespecified requirement that each co-primary outcome remain significant within the four-test Holm family. We selected the sample primarily for main-effect estimation, and the exploratory interaction estimates were correspondingly wide. The appropriate interpretation is that, within limited precision, no clear departure from additivity was detected; the analysis neither proved exact additivity nor supported a general claim that the combined program was superior.

The magnitude of the co-primary effects was modest but coherent. Visual and performing standardized effects ranged from 0.34 to 0.46, consistent with the small-to-moderate range reported in recent visual and

group-arts syntheses [11], [12], [15]. The average CORE-OM differences were smaller than the 0.50 individual response threshold, yet response probabilities were appreciably higher than control. WEMWBS main effects exceeded the prespecified three-point practical threshold on average. The wider confidence intervals appropriately reflect the reduced sample and should remain central to interpretation alongside responder distributions.

The active comparator strengthens interpretation relative to waiting-list or usual-care designs. Attention, duration, social contact, reflection, and home-practice invitations were matched, reducing—but not eliminating—the influence of nonspecific exposure. Alliance and satisfaction were higher in arts conditions, and professional backgrounds differed between arts and control facilitators. Adjusting for alliance preserved the direction of the findings but cannot isolate a pure artistic ingredient, because the intervention may partly produce alliance and alliance may also be one of its intended resources. The results therefore reflect component-package effects involving artistic tasks, facilitator competence, group process, and expectancy, rather than estimates of materials, rhythm, or performance in isolation.

Combined delivery produced the most favorable cell means and response probabilities, but the reduced study had limited power to detect interaction effects, and the confidence intervals included both positive and negative departures from additivity. Framework Analysis suggested why responses differed: additional modalities increased choice and offered alternative routes into participation, yet transitions, noise, visibility, and fatigue reduced depth or tolerance for some people. Greater modality breadth does not necessarily imply a positive statistical interaction, and this trial was not designed to rule out small interactions.

Secondary outcomes supported a differentiated multidisciplinary profile. Visual arts were particularly associated with creative self-efficacy and accounts of symbolic distance and revisability. Performing arts were more strongly associated with behavioral activation, reduced loneliness, and social connectedness, aligning with evidence on active group arts, drama, music, movement, and social identification [12], [13], [19]. These are differences in emphasis rather than exclusive mechanisms. Visual making was often social, and performing activity could support private emotion regulation. The integrated framework is therefore better represented as overlapping routes that are weighted differently by modality and context.

The exploratory mid-intervention process models were consistent with the integrated framework but remained vulnerable to mediator–outcome confounding, early outcome change, and limited precision. Concurrent week-6 adjustment attenuated the indirect estimates, showing that process and symptom change were already intertwined. The analyses therefore refine programme theory without establishing causal mediation. The qualitative strand added a different form of explanation by showing how participants interpreted bodily activation, image-making, group recognition, and choice, while disconfirming cases identified overload, self-consciousness, cultural mismatch, and fatigue. Personal accounts and statistical pathways were complementary but not interchangeable evidence.

Implementation findings are important for international transfer. The trial standardized core functions and dose while allowing documented changes in materials, pace, posture, sound intensity, solo exposure, and group configuration. This approach is consistent with complex-intervention guidance, which treats context and implementation as part of intervention evaluation rather than as noise [21]. Attendance alone cannot infer cultural responsiveness. The three interpreter-assisted interviews, adaptation records, and contrasting cases indicated that acceptable delivery depended on local meanings of voice, bodily visibility, image-making, touch, improvisation, and disclosure. Reproduction in other settings requires transparent adaptation rather than unmodified transfer.

The streamlined outcome set concentrated resources on distress, well-being, functioning, social connection, sleep, implementation, and safety. The findings do not support claims that arts programs replace psychotherapy, medication, social care, or crisis services. Their relevance lies in providing supervised complementary options for adults whose mild-to-moderate distress is linked with withdrawal, disrupted routine, loneliness, or reduced agency. Offer visual and performing components separately when preference or accessibility suggests a clearer fit, while combined delivery may suit participants who value modality choice and can tolerate transitions.

VI. LIMITATIONS

Several limitations temper interpretation. Participants and facilitators could not be blinded, most outcomes were self-reported, and arts and control facilitators differed in professional background. Although we preserved module dose, the alternating order may have influenced fatigue, priming, or carry-over, particularly in the combined cell. The study was powered primarily for minimally important factorial main effects and not for small interactions, confirmatory mediation, moderator families, or condition-specific process models. Only three centers, 28 groups, and 12 part-time facilitators contributed, limiting precision at the center and facilitator levels and restricting generalisability. Creative self-efficacy and supplementary belonging items require further validation in diverse clinical populations despite acceptable reliability in this sample. Removing the three-month assessment reduced participant burden but limited resolution of early post-program change, while remote 12-month collection may have introduced mode effects. Attrition reached 20% by 12 months, although multiple imputation and sensitivity analyses were consistent. The findings apply primarily to supervised adults aged 18–65 years with mild-to-moderate distress who could participate safely in accessible community, primary-care, or arts-in-health settings.

VII. CONCLUSION

Within a pragmatic three-center 2×2 factorial design, visual-arts and performing-arts components each produced average improvements in psychological distress and mental well-being beyond matched social-wellbeing programming. Both factors met the prespecified co-primary decision rule. The reduced sample was intentionally powered for factorial main effects of approximately d=0.30; interaction, mediation, moderator, and subgroup analyses remained exploratory. The combined cell achieved the most favourable means and response probabilities, but wide interaction intervals did not demonstrate synergy or universal superiority. Secondary outcomes and Framework Analysis suggested partially differentiated emphases: visual arts supported symbolic organization and creative confidence, whereas performing arts supported activity, shared timing, and group identification. These processes overlapped and were shaped by facilitator skill, alliance, cultural relevance, accessibility, and participant preference. Benefits attenuated but remained detectable at the remotely collected 12-month assessment. For adults with mild-to-moderate distress who can participate safely in supervised settings, manualized visual and performing arts represent credible complementary options rather than replacements for indicated psychological, medical, or social care. Centralized recruitment, randomization, electronic data collection, and masked assessment made the reduced trial feasible without removing allocation concealment, fidelity monitoring, safety procedures, or longitudinal follow-up. The methodological contribution lies in preserving rigorous component-effect estimation within a resource-conscious design while stating clearly where inferential precision was insufficient.

Author Contributions

The author conducted the conceptualization, methodology, data analysis, investigation, writing, review, editing, and final approval of the manuscript.

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Data Availability

The dataset will be available from the author upon reasonable request.

Conflicts of Interest

The author declares no conflict of interest.

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