

The WellSing Project

An Investigation into the
Effect of Individual Online
Singing for Well-Being on
Emergency Service
Personnel with
Post-traumatic Stress
Disorder.

Dannielle O'Keefe
The Voice Study Centre
University of Wales Trinity Saint David

Context and Rationale

The Problem

- Emergency service personnel face high rates of PTSD due to occupational trauma - twice the rate of the general population (Kyron *et al.*, 2023).
- Traditional therapies have low uptake due to stigma, accessibility, cost and motivation (Sayer *et al.*, 2009).
- Yet 39% of individuals with PTSD use complementary therapies including mind-body practices (Kim *et al.*, 2013).
- Avoidance of people, places and activities (Ophir *et al.*, 2020).
- Potential for maladaptive trauma comparisons in group therapies (Rudstam, 2023).

Professional Practice Context

- Music is an established tool for promoting well-being in individuals with psychological disorders including depression (Petchkovsky *et al.*, 2013), anxiety (Hetland *et al.*, 2015) and Bensimon *et al.*, 2008).
- Singing for well-being is an emerging field with documented therapeutic benefits offering a low-barrier, non-clinical intervention (Jones *et al.*, 2020).
- Singing engages parasympathetic nervous system (Perry *et al.*, 2016), normalises cortisol (Fancourt *et al.*, 2016), enhances cognitive and emotional control (Perry *et al.*, 2023) and enhances emotional expression (Legace *et al.*, 2015).

Context and Rationale

Justification

- Integrating evidence-based vocal pedagogy (Sousa *et al.*, 2020) and digital health solutions (Alqahtani *et al.*, 2021).
- Independent - Self-Administered - Online Delivered.
- Transparent and standardised intervention (Wei *et al.*, 2024).
- Accessible, cost effective, less stigmatising modality (Nowakowska *et al.*, 2019).

Research Aim

To provide a transparent basis for standardised vocal pedagogy intervention and to investigate its effect on mental health and well-being, serving the unique needs of emergency service personnel with post-traumatic stress disorder.

Overarching Research Question

To what extent does participation in a self-directed online vocal pedagogy program impact the mental health and well-being of emergency service personnel with a diagnosis of post-traumatic stress disorder (PTSD)?

Research Design

A pragmatic, sequential mixed-methods approach using a quasi-experimental design.

Research Design

Phase 1: Narrative Literature Review

Phase 2: Quasi-Experimental Research

Phase 3: Unstructured Participant Interviews

Research Design

Phase 1: Narrative Literature Review

Evidence-based vocal pedagogy practice:

- reduce anxiety (Subramanian *et al.*, 2023)
- enhance interoceptive awareness (Hegberg *et al.*, 2019)
- address symptomatic vocal quality issues associated with PTSD (Scherer *et al.*, 2013)

Theoretical Framework

- Self-Determination Theory (Deci and Ryan, 2000)
- Flow Theory (Csikszentmihalyi, 1991).

Learning Domains

- Benefits of regulated breathing
- Benefits of voice-based movement
- Benefits of voice exercises

Research Design

Phase 2 - Quasi-Experimental Research

Design

Sequential mixed-methods, repeated measure design (within-subject factors):

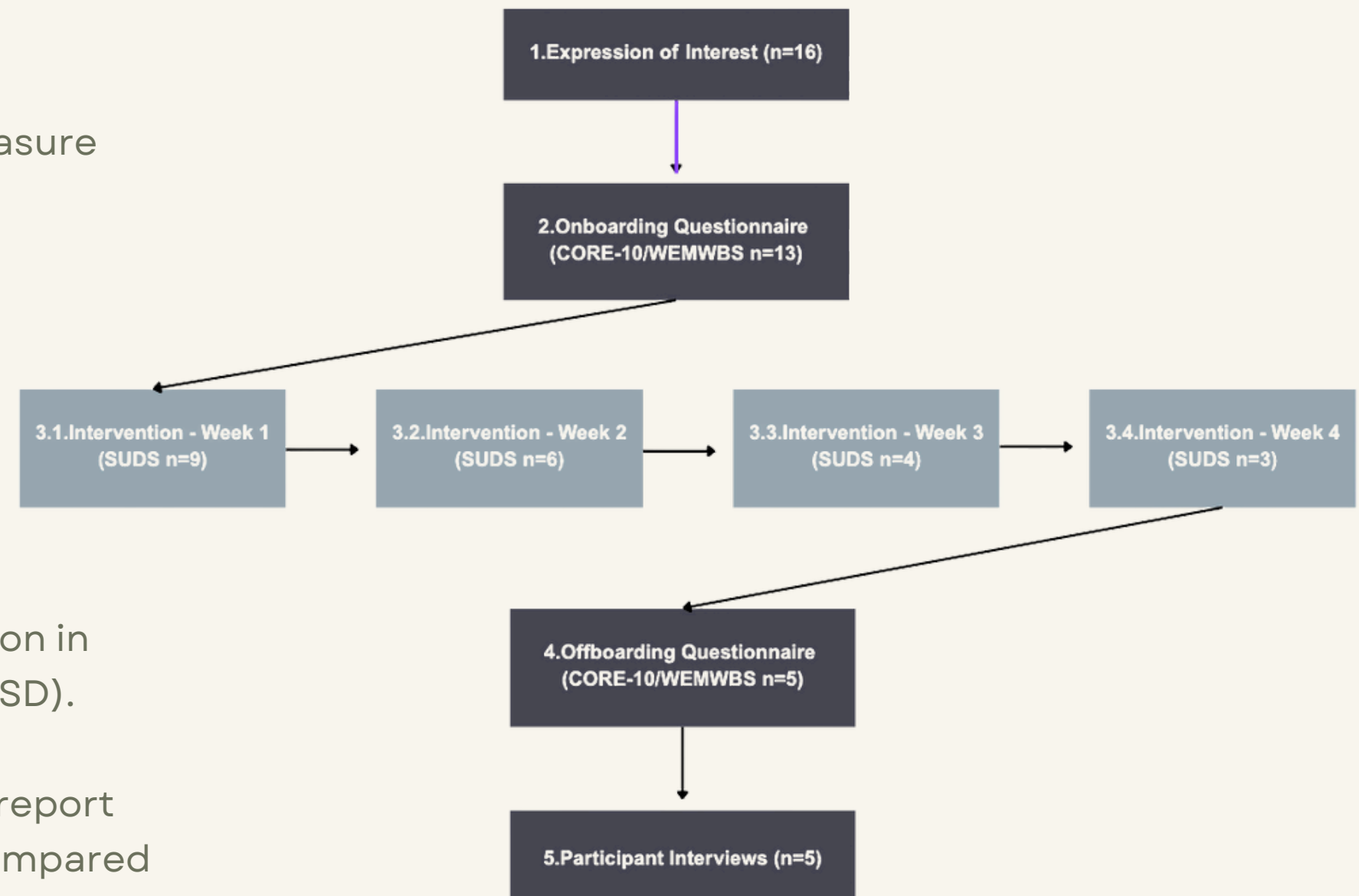
- Group 1 (PTSD)
- Group 2 (Non-PTSD)

Both groups received intervention.

Hypotheses:

H1: Post-intervention, Group 1 (PTSD) will demonstrate significantly greater reduction in CORE-10 compared with Group 2 (Non-PTSD).

H2: Post-intervention, Group 1 (PTSD) will report significantly higher scores in WEMWBS compared with Group 2 (Non-PTSD).



Measures

Critical Outcomes in Evaluation (CORE-10)

- 10-item scale designed to assess psychological distress in routine mental health care (Connell *et al.*, 2007).
- Excellent validity and utility in practical assessments (Clift *et al.*, 2017).
- Routinely used in singing for mental health research (Williams *et al.*, 2018).

Warwick Edinburgh Mental Health Well-Being Scale (WEMWBS)

- 14-item scale designed to measure positive aspect of subjective well-being (Tennet *et al.*, 2007).
- Assesses eudaimonic and hedonic aspects of well-being (Ryan and Deci, 2001).
- Routinely used in singing for well-being research (Fancourt, 2019).

Subjective Units of Distress (SUDS)

- Self-report measure of subjective distress, anxiety and fear in real-time (Wolpe, 1968).
- Frequently used in exposure treatments for PTSD (Levy and Radomsky, 2014).
- Notable psychometric limitations (Mattera and Zaboski, 2025).
- Represented as continuum of 10 stars completed pre- and post-intervention (Shapira *et al.*, 2022).

Research Design

Phase 3- Unstructured Participant Interviews

Purpose

- Broader understanding of participant experience.
- Gain insight into specific needs of the population being studied.

Process

- Conducted via phone.
- Recorded on iPhone after confirming consent.
- Transcribed including pauses for accurate representation (Rigor and Sigurvinsdottir, 2016).
- Broad questions introduced to aid participants (semi-structured).

Analysis

- Inductive Thematic analysis using Nvivo software (Rigor and Sigurvinsdottir, 2016).

An Ethical Approach

Ethical Considerations:

- Ethical approval granted by Wales Academy of Professional Practice (UWTSD) on 3rd February, 2025
- 'Vulnerable persons' (NHMRC, 2023) - Capable of informed consent.
- Mitigate potential distress:
 - Remote participation.
 - Self-administration.
 - Withdrawal.
 - Participant Information Sheet - 24/7 welfare services.
 - Consent Form - Informed Consent.
- Data security
 - Only essential information requested from participants.
 - Data stored on secure password protected device within a two-factor authenticated cloud storage repository.
 - Data accessible to primary researcher only.

A Reflective Approach

The Insider Researcher:

Benefits

- Access to difficult to reach participant group.
- Swift rapport and trust building.
- Deeper, nuanced understanding of subject matter (Scott, 2022).

Challenges

- Necessity for rigorous reflexivity to remain objective (Chammas, 2020).
- Balancing empathetic understanding and critical detachment (Asselin, 2003)
- Mitigation strategies:
 - Disciplined self-reflection process.
 - Regular supervision sessions.
 - Clear boundaries established with participants.

The WellSing Project

Intervention

- Concurrent participation across 4 weeks.
- 1 x 45 minute singing session per week.
- Short questionnaire (SUDS pre- and post-session).
- Minimum duration for efficacious outcomes (Bind *et al.*, 2023).
- Reduce disengagement (Bind *et al.*, 2023).
- Online delivery.

Content

- Week 1 - Voice Foundations: Breathing and Posture
- Week 2 - Voice Foundations: Phonation and Movement
- Week 3 - Voice Foundations: Resonance and Vocalisation
- Week 4 - Voice Foundations: Articulation and Performance

Influences

- Accent Method Breathing.
- Alexander Technique.
- Semi-occluded Vocal Tract Exercises.
- Traditional Vocal Warm Up (Marchesi, 1970).

The Participants

Participant Code	Gender	Age	Service	PTSD Diagnosis	Voice
17708	Male	50-59 years	Police	Yes	Baritone
12119	Female	30-39 years	Police	Yes	Alto
19295	Male	40-49 years	Police, Military	Yes	Tenor
13517	Female	50-59 years	Ambulance	Yes	Alto
18754	Male	50-59 years	Police, Fire	Yes	Tenor
12393	Female	50-59 years	Police	No	Alto
13013	Male	50-59 years	Police	Yes	Baritone
17800	Female	40-49 years	Police	Yes	Alto
16030	Female	40-49 years	Police	No	Alto
15257	Male	60-69 years	Police, Military	Yes	Baritone
18088	Female	40-49 years	Police	Yes	Alto
12643	Male	60-69 years	Police	Yes	Baritone
17541	Female	60-69 years	Police	No	Alto

Participant
Withdrawal

Quantitative Analysis

Dataset

- Only participants who completed all elements of the intervention ($n=5$).
- Only PTSD participants completed all elements.
- Amended Hypotheses:
 - H1: Participants will show a statistically significant decrease in CORE-10 score from pre-intervention to post-intervention.
 - H2: Participants will show a statistically significant increase in WEMWBS scores from pre-intervention to post-intervention.

Assumption Testing

- No missing data / outliers identified (Baker, 2018).
- Statistical significance ($p=0.05$) and power at 80% (Field, 2009).
- CORE-10 pre-intervention and post-intervention data satisfied assumptions (Kolmogorov-Smirnov Test $p=1$; Shapiro-Wilk $p=0.99$).
- WEMWBS pre-intervention data returned contradictory results (Kolmogorov-Smirnov Test $p=0.411$; Shapiro-Wilk $p=0.16$).
- WEMWBS Post-Intervention data satisfied assumptions (Kolmogorov-Smirnov Test $p=0.699$; Shapiro-Wilk $p=0.147$).
- Non-parametric testing for WEMWBS.

Quantitative Analysis

CORE-10

One-Tailed t-Test
Not statistically significant
($t(4)=0.8, p=0.235$)
Null Hypothesis
NOT REJECTED

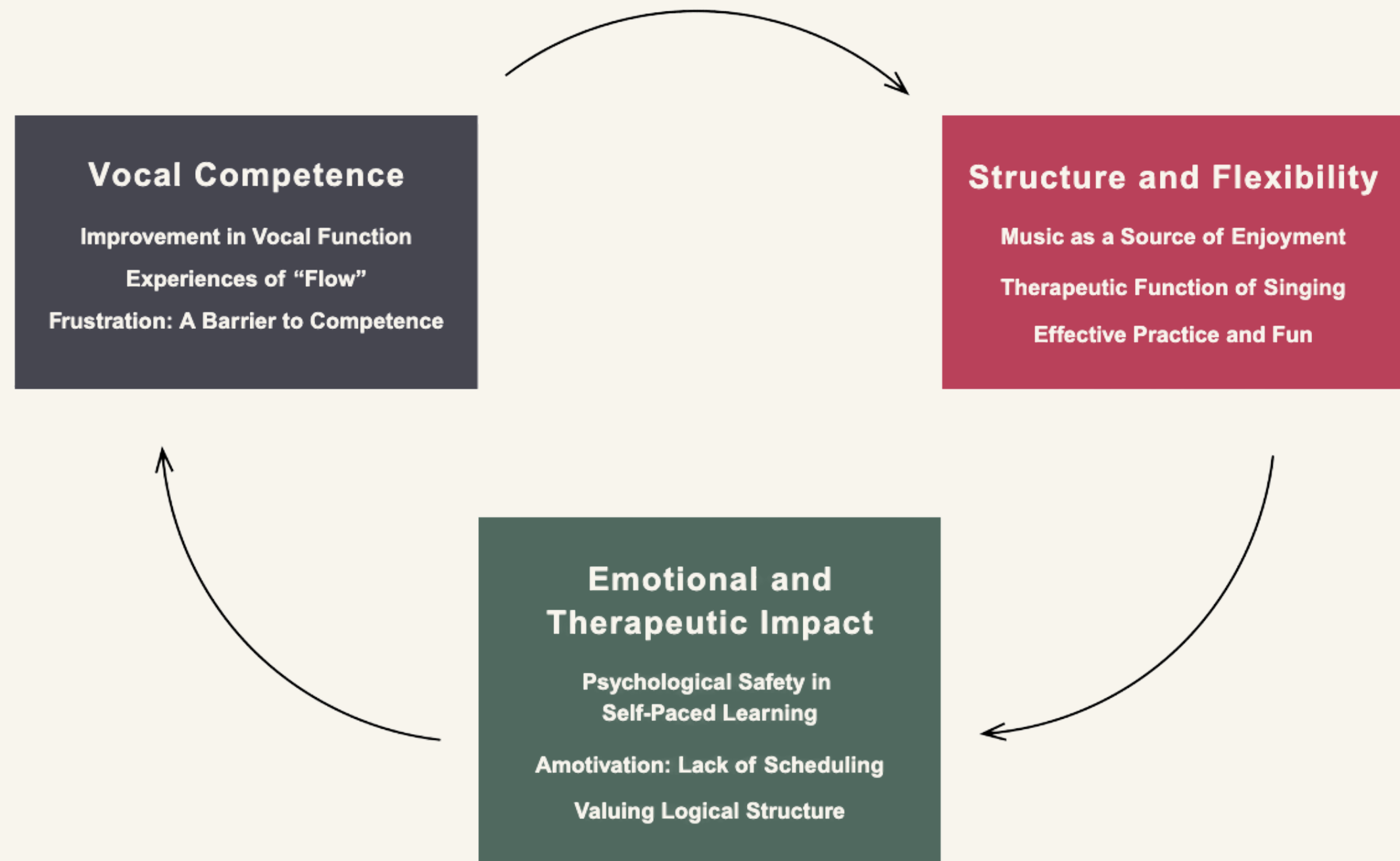
WEMWBS

Wilcoxon Signed Rank Test
Not statistically significant
($W=1, p=0.078$)
Null Hypothesis
NOT REJECTED

SUDS

Incomplete Data
Mean Ratings show:
Decrease in distress (2 points)
Weeks 2 and 4.
Slight increase in distress
(0.1-0.5 points) in
Weeks 1 and 3.

Qualitative Analysis



Discussion

Autonomic Support (Johansen et al., 2023)

- Complete the intervention in “my own time” and “when I was in the right mindset” was crucial to engagement and enjoyment, preventing it from becoming a “burden” (Participant 17800).

Amotivation (Johansen et al., 2023)

- Lack of “set appointment time” led to feelings of being “overwhelmed” and “flustered” resulting in a reluctance to start the program.
- Perceived lack of “leisure time” (Participant 18088).
- Thwarting of autonomy - freedom to choose becomes a pressure to perform (Johansen et al., 2023).

Competence and Flow (Csikszentmihalyi, 1991)

- Vocal exercises “extremely frustrating” and feelings of “just making noise” (Participant 17541).
- Twarted sense of competence, potentially leading to anxiety and disengagement.
- Improvements in vocal function “my speaking abilities improved 100%” because “I started to mumble quite a bit... the singing has actually improved that for me a lot” (Participant 12643).
- “I don’t mumble and talk too quickly... those things really aided in my communication from a physical sense” (Participant 19295).
- “Your’re actually not thinking about the bad things that happened in the past, you’re concentrating on what you’re doing” (Participant 12643).

Discussion

Emotional Impact

- “Uplifting” songs (Participant 17800).
- “Concentrating on breathing” is of benefit (Participant 19295).
- “It reiterated that music and singing is very emotional” (Participant 17800).
- In safety of their own home they could “feel vulnerable and...let it go” (Participant 17800).
- Self-consciousness was overcome as “it was just for me” and “there was no judgement” (Participant 17541).

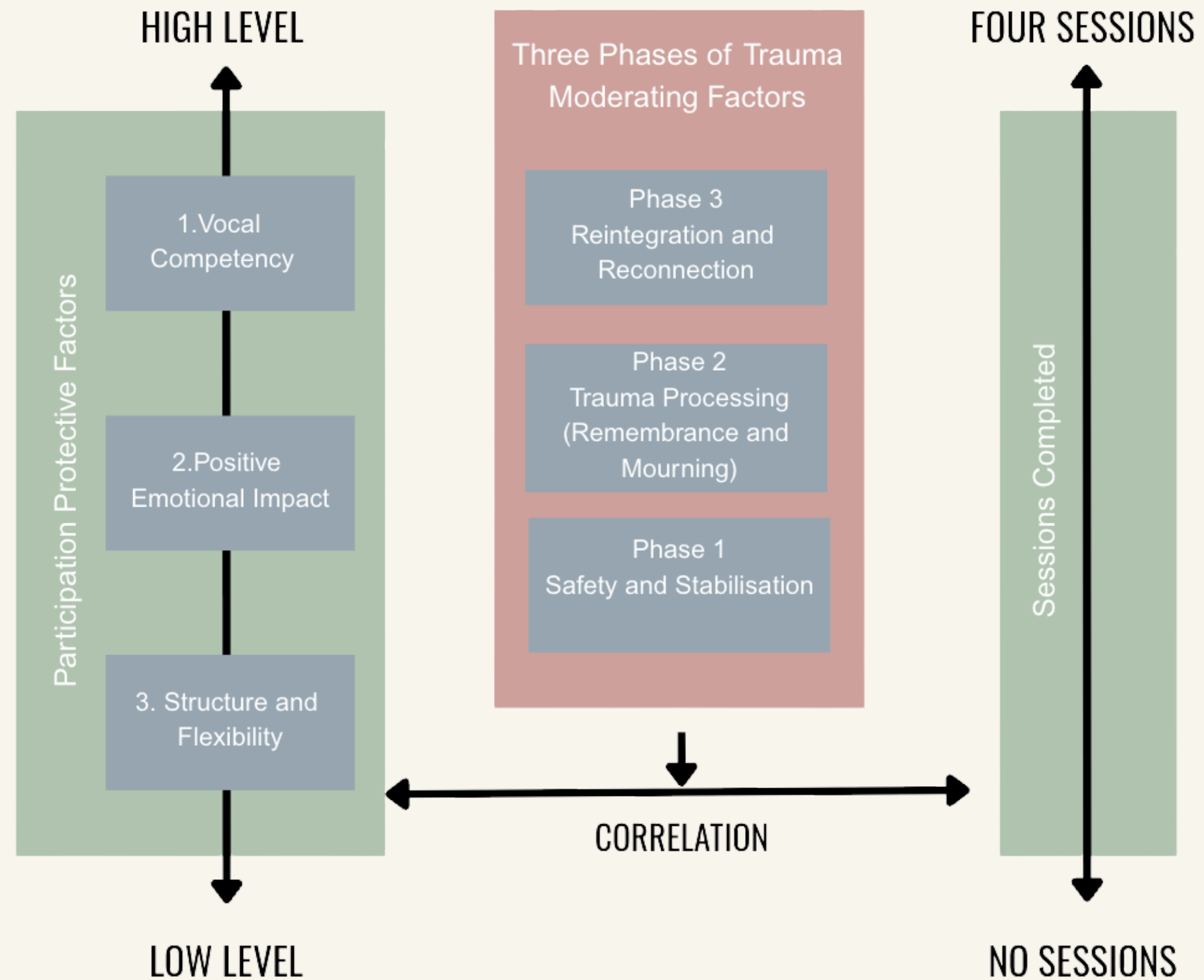
Group versus Independent

- “I probably would’ve felt a lot more self-conscious in a group” (Participant 17541).
- “I would have been a bit shy” and “wouldn’t have done that with other people” (Participant 18088).

Recovery Phase

- Three-Phase Trauma Recovery Model (Herman, 1992)
 - Phase 1: Safety and Stabilisation
 - Phase 2: Trauma Processing - Remembering and Mourning
 - Phase 3: Reintegration and Reconnection
- The WellSing Project requires a level of emotional and physical stability that may not be accessible in earlier recovery phases (1 and 2).
- Optimally positioned within third phase: Reintegration and Reconnection.
- Rebuilding trust, sense of identity and community engagement.
- Crucial for maximising therapeutic benefits whilst safeguarding well-being.

Integrated Model



Limitations & Recommendations

Limitations

- Small sample size precluding comparison between groups (Bind *et al.*, 2023).
- Cannot definitively attribute observed changes to singing activity itself.
- High attrition rate.
- Participants may have felt overwhelmed by the program's design rather than by the content.
- Four-week duration may have been insufficient to alter perception of well-being (Lord *et al.*, 2010).

Recommendations

- Larger, more diverse sample size from various emergency services.
- Incorporate objective data eg. bio-markers (Fancourt *et al.*, 2016).
- Recruitment or onboarding should consider participants stage of recovery.
- CORE-10 and WEMWBS limitations with non-normal distributions of small datasets.
- More robust method determining participant vocal range.

Reflections

Difficult to empathetically disengage, particularly in participant interviews.

The technical requirements of content curation and creation, including video production and editing, proved to be a steep learning curve and a challenge to complete within the allocated timeframe.

Pragmatic perspective allowed me to integrate compassion and empathy into the research framework.

Personal experience with PTSD informed a key conceptual shift, reframing participant non-adherence and incomplete data as valuable insights into the real-world feasibility and barriers to participation, rather than a personal failure.

The WellSing Project

The success of The WellSing Project may best be described by
Participant 17800:

“I felt respected with my PTSD. I definately didn’t feel any judgement... I felt respected because it was aimed at people with PTSD. It was being respected for, just, what’s happened to me in my life and again singing is a passion for me. It really spoke to me.”

Thank you.