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## Trauma-focused Group Music and Imagery with Women Suffering from PTSD or CPTSD

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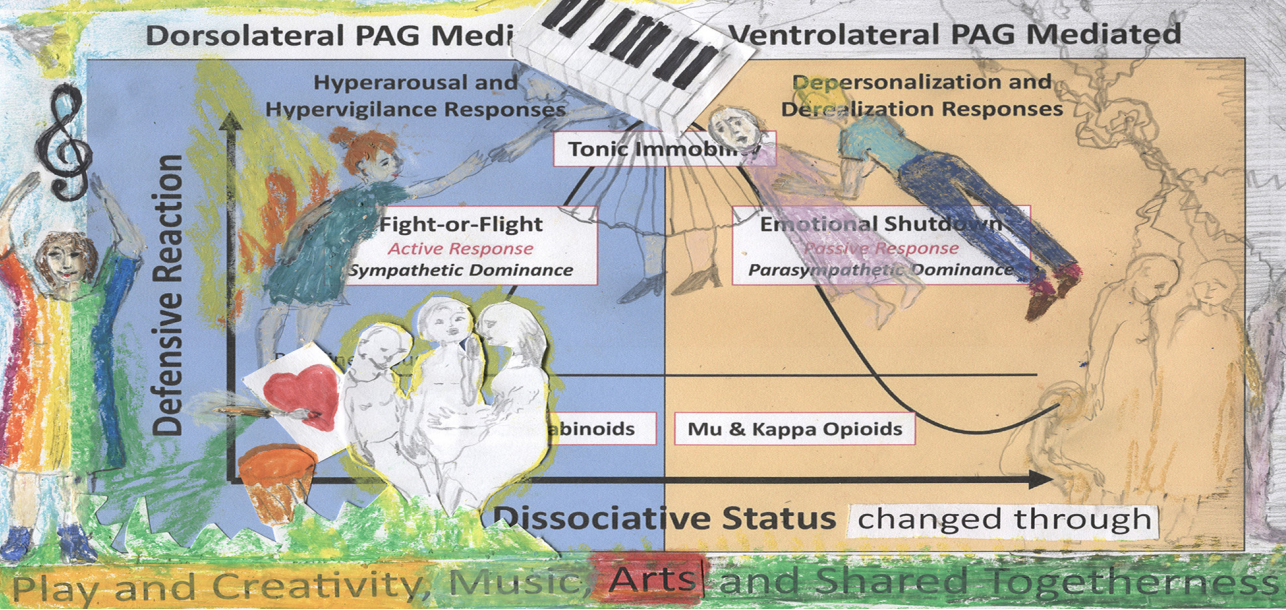
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# TRAUMA-FOCUSED GROUP MUSIC AND IMAGERY WITH WOMEN SUFFERING FROM PTSD OR CPTSD

A RANDOMIZED CONTROLLED STUDY

BY  
GABRIELLA RUDSTAM

DISSERTATION SUBMITTED 2023



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# **TRAUMA-FOCUSED GROUP MUSIC AND IMAGERY WITH WOMEN SUFFERING FROM PTSD OR CPTSD**

**A RANDOMIZED CONTROLLED STUDY**

by

Gabriella Rudstam



**AALBORG UNIVERSITY**  
DENMARK

Dissertation submitted

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## CV

Gabriella Rudstam (1958) is a Lic. Psychotherapist and Supervisor specialising in trauma and dissociation. She is also a Music Therapist, cert. Expressive Arts therapist, BMGIM therapist, EMDR consultant and Somatic Experiencing practitioner. She is trained in clinical hypnosis, psychodrama and structural dissociation. Gabriella has worked in psychiatry as a music and expressive arts therapist since the 1990s and at the Crisis and Trauma Centre in Stockholm since 2007. Over the years, she has also worked as a teacher and supervisor on the music therapy programme at the Royal College of Music in Stockholm and supervised at the Swedish GIM course. Gabriella now works as a psychotherapist on behalf of the Sörmland County Council, supervises the expressive arts programme at the Expressive Arts Institute and lectures at the clinical hypnosis course in Stockholm. She has a small private practice.





# ENGLISH SUMMARY

**Background:** Meta-analyses report that Cognitive Behavior Therapy (CBT), together with Eye Movement Desensitization and Reprocessing (EMDR), are the most studied and recommended treatments for PTSD. Most studies have focused on individual treatment and only a few on group psychotherapy treatments. The lack of randomized controlled studies on arts-based psychotherapy methods results in them not being recommended as viable treatments for trauma-related disturbances, even though case studies and qualitative studies have shown that they are helpful and appreciated by clients.

**Aim:** This PhD study aimed to investigate the efficacy of an arts-based psychotherapy method, phase-based trauma-focused Group Music and Imagery (Tf-GrpMI), in the treatment of women suffering from PTSD or CPTSD after being exposed to interpersonal trauma with physical, psychological and/or sexual abuse in childhood and/or adulthood.

**Method:** The PhD study was divided into two parts. Part one was a feasibility study using a mixed method design with repeated measurements and a qualitative analysis inspired by thematic analysis of the semi-structured interviews conducted after the treatment period ended. The feasibility study had a sample size of ( $n = 10$ ). Part two was a randomized controlled study (RCT) with a parallel group design, treatment group versus waiting list control (WLC) group. The sample size was ( $n = 45$ ). The participants received 12 weekly Tf-GrpMI sessions of 2,5 hours in length. They filled in self-rating scales before and after the intervention and at a three-month follow-up. The primary outcome was the treatment's efficacy on PTSD symptoms, measured with the checklist for DSM-5 (PCL-5) self-report scale. Secondary outcomes were anxiety, depression, dissociation, quality of life and the specific symptoms that, in addition to PTSD symptoms, are related to CPTSD, the disturbances in self-organization (DSO) symptoms: negative self-concept, affect dysregulation, and problems in relationships. Physiological measures of heart rate (HR), heart rate variability (HRV) and skin conductance (SC) were obtained before and after the intervention using a script-driven imagery method.

**Result:** Both the feasibility study and the RCT showed a significant reduction in PTSD symptoms, with large effect sizes (ES) as measured with Cohen's *d*. The secondary outcomes also changed significantly in a favourable direction with a medium to large ES. All the changes were sustained at the three months follow-up. The physiological measures showed a decreased HR and SC reactivity and an increased HRV after treatment compared to the WLC group. The results from semi-

structured interviews in the feasibility study implied that the treatment was acceptable and that the participants felt helped by the arts-based psychotherapy method.

**Conclusion:** The findings indicate that Tf-GrpMI is a promising group psychotherapy method for women suffering from PTSD or CPTSD due to interpersonal trauma. However, further studies are warranted to support the results.

# DANSK RESUME

**Baggrund:** Meta-analyser rapporterer, at kognitiv adfærdsterapi (CBT) sammen med eye movement desensitisation reprocessing (EMDR) er de mest undersøgte og anbefalede behandlinger for posttraumatisk stress-syndrom (PTSD). De fleste systematiske oversigtsartikler har fokuseret på individuel behandling, og kun få på gruppepsykoterapibehandlinger. Manglen på randomiserede kontrollerede studier af kunstbaserede psykoterapimetoder resulterer i, at disse ikke anbefales som evidensbaserede behandlinger for traumerelaterede forstyrrelser, selvom casestudier og kvalitative studier har vist, at de er hjælpsomme og værdsatte af klienter.

**Formål:** Dette ph.d.-studie havde til formål at undersøge effekten af den kunstterapeutiske fase-opdelte psykoterapimetode Traumefokuseret musik og billeddannelse i gruppe (Traumafocused Group Music and Imagery; Tf-GrpMI) som behandlingsform til kvinder, der lider af PTSD eller kompleks PTSD (CPTSD) efter at være blevet udsat for interpersonelle traumer med fysiske, psykiske og/eller seksuelle overgreb i barndommen og/eller voksenalderen.

**Metode:** Ph.d.-studiet var opdelt i to dele. Første del var et feasibility-studie med brug af et mixed methods design med gentagne målinger og en tematisk analyse af semistrukturerede interviews udført efter behandlingsperiodens afslutning. Undersøgelsen inkluderede 10 deltagere. Anden del var et randomiseret kontrolleret studie (RCT) med et parallelgruppedesign: behandlingsgruppe (T) versus ventelistekontrol (WLC) gruppe. Deltagerne ( $n = 45$ ) modtog 12 ugentlige Tf-GrpMI-sessioner af 2,5 timers længde. De udfyldte spørgeskemaer før og efter interventionen og ved en tre måneders opfølgning. Det primære mål var behandlingens effekt på PTSD-symptomer, målt med PTSD Checkliste for DSM-5 (PCL-5). Sekundære mål var angst, depression, dissociation, livskvalitet og de specifikke forstyrrelser i selvorganisering (DSO), der er relateret til CPTSD: negativ selvopfattelse, affektdysregulering og relationelle problemer. Fysiologiske mål for hjertefrekvens (HR), hjertefrekvensvariabilitet (HRV) og hudledningsevne (SC) blev indsamlet før og efter interventionen ved hjælp af en script-drevet billedannelsesmetode.

**Resultater:** Både feasibility studiet og det randomiserede kontrollerede studie viste en signifikant reduktion af PTSD-symptomer med store effektstørrelser (ES) målt med Cohens  $d$ . De sekundære resultater ændrede sig også signifikant i en gunstig retning med en mellemstor till stor ES. Alle ændringerne var stadig opretholdt ifølge follow-up målinger efter tre måneder. De fysiologiske mål viste en nedsat HR- og SC-reaktivitet og en øget HRV efter behandling sammenlignet med WLC-gruppen. Analysen af de semistrukturerede interviews i feasibility-undersøgelsen viste at behandlingen var acceptabel, og at deltagerne følte sig hjulpet af den kunst-baserede psykoterapimetode.



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My appreciation goes to Dag Krlin, who recently passed away. He has been a great source of inspiration for this research. He was my supervisor for several years when I started my carrier as a music therapist in psychiatry, and we worked together at Spectrum, a clinic for trauma-related disorders. I am also grateful to Margareta Wårja, who has accompanied me on my path for many years as an inspiring teacher, supervisor, colleague and friend and encouraged me to apply to Aalborg for my PhD. I would like to thank Fran Goldberg for her deep wisdom and clarity while leading me into the mysterious world of GIM as my primary trainer and Lisa Summer for her clear-minded contributions to the training.

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# ABBREVIATIONS

ANOVA	Analysis of Variance
ANS	Autonomic Nervous System
BL	(Relaxation) Baseline
CAPS	Clinician administered PTSD scale
CAT	Creative Arts Therapy
CBT	Cognitive Behavioural Therapy
CPTSD	Complex Posttraumatic Stress Disorder
DSM-5	Diagnostic and Statistical Manual for Diagnosis of Mental Disorders, 5th edition.
DSO	Disturbances in Self-Organization
DVC	Dorsal Vagal Complex
EBT	Evidence-based Therapy
ECG	Electrocardiogram
EMDR	Eye Movement Desensitization and Reprocessing
EMG	Electromyography
ES	Effect Size
EXA	Expressive Arts Therapy
FFT	Fast Fourier Transform
FT	Finger temperature
GMT	Group Music Therapy
GrpMI	Group Music and Imagery
HF	Power in the High-Frequency band of the HRV spectrum, between 0.15–0.40 Hz ( $ms^2$ ).
HR	Heart Rate (bpm)
HRV	Heart Rate Variability ( $ms^2$ )
IBI	Inter-Beat Interval
IIR	Infinite Impulse Response (filter)

LF	Power in the Low-Frequency band of the HRV spectrum, between 0.04–0.15 Hz ( $\text{ms}^2$ ).
LF/HF	Low-to-high frequency power ratio, used as an index of sympathovagal balance.
LME	Linear mixed effect model
MT	Music Therapy
NS-SCR	Non-specific Skin Conductance Responses
PCL-5	Posttraumatic Stress Disorder Checklist for DSM-5
PE	Prolonged Exposure
PNS	Parasympathetic Nervous System
PTSD	Posttraumatic Stress Disorder
RDoC	Research Domain Criteria
RMSSD	Root mean square of successive inter-beat differences
RoDC	Rate of Diagnostic Change
RSDI	Response to script-driven imagery scale
SC	Skin Conductance
SCL	Skin Conductance Level
SDI	Script-Driven Imagery
SNS	Sympathetic Nervous System
SUD	Subjective units of distress/disturbance
T	Treatment group
Tf-GrpMI	Trauma-focused GrpMI
TS	Trauma Script
VRE	Virtual Reality Exposure
VVC	Ventral Vagal Complex
WoT	Window of Tolerance
WLC	Waitlist control group

# CHAPTER 1. INTRODUCTION

This PhD thesis aimed to explore the efficacy of a phase-based trauma-focused intervention with Group Music and Imagery (Tf-GrpMI) and expressive arts as an alternative approach to the established and recommended therapy methods in the treatment of women that have been exposed to interpersonal violence (i.e. psychological, physical and or sexual abuse) leading to post-traumatic stress disorder (PTSD) or complex PTSD. The study has an embedded mixed method design with a small qualitative part nested in a larger quantitative part (Creswell, 2014).

## 1.1. PERSONAL MOTIVATION

Cloitre (2015), a well-known professor, researcher and clinician in the field of trauma, raised an important question in today's trauma treatments. Should one form of therapy fit all patients? Or can it also be valuable to take into account patients' preferences? Maybe different types of therapies suit different people and different types of trauma. Having worked in the field of trauma for many years, I recognise these questions and have repeatedly witnessed how well-functioning trauma clinics with innovative therapies (such as various forms of arts and bodily-based psychotherapies) where patients felt helped have been closed down due to guidelines recommending evidence-based treatments (EBT) based on the results of randomized controlled trials (RCTs). Since over 70% of all RCTs include cognitive behavioural therapy (CBT), CBT has become the recommended first-line treatment (American Psychological Association, 2017; Forbes, 2020; World Health Organization, 2013). However, in my experience, not everyone benefits from CBT, especially not the more complex traumatised clients and more RCTs are needed to investigate the effectiveness of other trauma treatments, which motivated me to start this PhD project.

I began my carrier as a young music therapist in a residential treatment centre for young adult psychotic patients. It was a place open for new ideas, and they wanted to try music therapy. The centre was later closed for unclear reasons. I continued working as a music therapist in a psychiatric outpatient unit, completed my training as an expressive arts therapist, and became a licensed psychotherapist. The psychiatrist and GIM therapist Dag Körlin started a clinic for trauma-related disorders, which was called Spectrum. He asked me if I was interested in working there, and I said yes. During that time, I trained in the Bonny Method of Guided Imagery and Music (BMGIM). I worked at Spectrum for ten years, and we worked with a group programme developed and researched by Dr Dag Körlin (Körlin, 2005). The programme consisted of many different types of groups: expressive arts, art, dance and movement groups, cognitive groups, psychodynamic groups, GIM groups, art therapy groups, and I had the opportunity to lead several of these groups. It was an exciting and inspiring time, with much learning. However, shortly after Dag finished

his doctoral thesis, Spectrum was cancelled for unclear reasons. Our way of working was perhaps not in line with current guidelines.

I continued my work at the Crisis and Trauma Centre (KTC) in Stockholm, led by Psychiatrist Hans Peter Söndergaard and Lic. Psychologist Luis Ramos. The primary patient group were refugees with war and torture trauma, but we also worked with traumatised Swedish citizens and received many referrals of women who had been traumatised in violent relationships and often carried a history of childhood trauma. I learnt a lot at KTC and received training in Structural Dissociation, EMDR and Internal Family Systems. KTC was at the forefront of trauma therapy in Sweden and held annual conferences with the latest in the field of trauma. It was a place with many possibilities and also a research centre. I did my master's thesis (my GIM project) using music breathing (MB) and group music and imagery (GrpMI) in stabilisation groups for female refugees, a qualitative study based on grounded theory. At that time, I also became a Somatic Experiencing Practitioner since I was interested in deepening my knowledge of bottom-up and body-oriented techniques.

All these experiences and trainings have influenced this PhD project, which aims to investigate how music, imagery and expressive art methods affect the post-traumatic stress symptoms of traumatised clients. Having concentrated on the stabilisation phase in my master's thesis, I wanted to explore whether GrpMI could also be effective for trauma treatment. Knowing there was a need for RCT studies in our field, I decided it was the right way to go and started my research project on trauma-focused group music and imagery for women suffering from PTSD or CPTSD caused by interpersonal trauma.

I was lucky to have a colleague at KTC, Ingrid Hogan, a Lic. Psychologist who was also a BMGIM therapist trained in expressive arts. She became my co-therapist, and we held several pilot groups to develop the flexible manual used in the RCT. She continued to be my co-therapist throughout the whole RCT. Moreover, a talented biologist and software programmer at the centre interested in physiology, Ulf Elofsson, helped me set up the physiological measurements and how to conduct the statistical data analyses.

Unfortunately, I once again faced cancellation. The Crisis and Trauma Centre, where the research was located, was closed in favour of more CBT-oriented clinics. I still managed to collect enough data to complete my research, and I hope this work will contribute to seeking and enhancing knowledge concerning the arts-based psychotherapy methods as valuable tools in trauma treatment. So to close the circle, as Cloitre states in her article (2015), “The One size fits all approach to trauma-treatment—should we be satisfied?” My subjective meaning is NO, but what does the research say?

The following section will provide an overview of the PhD thesis.

## 1.2. OVERVIEW OF CONTENT

The linking text in this article-based PhD thesis is divided into seven chapters.

**Chapter 1. INTRODUCTION:** Presents the structure of the thesis, the articles involved and personal motivation.

**Chapter 2. BACKGROUND:** Presents background for this study. Post-Traumatic Stress (PTSD) and Complex Post-Traumatic Stress (CPTSD) are explained together with the prevalence of the disorders. There is also a review of commonly used treatment modalities, including Guided Imagery and Music (GIM) and Expressive Arts (EXA), and a deepened theory background concerning psychotraumatology.

**Chapter 3. LITERATURE REVIEW:** Provides a literature review of the established therapy methods used to treat PTSD and CPTSD, both groups and individuals and explores their effectiveness. The review also examines how Music Therapy, GIM and Creative Arts have been used in trauma treatment.

**Chapter 4. AIMS AND RESEARCH QUESTIONS:** Presents the aims of the study, the research questions, epistemological perspectives, and in what specific article different research questions are addressed.

**Chapter 5. METHODS AND MEASURES:** Focuses on the methods and study design used to answer the research questions. It includes outcome measures, the research procedure, and the clinical treatment method.

**Chapter 6. RESULTS:** Summarizes the results from the articles, the feasibility study (Article 1), the randomized controlled study with self-rating scales (Article 2) and the second part of the randomized controlled study exploring physiological measurements, used as a complement to the self-rating scales to evaluate the treatment effect (Article 3).

**Chapter 7. DISCUSSION:** Results and findings related to the Research Questions are presented and discussed compared to other studies and linked to psychotraumatology. Limitations are presented and discussed, along with a conclusion and recommendations for future research.

### 1.3. LIST OF ARTICLES

This PhD thesis is based on the research described in the following articles.

- Article 1.** Rudstam, G., Elofsson, U., Søndergaard, H. P., Bonde, L. O., & Beck, B.D. (2017). **Trauma-focused music and imagery with women suffering from PTSD/complex PTSD: A feasibility study.** *Approaches: An Interdisciplinary Journal of Music Therapy*, Special Issue 9(2), 147–158. <https://approaches.gr/wp-content/uploads/2017/12/2-Approaches-9-2-2017-rudstam-a20171222.pdf>

This article explores the feasibility of using GrpMI and Expressive Arts in group treatment for women diagnosed with PTSD or CPTSD. The effects of the intervention on PTSD symptoms and dissociation are reported. It also explores the feasibility of using script-driven imagery and physiological measures to access this population's capacity to regulate the ANS. Furthermore, it contains the themes from a qualitative analysis of the semi-structured interviews done after the treatment period regarding how the women experienced participating in Tf-GrpMI.

- Article 2.** Rudstam, G., Elofsson, U. O. E., Søndergaard, H. P., Bonde, L. O., & Beck, B. D. (2022). **Trauma-focused Group Music and Imagery with women suffering from PTSD/complex PTSD: A randomized controlled study.** *European Journal of Trauma & Dissociation*, 6(3), 100277. <https://doi.org/10.1016/j.ejtd.2022.100277>

This article presents a randomized controlled trial comparing an active treatment group with a waiting list control group. Forty-five women diagnosed with PTSD or CPTSD were enrolled in the study, 22 in the active treatment group (T) and 23 in the waiting list control (WLC). The active treatment group got 12 sessions with Tf-GrpMI, while the waiting list group was used as a control. For ethical reasons, the WLC got the same treatment after having undergone a waiting control period of three months. Both groups did a follow-up assessment three months after treatment ended. The research was quantitative, using self-rating scales at pre, post and follow-up. Both within-group and between-group measurements are reported.

- Article 3.** Article 3. Rudstam, G., Elofsson, U. O. E., Søndergaard, H. P., & Beck, B. D. (2023). **Psychophysiological assessment of trauma-focused Group Music and Imagery therapy for women with PTSD/CPTSD, using script-driven imagery: A randomized study.** *European Journal of Trauma & Dissociation*, 7(4), 10035 <https://doi.org/10.1016/j.ejtd.2023.100353>



This article focuses on reporting the psychophysiological measurements recorded during a script-driven imagery procedure, pre and post-intervention, as a complement to the self-rating scales used in the RCT, for evaluating the efficacy of Tf-GrpMI. Moreover, correlations between changes in self-rated PTSD symptoms and psychophysiological biomarkers are presented.



# CHAPTER 2. BACKGROUND

## 2.1. WOMEN AND VIOLENCE

Psychological, physical, and sexual violence against women is a major public health problem. The World Health Organization (WHO) estimates that approximately 30% of women worldwide have been exposed to physical and sexual abuse during their lifetime. Intimate partner violence is the most prevalent. Around the world, 27% of women between 15–49 years reported being exposed to domestic violence (World Health Organization, 2021). An EU-wide survey from the European Union Agency for Fundamental Rights (FRA) showed a similar result, with one in three women reporting being exposed to violence since age 15. Of those, 31% had experienced physical abuse, 11% reported having been sexually abused (by a partner or non-partner), and 5% had been raped (European Union Agency for Fundamental Rights, 2015). In a Swedish survey, the prevalence of having been exposed to physical, sexual, and repeated psychological abuse after the age of 18 was explored in 20,000 randomly chosen men and women. The result showed that 20% of women and 8% of men had been exposed to repeated psychological abuse of a former or current partner, 14% of women and 5% of men had been physically abused, and 7% of women and 1% of men been sexually abused (Frenzel & Brottsförebyggande rådet, 2014). Another national public health survey in Sweden concluded that exposure to domestic violence was associated with a higher risk of attempting suicide (Dufort et al., 2015).

## 2.2. CHILDHOOD MALTREATMENT

Many women exposed to emotional, physical, or sexual abuse in adulthood also suffer from interpersonal childhood trauma. Maltreatment in childhood, rather than exposure to other stressors such as accidents or natural disasters, can often develop into psychopathologies such as major depression, anxiety disorders, or posttraumatic stress disorders. Around 45% of the population who have been childhood abuse victims are at risk for developing psychiatric disorders (Teicher & Samson, 2016). Characteristics of maltreatment in childhood are prolonged or repeated traumatic experiences that involve a betrayal of trust, usually by a caregiver. The maltreatment could be childhood emotional, physical or sexual abuse or emotional and physical neglect (Fisher, 2014; Teicher & Samson, 2013). Neuroimaging studies have reported alterations in brain structures in maltreated individuals, such as a reduced hippocampal volume (the limbic structure essential for the formation and retrieval of explicit memories), hyperreactivity in the amygdala (important for encoding implicit memory and detecting danger), reduced thickness in the corpus callosum (interhemispheric communication), and impaired functioning in the prefrontal cortex (a part of the brain crucial for information processing) (Teicher et al., 2016). These alterations make the maltreated individuals less capable of regulating their emotions,

understanding themselves, and adequately interpreting other people's thoughts and intentions, thus understanding when situations are safe or unsafe. Childhood maltreatment influences the brain's development which can be explained as the brain's adaptive way to protect the individual from threats and danger to facilitate survival. In other words, these individuals are driven by fear (Fisher, 2014; Gerge, 2020; Teicher & Samson, 2016).

### **2.3. POSTTRAUMATIC STRESS DISORDER**

Exposure to violence, especially from another human being, can increase the risk of developing PTSD. Per the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), individuals who suffer from PTSD have been exposed to death, threat of death, serious injury, or sexual violence through:

- (1) Directly experiencing the traumatic event(s).
- (2) Witnessing, in person, the event(s) as it occurred to others.
- (3) Learning that the traumatic event(s) occurred to a close family member or close friend. In cases of actual or threatened death of a family member or friend, the event(s) must have been violent or accidental.
- (4) Experiencing repeated or extreme exposure to aversive details of the traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse). (APA, 2013, p. 271)

Individuals suffering from PTSD are haunted by traumatic memories they cannot integrate. Kept in an elevated arousal level in the autonomic nervous system (ANS), they are cycling between hyper- and hypo-arousal, with intrusive re-experiencing (flashbacks) and "shutting down" because of the attempts to avoid the traumatic memory (see section 2.7.4.). Trauma victims lack the capacity to recover and thus suffer from nightmares, concentration, and memory disorders (Friedman et al., 2007; Levine, 2010; Nijenhuis et al., 1998; Van der Kolk, 2015). Van der Hart and colleagues stressed that for a trauma memory to be processed and integrated, there needs to be: realization (knowing that the trauma happened), personification (knowing that it happened to them) and presentification (knowing that it happened in the past, and not now) (Hart et al., 2006).

Survivors from childhood maltreatment appear to diverge from other individuals with PTSD, showing greater symptom severity with more comorbidity. They are, therefore, often more challenging to treat. Furthermore, individuals that have been exposed to both childhood and adult traumas are more likely to develop PTSD than those that have either adult trauma or childhood trauma (Herman, 2001; Teicher & Samson, 2013; Van der Kolk, 2015.). Schore (2014) stresses the importance of focusing on the functions of the right brain, such as implicit, nonverbal, bodily-based, and holistic processing in psychotherapy, to repair early emotional and relational wounds from childhood trauma. Severe early abuse can also, according to the theory of structural

dissociation, lead to a splitting of the consciousness into different parts, ANP (apparently normal personality), the part(s) of the personality that can function in daily life, and EP (emotional personality), the part(s) of the personality that carries the burdens of trauma (Hart et al., 2006; Nijenhuis, 2015).

Lanius et al. (2010) presented evidence of neurobiological features for a division between a dissociative subtype and a non-dissociative subtype of PTSD. They described two types of affect dysregulation in PTSD. In the hyperaroused/non-dissociative subtype, there was an emotional undermodulation, with a lack of inhibition of the prefrontal and limbic areas. In contrast, in the hypoaroused/dissociative subtype, there was an emotional overmodulation in inhibiting the same limbic areas through the midline prefrontal cortex. Dissociative subtypes are approximated to be found in around 15–30% of PTSD disorders (Lanius et al., 2010). Stevens found a positive correlation between right amygdala activation and hyperarousal symptoms in civilian women with PTSD (Stevens et al., 2013). Terpou lifts the role of the different parts of the periaqueductal grey (PAG), a structure in the midbrain, for initiating fight/flight response or to inhibit the motor commands by applying a brake for the sympathetic nervous system. (Terpou et al., 2019). In a review by Del Rio-Casanova and colleagues (2016) of over and under-regulation patterns in trauma-related disorders, they proposed an axis with the underregulated types (BPD, PTSD with re-experiencing symptoms and dissociative types with positive symptoms) on one end and disorders primarily governed by overregulation on the other side (somatoform and psychoform dissociative disorders with mainly negative symptoms). However, an alternation between over and under-regulation is common, even if one type might be predominant (González et al., 2017; Hart et al., 2006)

In DSM-4 and ICD-10, PTSD is defined by three symptom clusters: re-experiencing, avoidance and alteration in arousal and reactivity. The DSM-5 diagnoses of PTSD have incorporated an additional cluster: negative alteration in mood and cognition, plus a dissociative subtype categorized by symptoms of depersonalization (feeling unreal) and derealization (feeling that the environment is unreal) (APA, 2013; World Health Organization, 2013).

### **2.3.1. THE ORIGINS OF THE CONCEPT OF TRAUMA – A HISTORICAL OVERVIEW**

Throughout history, human beings have been exposed to trauma with its aftermath. Trauma is the Greek word for “wound” (Merriam-Webster, n.d.). Although the Greeks used the term only for physiological injuries, nowadays, trauma is just as often used to refer to emotional wounds.

In the middle of the 19<sup>th</sup> century, a French psychiatrist Briquet (1859), found an association between childhood trauma and the symptoms of “hysteria”. Hysteria was at the time believed to be a disease of the uterus. The term hysteria comes from

Hippocrates and has its ground in old Egyptian beliefs that the womb could wander around in the female body and cause disease-like conditions. The symptoms of hysteria could be intense emotional reactions, somatizations, and dissociation. As Briquet presented his findings of a link between hysteria and childhood trauma, a countermovement with a false memory debate was raised, and children were suspected of wrongly accusing their parents of incest (Friedman et al., 2007).

The neurologist Charcot (1887), in Salpêtrière, a hospital in Paris, France, found that trauma could put the patients in a mental state similar to hypnosis, a so-called hypnoid state. He described both a high state of suggestibility in these patients and how this state was related to having been exposed to unbearable experiences. His work was predominantly to observe and classify the symptoms of hysteria. He was uninterested in the patient's inner life (Friedman et al., 2007; van der Kolk, 2015).

In the late 19<sup>th</sup> century, Pierre Janet and Sigmund Freud were pupils of Charcot at the Hospital Salpêtrière (Friedman et al., 2007; Herman, 2001; Van der Kolk et al., 1996). Both continued the work of Charcot and were rivals in being the first to understand the cause of hysteria. They both noticed that observing and classifying the hysterical symptoms was not enough. There was a need to talk to the patients to understand their inner lives. They started to talk and listen to their patients, and through these investigations, they independently came to the same conclusion, namely that hysteria was caused by psychological trauma. They found that unbearable emotional reactions to traumatic experiences produced an altered state of consciousness that could develop into hysteria. Janet called this state of mind "dissociation" and Freud "double consciousness". In the meantime, other pupils of Charcot, Tourette and Babinski continued the research on suggestibility and false memory. Babinski took over as the head of the Hospital Salpêtrière, and the idea of a traumatic origin to hysteria was soon forgotten, and the hysteric symptoms were instead again explained as a neurological disease of the uterus (Friedman et al., 2007; Hart et al., 2006; Herman, 2001). Freud developed his ideas into psychoanalysis, and Janet's clinical observations of dissociation and split of consciousness were soon forgotten. Later in the 1980s, when the role of dissociation was rediscovered, Janet's extensive work was acknowledged and laid the ground for modern psycho-traumatology, such as the theory of structural dissociation (Hart et al., 2006; Nijenhuis, 2015).

During the early phases of World War I (in 1914), a British psychologist, Charles Samuel Myers, coined the term "shell shock" to describe the panic reactions reported by traumatized soldiers after combat. Since the term became associated with cowardice, it was replaced with combat stress reaction after World War II. In the U.S., an American psychiatrist Abram Kardiner started to treat traumatized U.S. war veterans from World War I. He observed that the soldiers had sustained hypervigilance and were overreactive to environmental threats. After World War II, in a study of the long-lasting effects of traumatization in Holocaust survivors, a psychoanalyst, Henry Krystal (1968), noted that trauma could lead to an inability to

interpret feelings and a state of “giving up”, a development of alexithymia, which he found important to understand the psychosomatic symptoms in the individuals that suffered from chronic traumatization. (Friedman et.al., 2007; Herman, 2001).

Between 1918 and 1968, trauma studies were almost only concentrated on males. But now, in the 1970s, the neglected, traumatized population of women and children were recognized. In Boston City Hospital, a psychiatric nurse, Ann Burges, and a sociologist, Lynda Holmström, observed a psychological reaction in women who had been raped that they called “rape trauma syndrome”. They found that the nightmares and flashbacks seen in the raped women resembled the traumatic neuroses of war veterans (Herman, 2001). Several women, amongst them the psychiatrist Judith Herman (1980, 2001), started documentation of sexual childhood abuse and its devastating impact on the victims.

The first time PTSD was included as an official diagnosis in DSM-III was in 1980. Since then, there have been advances in understanding the impact of traumatization in different stages throughout the individual’s lifecycle, understanding the neurobiological processes underlying traumatization and systematically exploring various treatment outcomes for different trauma populations (Friedman et al., 2007).

## **2.4. COMPLEX POSTTRAUMATIC STRESS DISORDER**

Herman (1996) and van der Kolk et al. (2005) proposed a new diagnosis named Complex post-traumatic stress disorder (CPTSD), or Disorder of extreme stress not otherwise specified (DESNOS). The diagnosis included the specific features of PTSD but was related to exposure to multiple traumas, especially interpersonal psychological childhood traumas (Courtois & Ford, 2009). There has been an ongoing debate whether CPTSD, as a consequence of prolonged and multiple traumas, could be distinguished from PTSD.

The American Psychiatric Association omitted CPTSD in the DSM-5 but instead expanded the PTSD diagnoses with three new symptom clusters associated with affective and behavior changes in PTSD samples plus a dissociative subtype (Elklit et al., 2014; Maercker, et al., 2013).

Studies have investigated the special traits, similarities and differences between PTSD, CPTSD and Borderline Personality disorder (BPD) (Cloitre et al., 2013). CPTSD is assumed to have the three symptom clusters of PTSD: re-experiencing, avoidance, and sense of threat, plus three additional symptom clusters related to disturbances in self-organization (DSO): affect dysregulation (AD), negative self-concept (NSC), and interpersonal problems (IP) (Cloitre et al., 2013; Elklit et al., 2014; Knefel & Lueger-Schuster, 2013; Maercker, et al., 2013).

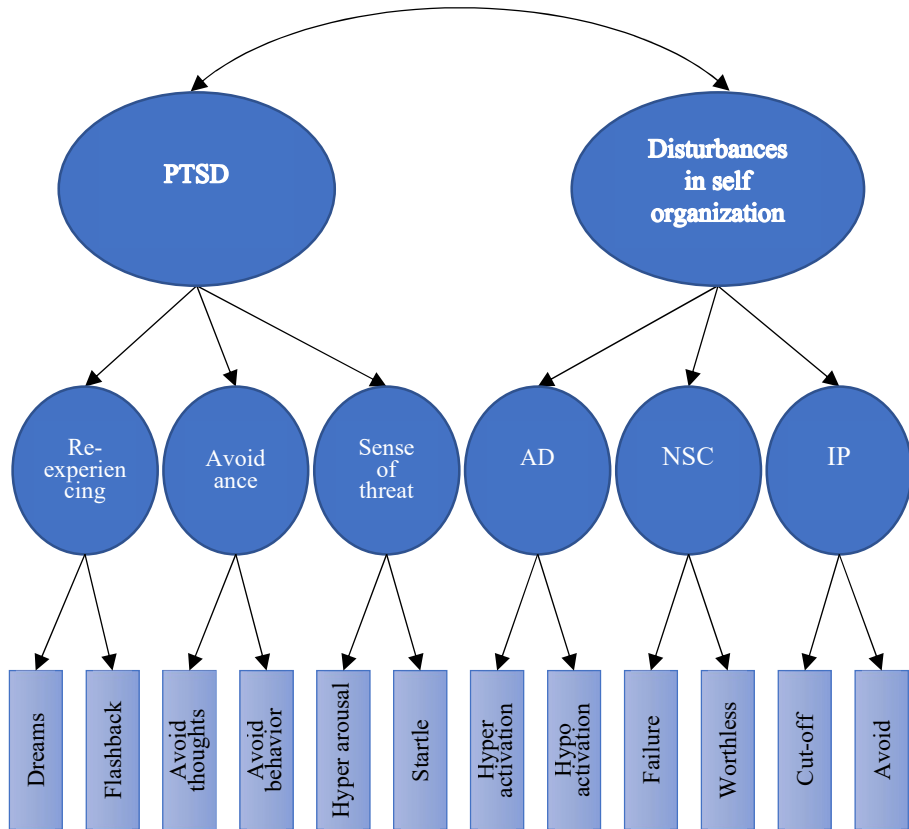
Wolf et al. (2015) raised concerns about splitting PTSD in the two sibling diagnoses of PTSD and CPTSD. In contrast to Cloitre, Elklit, Maercker and Knefel, they found that CPTSD and PTSD only differed in symptom severity and were not linked to a particular type of posttraumatic psychopathology. Resick (2012) argued that there was an overlap between CPTSD and BPD. CPTSD could be seen as PTSD plus BPD and not a diagnosis of its own. Cloitre et al. (2013) stated that CPTSD could stand independently as a coherent diagnosis with or without BPD comorbidity. They pointed out that in CPTSD, the effects of the trauma with PTSD symptoms are the core element, and trauma-focused intervention can be used relatively quickly to reduce the symptoms. In CPTSD, there is a stable negative self-concept and avoidance of relationships, whereas, in BPD, there is a lack of stable self-concept and fear of abandonment, with a high risk of suicidality and self-harm. According to Cloitre, the treatment of choice for BPD must primarily be organized around these issues. Particular attention is needed around the termination of the therapy with BPD because of the fear of abandonment (Cloitre et al., 2013).

Recent research has continued to evaluate differential predictors of PTSD and CPTSD based on the new ICD-11 criteria (Cloitre et al., 2019; Hyland et al., 2017; Karatzias, Hyland, Bradley, Cloitre, et al., 2019; Maercker et al., 2018; Powers et al., 2017). Cloitre et al. (2019) and Maercker et al. (2018) concluded that sexual and physical abuse by caregivers in childhood was associated with a higher risk of developing CPTD, whereas kidnapping or rape predicted PTSD. Adverse childhood events were equally associated with both PTSD and CPTSD. Subjects with CPTSD reported lower psychological well-being and a higher psychiatric load. Hyland et al. (2017) found support for the ICD-11 proposal that interpersonal inescapable trauma exposure in childhood increased the risk of developing CPTSD. They also found some indication that being female increased the risk for both diagnoses.

Complex posttraumatic stress disorder was proposed for ICD-11 as a sibling disorder to PTSD (Karatzias et al., 2017). In a review of current evidence for diagnosing PTSD and CPTSD, Brewin et al. (2017) present a CPTSD model with the three PTSD features plus the three additional features related to disturbances in self-organisation (DSO). Brewin's model is presented in Figure 1.



Figure 1. A model of Complex PTSD.



Note: Adapted from Brewin et al. (2017). AD=Affect Dysregulation. NSC=Negative Self Concept. IP=Interpersonal Problems.

The model shows the three PTSD features. 1) Re-experiencing with nightmares and flashbacks, 2) Avoidance of thoughts and behaviour, 3) Sense of threat with hyperarousal and exaggerated startle response. It also shows the three DSO elements (Disturbances in Self-Organization) proposed to distinguish PTSD from CPTSD. 1) AD (Affect dysregulation) with hyperactivity or hypoactivity, 2) NSC (Negative self-concept) with a sense of failure or worthlessness etc., 3) IP (Interpersonal problems) problems in relationships, avoiding relationships or feeling cut-off from others. Both PTSD features and DSO elements are required to be diagnosed with CPTSD. CPTSD have now been included as a separate diagnosis in ICD-11 (World Health Organization, 2018).

## 2.5. PREVALENCE OF PTSD, CPTSD RELATED TO TRAUMA TYPE

In a National Comorbidity Survey (NCS) in the USA, designed to study the distribution of psychiatric disorders in adults in 48 states ( $n = 5,877$ ), it was estimated that 51% of women and 60% of men had experienced at least one traumatic event during their lifetime, which resulted in the development of PTSD in 7.8% of the sample. Females had a higher prevalence of PTSD, with 10.4%, and men with 5.0%, respectively. The trauma type with the highest risk of developing PTSD was rape, which was far more often reported by women (Kessler et al., 1996). In a Swedish study of 298 women that have been raped, it was found that 70% of the women reported significant tonic immobility (a fright reaction where the active defences are stopped by the parasympathetic branch [see section 2.7.4.]), and 48% extreme tonic immobility during the assault, as measured by the Tonic Immobility scale. Tonic immobility is a common predictor for developing PTSD (Möller et al., 2017).

In Sweden, according to the Region Stockholm County Council (Region Stockholm, 2019), the lifetime prevalence of PTSD in the Swedish population is estimated to be around 5.6%. The syndrome is twice as high in females and foreign-born. However, later reports indicate that the prevalence of PTSD is higher since many citizens are undiagnosed.

In a re-analysis of studies from 18 Nordic convenience samples ( $n = 5,220$ ), Ditlevsen and Elklit (2012) searched for gender differences and trauma types in PTSD. All participants had been exposed to a potentially traumatizing experience. The authors found that exposure to violence resulted in a qualification for PTSD in 20% of women and 16% of men. They concluded that across all the studies, women had a greater prevalence of PTSD than men, even if men were exposed more often to potentially traumatizing events. Trauma types like combat, war, terrorism, nonsexual child abuse or neglect and adult sexual assault gave no significant difference between genders in the prevalence of PTSD. The analysis showed that the trauma type with the highest gender difference for PTSD was disaster and accident, and the lowest difference between genders was connected to violence and chronic disease. PTSD severity was overall greater in women than in men.

In another study, a Danish birth cohort aged 24 ( $n = 2,980$ ) was analysed in search of the prevalence of PTSD or CPTSD in relation to trauma type (Hyland et al., 2017). They found that, in total, 3% of the sample was diagnosed with PTSD and 1% with CPTSD. Women were more likely to belong to PTSD or CPTSD classes. Childhood interpersonal trauma was the trauma type that most often predicted CPTSD (Hyland et al., 2017)

The following section will describe a selection of different treatment approaches for PTSD/CPTSD relevant to this study, starting with the recommended evidence-based treatments.

## **2.6. THE ESTABLISHED EVIDENCE-BASED AND TRAUMA-FOCUSED APPROACHES**

The most commonly studied treatments for PTSD are various forms of Cognitive Behaviour therapy (CBT) and Eye Movement Desensitization and Reprocessing therapy (EMDR). Research has shown high effect sizes in the reduction of PTSD symptoms with these methods, even though especially Prolonged Exposure (PE) has high levels of dropouts. These methods are the recommended evidence-based treatments by guidelines (World Health Organization, 2013). Below is a short presentation of the methods.

### **2.6.1. PROLONGED EXPOSURE**

Behaviorism developed in the early 1900s as a reaction against the psychoanalytic approach that was predominant at the time. In Ivan Petrovitch Pavlov's experiments with dogs, he found that previously neutral stimuli could be paired with something that naturally evokes a response, e.g. classical conditioning, which had implications for PTSD treatment and led further to the development of exposure as a treatment modality for PTSD (Friedman et al., 2007). In exposure treatment, the client is exposed to the feared stimuli without negative consequences to habituate the emotional reactions. The method was extended to include both exposure to external stimuli and imaginal exposure (the individual's memory of the traumatic event). According to Foa, the exposure needs to continue until the fear response has vanished for the treatment to be successful (Foa et al., 1999; Foa & Kozak, 1986; Schnyder et al., 2015). Prolonged Exposure (PE) is now a widely used method for trauma treatment, and the exposure component has been integrated into many other therapy methods for PTSD (Cloitre, 2009; Friedman et al., 2007).

### **2.6.2. COGNITIVE BEHAVIORAL THERAPY**

Cognitive Behavior Therapy developed into a second wave of behaviourism where the "Socratic questions" (a form of dialogue aiming to foster critical thinking) became important. (Friedman et al., 2007). The cognitive approaches focused on how the traumatic event had impacted the individual's belief system. CBT theory claims that to heal, there is a need for cognitive restructuring, meaning a need to rework and modify an individual's meaning of the traumatic experience (Cloitre, 2009; Friedman et al., 2007). Thus distorted learning from traumatic experiences can be changed with the help of teaching and desensitization (Johnson, 2009; Schnyder et al., 2015). Exposure-based and cognitive therapies are supported by many studies that demonstrate their efficacy (see Chapter 3).

### **2.6.3. EYE MOVEMENT DESENSITIZATION AND REPROCESSING**

EMDR was developed by Shapiro in 1987 (Shapiro, 2001). The method is multimodal and involves a setup where a target trauma is identified together with associated negative cognition, emotions and bodily sensations. A positive cognition is identified that can replace the negative belief. Bilateral stimulation (BLS), i.e., eye movements, tactile or sounds, are then used to process the traumatic memory. BLS is a rhythmic movement between two poles, either the therapist tapping the knees of the client, the client following the therapist's fingers, moving from side to side or listening to sounds in earphones moving from the right to the left ear. BLS is an essential ingredient in EMDR, and questions have been raised concerning the role of the BLS. Hypotheses are that it challenges working memory or works via the orientation reflexes. Another explanation is that it provides dual attention, both being there (in the traumatic memory) and now (moving the eyes looking at the therapist's fingers), which helps process the experience. Elofsson and colleagues found that the bilateral eye movements in EMDR decreased sympathetic activity and increased the parasympathetic/vagal influence, resulting in a decrease in heart rate (Elofsson et al., 2008). Shapiro developed the adaptive information processing model (AIP), proposing that unprocessed disturbing memories can lay the ground for many pathologies. Shapiro found that BLS could unblock the information processing in the brain that got stuck due to the traumatic experience. The method uses techniques from hypnosis, such as safe place installation, resourcing and ego-state interventions (Cloitre, 2009; Shapiro, 2001, 2012; van der Kolk, 2015).

## **2.7. THE BOTTOM-UP PERSPECTIVE, ANS AND MIND/BODY APPROACHES**

The bottom-up perspective emphasises working with interoceptive awareness and balancing the autonomic nervous system (ANS). A key model for these approaches is the polyvagal theory developed by Stephen Porges and the concept of the “window of tolerance” (Ogden et al., 2006; Porges, 2011; Siegel, 1999). The following section explains these theories and continues with a presentation of mind/body approaches.

### **2.7.1. THE POLYVAGAL THEORY**

In the Polyvagal Theory, Porges proposes that the ANS could be described as a hierarchy of responses. Instead of consisting of only two branches, the sympathetic and parasympathetic branches, he found in his research that the ANS have three branches (Porges, 2001, 2011). The sympathetic nervous system (SNS) that activates fight-or-flight reactions and the parasympathetic nervous system (PNS) with two distinct branches: dorsal vagal complex (DVC), connected to the sub-diaphragmatically organs, and ventral vagal complex (VVC), the myelinated vagus, the most sophisticated and recently developed branch, existing only in mammals (Porges, 2007). The ventral vagus originates in the nucleus ambiguus, in the brain

stem, and is connected to the throat, face, middle-ear muscles, heart, and lungs and controls facial expressions and vocalization. These functions are essential for the individual's ability to be socially engaged (Porges, 2011). In situations of threat, the SNS gets activated, preparing for active defence such as fight or flight. When danger is over, or the active defences of fight/flight have succeeded, the sympathetic activation gets downregulated by the vagal brake. The individual can settle down, return to safety and relaxation, and VVC and social engagement are again activated. If the defences fail, the dorsal vagal complex (DVC), the most primitive branch of the ANS, activates and inhibits the sympathetic branch. The system moves into a state of immobilization, using passive defence mechanisms such as playing dead or entering a state of collapse (Porges, 2011; Porges & Dana, 2018).

Porges named the process of evaluating whether people or circumstances are safe, dangerous, or life-threatening “neuroception”. According to Porges, neuroception is a subconscious process that starts at a neurophysiological level to prepare the individual for defensive or social engagement. This process happens before the individual is consciously aware. Neuroception can be adaptive or maladaptive according to the individual's life history or psychopathology (Levine, 2010; Porges, 2004, 2011).

When the individual feels safe, and the ANS is in balance (with VVC activated according to the polyvagal theory), the heart rhythm varies, i.e., it increases and decreases with inhalation and exhalation, called respiratory sinus arrhythmia (RSA). Measures of Heart Rate Variability (HRV), i.e., how much the heart rhythm varies during inhalation and exhalation, demonstrate ANS flexibility and relaxation capabilities (Porges, 2011). A low HRV may indicate depression, panic, anxiety disorders, fibromyalgia, and diabetes (Pole, 2007; Schneider & Schwerdtfeger, 2020; Thayer & Lane, 2007), which are afflictions that often plague patients who suffer from complex PTSD (van der Kolk, 2015). HRV has been found to be lower in individuals with PTSD compared to healthy controls, both at rest and in stressful situations, supporting the view of a dysregulated ANS in individuals with PTSD (Pole, 2007; Schneider & Schwerdtfeger, 2020).

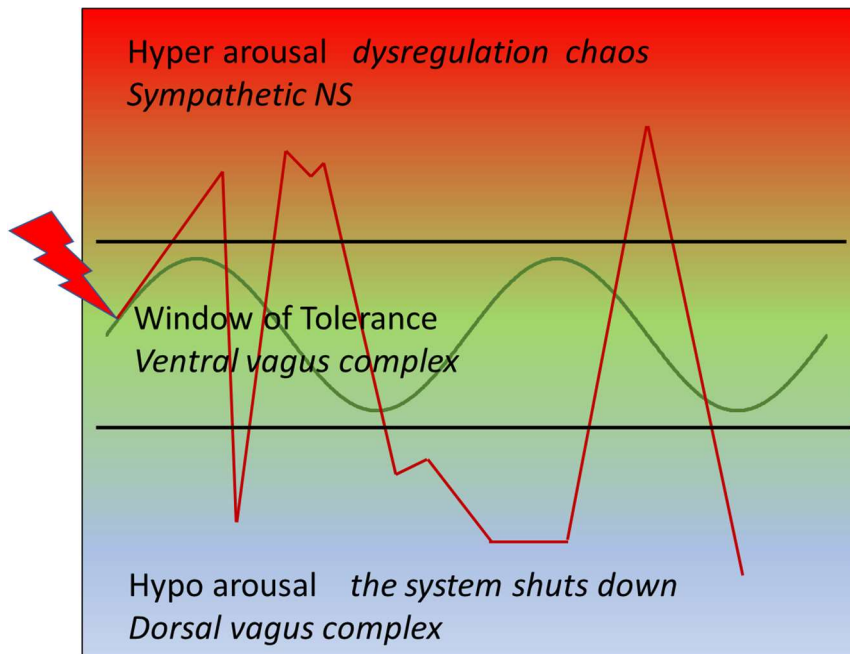
## **2.7.2. THE WINDOW OF TOLERANCE**

The concept of the “Window of Tolerance” (WoT) (Siegel, 1999) describes the amount of emotional arousal that an individual can tolerate “without disrupting the functioning of the system” (Siegel, 1999, p. 253). The WoT varies from individual to individual and from time to time, according to circumstances. When clients are helped to stay within their WoT, they are capable of integrating information from both internal and external environments (Ogden et al., 2006). Traumatized individuals often oscillate between too much activation (hyper-arousal) and too little activation (hypo-arousal), thus moving between trauma re-experiencing and numbing, or, popularly said, being “stuck on ON” or “stuck on OFF” (Hart et al., 2006; Levine et

al., 2018; Ogden et al., 2006; Van der Kolk et al., 1996). Figure 2 shows how the arousal zones in the WoT are linked to the three branches of the Polyvagal theory (Levine, 2010; Ogden et al., 2006; Porges, 2011)

Figure 2. *The Window of Tolerance.*

*The green line shows a well-regulated autonomic nervous system (ANS), with the ventral vagus complex online and within the window of tolerance. The red line shows a dysregulated triggered ANS without the capacity to return to safety.*



### 2.7.3. CRITICISM OF THE POLYVAGAL THEORY AND OTHER THEORIES

The Polyvagal Theory is comprehensible and fits well with clinical observation. However, the theory has been criticized by Grossman and Taylor (2007). They question the very core of the polyvagal theory with the assumption of the two distinct branches of the parasympathetic system, the ventral vagus originated from the nucleus ambiguus (nA), and the dorsolateral vagus originated from the dorsal motor nucleus (DMN). They are critical to the idea that the ventral vagal myelinated branch has evolved only in mammals and if ventral vagal activity can be measured by RSA. They argue that lungfish also has a respiratory sinus arrhythmia but that it originates from the cardioinhibitory pathways of the DMN and that the primary function of RSA is to adjust the relationship between respiratory and pulmonary perfusion to match

behavioural and metabolic requirements. In their opinion, RSA cannot be used to measure nA-generated vagal efferent tone. Porges replicates that Taylor and colleagues misinterpret the polyvagal theory and fail to distinguish between the mammalian RSA, dependent on the ventral vagus and the nA, and other vertebrates heart rate respiratory interaction, mostly involving the dorsal vagal nucleus (Porges, 2023). The polyvagal theory does not assume that only mammals have a heart-rate respiratory coupling. He also comments that RSA opens a way to test the polyvagal theory of ventral vagus activity but that it is not a foundational construct of the theory.

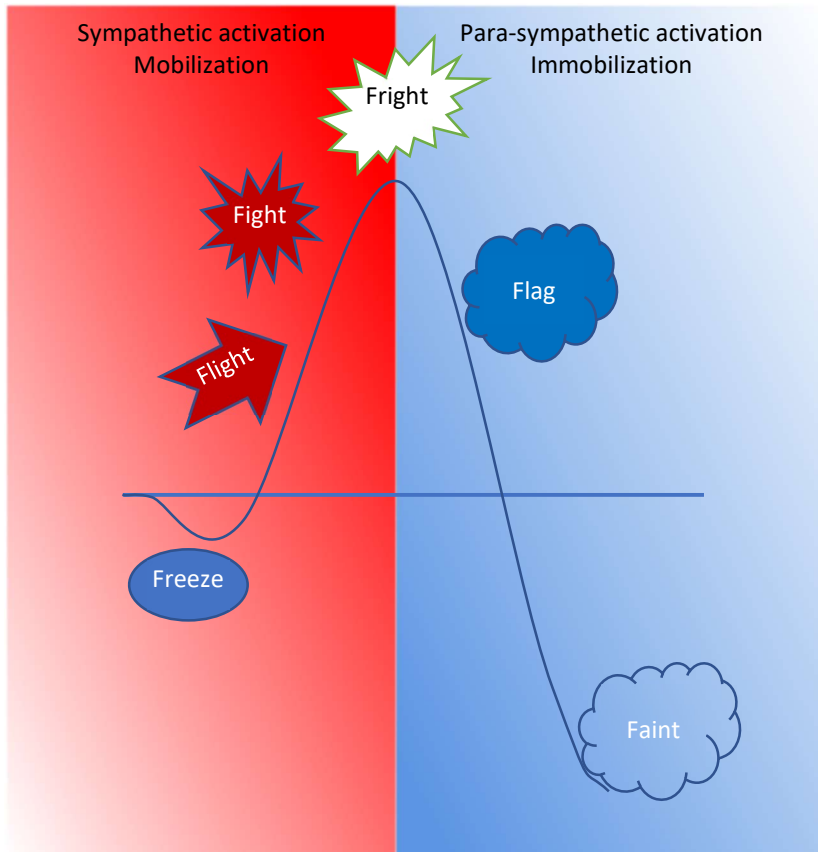
Nevertheless, there are other theories related to HRV. One of these models is Neurovisceral Integration: The Central Autonomic Network model (CAN) (Thayer & Lane, 2000, 2009). The CAN model assumes that the default mode in ANS, in response to uncertain situations, is the sympathetic activation with flight/fight defences and that there is a natural negativity bias. The aim, they argue, is to optimize the chance of survival by preparing the organism for the worst. However, to function in daily life, this response needs to be inhibited top-down by the prefrontal cortex (PFC). In PTSD and other psychopathological states, a lack of inhibition from PFC leads to dysregulation of emotions, cognitions and behaviour, with a failure to recognize safety cues (Thayer & Lane, 2009). Similar to the polyvagal theory, they state that low HRV is associated with poorer self-regulation ability, for example, in PTSD, and higher HRV is associated with a more healthy condition, with higher resilience and more curiosity and willingness to approach new situations. (Hildebrandt et al., 2016; Porges, 2011; Thayer & Lane, 2009). The Heart Rhythm Coherence Model (McCraty & Childre, 2010) uses the term psychological coherence, and the authors hypothesise that positive emotions shift the system to a more coherent and harmonious psychological mode that enhances self-regulation and well-being. In HRV Biofeedback, the Resonance Frequency Breathing method (Lehrer, 2013; Lehrer & Gevirtz, 2014) it has been found that breathing at a rate of an individual's cardiovascular resonance frequency rate (around 4.5 to 6.5 breaths per minute) exercises the baroreflex and maximizes the HRV amplitude, potentially improving the autonomic homeostasis, and increasing the parasympathetic influence on the heart. This resonance frequency in humans and some other mammals are around 0.1 Hz. They state that when HRV oscillates with a high amplitude and a more complex pattern, it is as if the organism has multiple backup systems that make it finetuned to the needs of the internal and external environment (Lehrer & Gevirtz, 2014). Low and less complex oscillations in HRV are coupled to impaired physiological and psychological functioning. According to Shaffer et al. (2014), the interest in the field is now not solely on targeting sympathetic activation but also on increasing the vagal tone to enhance self-regulation, resilience and recovery. Further research will continue to illuminate these issues.

#### **2.7.4. THE DEFENCE CASCADE**

When an individual is out of their WoT, no longer safe and feeling threatened, the defence cascade is initiated (Schalinski, 2013). The defence cascade is a way to explain the different stages of the fear response that a human being can experience when exposed to traumatic events. These reaction patterns are adaptive to the specific threat levels the individual encounters (dangerous or life-threatening). The defence cascade starts with a startle response, thus helping the individual orient towards the threat. If the threat is evaluated as dangerous, the person moves into active defences, such as fight and flight. If the threat is inescapable and evaluated as life-threatening, the organism moves into a state of tonic immobility or shut-down (see Figure 3) (Kozłowska et al., 2015; Schauer & Elbert, 2010). The response patterns are biologically hardwired in the ANS and can also be seen in mammals. Mammals are often able to restore ANS functioning when danger is over by moving through the so-called defence cycle, while humans tend to lock themselves up into the fear response evoked in the original traumatic experience, which then can continue as a repetitive pattern (Levine, 1997; Schalinski, 2013; van der Kolk, 2015). Kozłowska underlines the importance of understanding these neural patterns and using interventions focused explicitly on where the traumatised individual is stuck to release the pattern (Kozłowska et al., 2015).



Figure 3. The Defence Cascade.



Note: Adapted from Schalinski (2013).

Figure 3 describes schematically the defence cascade (Kozłowska et al., 2015; Schalinski, 2013; Schauer & Elbert, 2010; Terpou et al., 2019). Schauer and Elbert suggested that the defence cascade consists of six defence responses (the 6-F's) described below (Schauer & Elbert, 2010).

- 1) *Freeze*: The orienting response (OR) or attentive immobility. A watchful alert state, orienting towards the threat, including inhibition of motor activity and a decreased heart rate. There is an onset of the alarm response, and the body starts to prepare for active defence, the so-called preparatory set (PS). PS involves organizing the whole system in relation to the challenge (Levine, 2010; Payne & Crane-Godreau, 2015).
- 2) *Flight*: Mainly sympathetic activation. A threat has been discovered, and sympathetic arousal is rapidly activated with an attempt to flee: heart rate

and skin conductance increase. Breathing gets deeper and faster to increase the oxygenation of important muscles and organs. Digestion is at a halt. Catecholamines are released from the adrenal glands, and further, endocannabinoid-mediated painkillers are released to reduce pain without immobilization (Lanius et al., 2018; Terpou et al., 2019).

- 3) *Fight*: If fleeing is impossible, the subject mobilizes to fight, and energy moves into upper limbs, arms, and throat (if the individual appraises there is a chance to win the fight). If not, the next stage becomes activated.
- 4) *Fright*: Tonic immobility. The arousal is at its height, and the system starts to turn into dizziness and nausea. Active defences have failed, and fight or escape is no longer possible. There is a co-activation of both the sympathetic and parasympathetic systems (Ogden et al., 2006; Schauer & Elbert, 2010). The muscles are overly tense, and movement becomes slow and difficult. The system has moved into “playing dead syndrome”. The fight or flight response is put on hold by a “braking mechanism” in the parasympathetic branch (Porges, 2011; Terpou et al., 2019). The endogenous opioid system starts to release high quantities of opioids for pain relief. Especially the kappa-opioid receptors have been found to produce an altered state of consciousness that produces dissociation and emotional numbing (Lanius et al., 2010, 2018).
- 5) *Flag*: Flaccid or unresponsive immobility and emotional shut-down. The ability to act is no longer there; the parasympathetic dorsal branch is activated with passive responses, and the body becomes limp. The individual is in a dissociative state. Dissociation is characterized by a disruption of normally integrated functions such as consciousness, memory, identity, perception of the environment, sensations, and bodily functions (Nijenhuis et al., 1998; Schauer & Elbert, 2010). Being motionless can be lifesaving in a situation with a death threat. According to the Polyvagal Theory, immobilization and death feigning occur through the activation of inhibitory impulses from the Dorsal Vagal Complex (DVC) to the heart (Porges, 2011). A drop in heart rate and blood pressure leads to bradycardia—one of the more primitive defence mechanisms.
- 6) *Faint*: The final stage of the defence cascade involves a complete detachment of one’s sense of self and bodily sensations. These dissociative responses are found across several diagnoses and can be measured in reduced startle response and HRV (Hart et al., 2006; Lanius et al., 2010). Disgust, such as fear of bodily contact with something awful, such as sexual violence, seems to be linked to fainting (Schauer & Elbert, 2010).

The Polyvagal Theory, WoT and the defence cascade model have influenced many therapies with a bottom-up perspective. Among them are Somatic Experiencing and Sensorimotor Psychotherapy, body-centred therapies that focus on the brainstem and restoring the flexibility of the autonomic nervous system. These methods will be presented in the next section.

### **2.7.5. SOMATO-SENSORY PSYCHOTHERAPY**

Somatic Experiencing (SE) and Sensorimotor Psychotherapy (SP) are body-focused psychotherapy models using a bottom-up perspective in treating traumatised individuals (Brom et al., 2017; Ogden et al., 2006). These methods are similar and build on the polyvagal theory. They differ from cognitive therapies by focusing on tracking inner sensations related to the so-called interoception (visceral) and proprioception (sense of movement) instead of cognitive processes. A connection between the sense of self and interoceptive awareness has been proposed by Damasio (2003) and Craig (2009). In SE and SP, the goal is to increase interoceptive awareness.

Dr Peter Levine, the grounder of SE, was in his research inspired by how prey animals in the wilderness reacted after having been chased by a predator. Levine observed that mammals that moved into immobilization during life-threatening experiences could move through the initial shock and restore the ANS balance when the threat was over. The mammals were getting out of tonic immobility by discharging the inhibited survival energy, showing up in trembling, movements, and deep breathing. Levine and Ogden (the grounder of SP) thought that completing this process in humans, helping the traumatised individual finish incomplete defence responses originating from the traumatic experience, could prevent PTSD symptoms (Levine, 1997; Ogden et al., 2006; Payne et al., 2015). If inhibited survival energy from fight/flight or other protective defences got stuck in the system, it could cause a rigid defence pattern, resulting in psychological or physiological symptoms or syndromes (Levine, 2010; Ogden et al., 2006). In order to complete the defence cycle, Levine introduced a method called pendulation (Levine, 1997; Levine et al., 2018). Pendulation helps the client gradually release the stuck energy from the traumatic experience by moving between contraction and expansion. The therapist guides the client back and forth from resourcing (interoceptions of safety) to the traumatic experience (the uncomfortable sensations from trauma), resulting in a release of traumatic tensions and integration in a titrated way, with the client kept within their WoT (Payne et al., 2015, p. 12). The biological defence response is completed through interoceptive and proprioceptive awareness and through the imagination of a successful flight or fight that was impossible in the original trauma (Payne et al., 2015; Payne & Crane-Godreau, 2015).

In contrast to exposure therapy, this is not habituation, nor is it suppression of the original memories or feelings. It is a renegotiation or reworking on an implicit level helping the individual to have an experience of completing the instinctive defensive

responses “so the necessary action has finally taken place” (Payne et al., 2015, p. 12). This phenomenon has also been called “the Act of Triumph”, a concept originally coming from Pierre Janet and thought to help the client “reset” the nervous system (Hart et al., 2006; Janet, 1925; Levine, 2010; Ogden et al., 2006; Payne et al., 2015; Whitehouse & Heller, 2008).

Levine presents a model for tracking how the client processes experiences, which he gave the acronym SIBAM. SIBAM consists of different channels: S = sensations, I = imagery, B = behaviour, A = affect and M = meaning. When a client suffers from unresolved trauma, these different aspects can be fixed in maladaptive patterns and become over- or under-coupled (dissociated) from each other, causing a faulty neuroception (a misinterpretation of others and the environment) (Levine, 2010; Porges, 2011).

## **2.8. ARTS-BASED PSYCHOTHERAPY**

The clinical intervention used in this PhD dissertation is a combination of GIM and Expressive Arts (EXA) adapted for phase-based trauma-focused group psychotherapy with clients suffering from PTSD or CPTSD. This section will give an overview of EXA and GIM together with the group format Group Music and Imagery (GrpMI), the foundation for the intervention used in this PhD study.

Creative arts therapy (CAT) is an umbrella term for psychotherapy that uses the arts as a therapeutic vehicle, i.e. music therapy, drama therapy, art therapy, dance/movement therapy, storytelling/poetry and expressive arts (Schouten et al., 2015). The usefulness of CATs in trauma work might be explained by offering other ways for expressing feelings and sensations in addition to words. In PET scans of subjects with PTSD, it has been seen that activation in Broca’s area (the speech centre in the brain) is decreased during flashbacks (Rauch et al., 1996; Van der Kolk et al., 1996). For healing to occur, traumatic memories with their mostly implicit (nonverbal) character must be integrated into the explicit autobiographic memory, thus knowing where, when, how, and to whom the trauma happened and that it is over now (Hart et al., 2006; Körlin, 2005; Siegel, 2001; van der Kolk, 2015; Van der Kolk et al., 1996). With their nonverbal and experiential focus, CATs offer possibilities to create forms of unspeakable wordless traumatic memories (Carey, 2006; Gerge et al., 2019; Körlin, 2005; Van der Kolk et al., 1996). The methods have been widely used in trauma therapy since the 1970s (Baker et al., 2017; Johnson, 2009), but despite the fact that CAT therapists have seen clinical results with traumatised patients, the methods lack evidence for their efficacy due to the lack of quantitative research in the field (Baker et al., 2017; Garrido et al., 2015; Schouten et al., 2015). Johnson (2009) points out that for the field to be acknowledged, there might be a need to incorporate more CBT techniques in the creative methods since CBT is the leading paradigm in our time. Although this is something CAT therapists seem unwilling to do. He argues that there are similarities between CBT and CATs in trauma work. For example,

imaginal exposure, an essential element in CBT, is utilized in CATs when the trauma memory is represented in artwork, music, and role-play. Furthermore, the stimulation of the different senses by the art media can help bring more vividness to the imagery. In psychodrama, there are possibilities for roleplaying with new learning and solutions, thus working with another critical element in CBT: cognitive restructuring (Johnson, 2009). However, a significant difference is that the CBT therapist acts more like a teacher, pushing the clients to work, while the CAT therapist offers them space to play and find the solutions from within themselves. The aesthetic components in arts-based psychotherapies also bring another dimension to the work, which might make it more endurable (Johnson, 2009; Kenny, 1995).

Another essential aspect of CAT (and other psychotherapies) is the attunement with a “good enough non-challenging therapist” (Winnicott, 1991) that can support the client in finding calm, peaceful and resourcing imagery, thus enhancing feelings of safety. In this way, the therapy process follows a phase-oriented path with stabilisation before trauma processing, keeping the client safe within their WoT (Blom, 2014; F. M. Corrigan & Hull, 2015; Gerge, 2018; Ogden et al., 2006; Porges, 2011; Schore, 2014; Stern, 2010), which Corrigan & Hull describes beautifully in the following quote:

Patients with complex PTSD who cannot be held in a compassionate and non-judgmental therapeutic relationship will quickly revert to the survival behaviours which have kept them alive. (F. M. Corrigan & Hull, 2015, p. 81)

### **2.8.1. EXPRESSIVE ARTS**

In Expressive Arts (EXA), a multimodal therapy form, the different art modalities, such as music, movement, drama, poetry, and artmaking, are used in combination (Meyer DeMott, 2017; Wärja, 2015). The various art forms primarily talk to different senses and bring different qualities to the therapeutic work, music to the auditive, dance to the sensorimotor and art to the visual sense. In EXA, the movement between different art forms is called intermodal transfer. As Wärja states, “In each distinct art form, the modalities of the other arts lie dormant in the background as potential resources” (Wärja, 2018, p. 21). This intermodal approach was introduced by Paulo Knill (Knill et al., 1995, 2005). The use of imagination and play can be helpful in the transition between the implicit (internal interoceptive world) and the explicit (external world) (Gerge et al., 2010, 2019; Körlin, 2005). Increasing the range of play and curiosity can contribute to an expanded WoT (expanded resilience) and strengthen social engagement (Meyer DeMott, 2017; Porges, 2011). Furthermore, the arts can bring experiences of beauty and vitality into the therapeutic process (Wärja, 2018). The foundation for expressive arts comes from phenomenology and aesthetics, grounded in humanistic and existential psychotherapy traditions (Knill et al., 2005; Malchiodi, 2005).

## 2.8.2. GUIDED IMAGERY AND MUSIC

In the 1970s, an American music therapist, Dr Helen Lindquist Bonny, developed a receptive music therapy method called the Bonny Method of Guided Imagery and Music (BMGIM) (Bonny & Summer, 2002). She studied how music listening in a state of expanded awareness could be used for personal growth and self-exploration (Bonny & Summer, 2002; Bruscia & Grocke, 2002). In the original individual format of BMGIM, a session lasts 90–20 minutes, starting with a verbal conversation, an induction with relaxation and a focus to prepare for the music-listening phase. The music used in the sessions is pre-recorded, usually consisting of 4–6 music pieces from the Western classical repertoire carefully selected to support and stimulate imagery and internal exploration. During the music-listening phase, the therapist serves as a guide by asking short questions to help deepen the imagery experience. The session often ends with mandala drawing (or other artmaking), followed by verbal processing of the experience and how it relates to the initial focus (Bonny & Summer, 2002; Wärja, 2018). Since the method showed to be too challenging to be used with the more vulnerable clients, adaptations were developed for psychiatric individuals and group work (Beck et al., 2017; Blake & Bishop, 1994; Bonde & Nygaard Pedersen, 2015; Goldberg, 1994; Grocke, 2019; Körlin, 2008; Rudstam et al., 2017; Summer, 2019; Torres et al., 2018; Wärja, 2015). The adaptations without guiding of a therapist during the music listening phase are called Music and Imagery (MI) and Group Music and Imagery (GrpMI). The music listening phase in MI and GrpMI is shorter, around 2-10 minutes, with a shorter relaxation and induction. For traumatised participants, sitting in chairs instead of lying down has been used to avoid being overwhelmed, with too strong emotions, and maybe re-traumatised.

There are today several MI methods. One such method that has influenced the present study is Short Music Journeys (in Swedish “Korta musikresor”, KMR) (Wärja, 2015). KMR is rooted in the Bonny Method, expressive arts, existential and psychodynamic psychotherapy (Bonny & Summer, 2002; Knill et al., 2005; Wärja, 2015). The music used in KMR is mainly from film and folk music, with some supportive pieces from the GIM repertoire. The pieces are between 2–6 minutes long. The music used is predictable, with a clear melody and rhythm. The aim is to produce support and safety with a little dynamic movement, in contrast to the more challenging music used in BMGIM.

Other MI methods, accredited by the European Association of Music and Imagery (EAMI), are (1) Music Breathing (Körlin), (2) Resource-oriented Music imagination (RoMI-Frohne-Hagermann), (3) Engaged Music Listening with Guided breathing (EMLGB-Leslie), (4) Music and Care (Papanikolaou), (5) Music and Imagery for Health Programme (Moe), and Supportive, Re-educative Music and Imagery (Summer-Continuum Model) (EAMI Education Committee, 2023). There is an ongoing debate about whether the developments are adaptations, modifications or independent methods that needs their own training and standards.

In selecting music for music and imagery sessions, it is common to use the *iso-principle*. The music is chosen to match the client's mood and general energy level. In Helen Bonny's guidelines for selecting music pieces for the GIM programs, the "affective contour" (the music's dynamic changes and intensity curve) is considered important, together with the pitch, harmonic structure, melody, rhythm and tempo, instrumentation and aesthetic quality. She focused on finding the musical pieces that would fit together for the intended character of the program (Bonny & Summer, 2002). Summer presented an approach in selecting music for a music and imagery session: *music as holding or as stimulating*. She also introduced three concepts: *supportive, re-educative and re-constructive* (Bonny & Summer, 2002), inspired by Wolberg (1977). Music was chosen according to the needs and ego strength of the client.

Wärja and Bonde both independently explored ways to select music for GIM. Based on their respective work, they put together a systematic approach to categorize the music, a taxonomy of music in therapeutic music and imagery work (Wärja & Bonde, 2014). This taxonomy has inspired the music choice in this PhD study and will be presented below.

*Table 1. Music Taxonomy.*

*A taxonomy inspiring the music selection for the Group Music and Imagery sessions.*

### Supportive music

<i>1. The supportive and safe field</i>	Reliable and predictable music with no surprises. Simplicity in musical elements, perhaps only one solo instrument or together with one or two supporting instruments.
<i>2. The supportive and opening field</i>	Music with dialoguing instruments, possibly two different themes and more than one instrument, and a "tiny" musical surprise.
<i>3. The supportive and exploring field</i>	Music with some dynamic tension that gives further support for surrender and the possibility of exploring differences. Crescendos and diminuendos. Some harmonic tension. At times full orchestra. More elements of complexity.

### Mixed supportive and challenging music

<p>4. <i>The explorative field with surprises and contrasts</i></p>	<p>Music often presents a non-familiar soundscape, with surprising shifts in melody, harmony and specific instrumental texture. The musical course of events contains at least one major surprise, and there is moderate harmonic tension.</p>
<p>5. <i>The explorative and deepening field</i></p>	<p>This music invites the listener into an emotional field, a certain mood or emotion, and holds the listener there, even though this can be challenging. The music is often in a minor or modal key, expressing a “dark” atmosphere, typically through intense and expressive melody.</p>
<p>6. <i>The explorative and challenging field</i></p>	<p>Music in this category offers some surprises and contrasts, often with a rather high degree of melodic or harmonic tension. The balance is often obtained by letting the piece begin and end in a calm and supportive character/quality.</p>

### Challenging Music

<p>7. <i>The rhapsodic field</i></p>	<p>Music is a sequence of often unrelated (or loosely related) musical ideas, presenting many different moods, tempi and timbres. Ideas/elements can be quite elaborated or even improvisatory.</p>
<p>8. <i>The field of metamorphosis</i></p>	<p>Music is characterized by one or more significant ideas that are elaborated in many different ways (shape, timbre, dynamics, and tempo) and even transformed into something very different from the first form.</p>
<p>9. <i>The field of mystery and transformation</i></p>	<p>Music in this category cannot be generalized. However, it is often music that is intended to describe, express or facilitate transformation or mystic states of consciousness.</p>

*Note: Adapted with permission from Wärja and Bonde (2014)*



Music choice is essential in GIM therapy since the different musical features (harmony, melody, rhythm, dynamics, pitch, and instrumentation) influence the clients' imagery and processing (Bonny & Summer, 2002). The classification system in the Music Taxonomy (Table 1) by Wärja and Bonde (2014) can guide choosing music according to the client's ability to tolerate arousal. Categories 1 to 3 may be the most suitable for building safety and calming the nervous system. However, more explorative music, with more challenges, surprises and dynamics, will be needed when working with trauma processing and renegotiation. The music from the mixed supportive and challenging field may help the client towards a feeling of strength and empowerment.

The dynamics in music can, according to Stern (2010), be compared with vitality forms of emotion (how they arrive and fade away, and how they move in time, their temporal contour). He coined the concept of “vitality affect” to describe those experiences. Vitality forms can be described as *accelerando*, *diminuendo*, *crescendo*, *staccato*, *floating*, *fading*, *pulsing*, *gliding*, *swinging*, *swelling*, *halting* and so on, which are important aspects in the choice of music and influences how imagery emerges and develops (Körlin, 2019b; Stern, 2010).

Furthermore, different music pieces have different emotional tones, influencing the imagery. Goldberg states that an image evoked by the music includes “all sensory modalities, kinesthetic images, body sensations, memories, feelings, thoughts, and tacit knowledge, and an intuitive sense of imaginal events that arise outside of sensory modes that she calls noetic images (an intuitive feeling of just knowing something)”. (Goldberg, 2019, p. 484). This theory can be linked to the SIBAM model used in Somatic Experiencing (see section 2.7.5.). In order to track a client's processing, where the goal is to have fluent access to all modalities (or channels) and not get stuck in one or two or miss the connection between specific channels, the movement of the music in the GIM and the music-evoked images can be a cue to help repetitive frightening images, such as flashbacks, to start moving away from the fixed repetitive state by introducing movement and a sense of empathic mirroring, thus facilitating integration between different channels or memory fragments.

Researchers are continuously studying the influence of music on emotion and the human mind (Juslin, 2019; Juslin & Sloboda, 2011; Koelsch, 2015). Koelsch questions whether it should be called music-evoked, music-induced, or music-produced emotions (Koelsch, 2015). Nevertheless, he concludes that in GIM, music-evoked images derived from the emotional quality of the music (the tension and resolution, melody, harmonic texture, rhythm, volume, etc.) are used in therapy to deal with inner conflicts and traumas.

There are contraindications for applications of the full BMGIM method. It requires (1): Having a capacity for symbolic thinking. (2): Being able to differentiate between reality and symbolic thinking. (3): Being able to share the experience with a therapist.

(4): Being able to process and grow through GIM. If these criteria are not met, the BMGIM might not be the therapy of choice for that particular client (Bonny & Summer, 2002; Grocke & Moe, 2015). For further description of the development of GIM and MI for traumatized clients, see the literature review (section .3.1.5.).

## CHAPTER 3. LITERATURE REVIEW

The first part of the literature review was conducted in 2015 to lay the ground for the research questions in this dissertation. The purpose of the literature review was to learn about the recommended therapy methods, groups and individuals in the treatment of PTSD and CPTSD and discover the effectiveness of these methods. The purpose was also to explore the use of Music Therapy (MT), Creative Arts Therapy (CAT), and Guided Imagery and Music (GIM) in the treatment of PTSD and CPTSD.

### 3.1. LITERATURE SEARCH METHODS

The electronic databases at Aalborg University library were used for the literature research for the present PhD thesis. The central themes in the search were post-traumatic stress (PTSD), complex PTSD (CPTSD), Guided Imagery and Music (GIM).

The search was conducted from 25 August to 16 November 2015. The initial search terms were “Music therapy AND PTSD”, “Music therapy AND CPTSD”, and “Music therapy AND dissociation”. The search was narrowed down to target GIM specifically, using the terms "GIM AND PTSD", "GIM AND CPTSD", and "GIM AND dissociation". Further inquiry involved "PTSD AND individual therapy" as well as "PTSD AND group therapy". Lastly, an additional search was carried out, specifically targeting "PTSD AND group therapy AND music therapy".

Searches were also done in doctoral theses at Aalborg University, and reference lists were hand searched for interesting items.

The following databases were used: RILM, MEDLINE, CINAHL, Pubget, PsycNET, PUBMED, Scopus, Proquest, Google Scholar and Music Therapy Literature (Bonde 2015). The inclusion criteria were that the articles were peer-reviewed and published in English. Articles with a focus on children were excluded. The initial search was up to 2015. An updated search from 2016–2021 will be presented at the end of this chapter.

The findings are categorized into the following subcategories:

- Meta-analyses of PTSD Treatments.
- Group therapy in PTSD Treatments
- Group Music Therapy in PTSD Treatments
- Individual Music Therapy in PTSD Treatments
- GIM with modifications in PTSD treatments
- Creative Arts (CATS) in PTSD treatments

### 3.1.1. META-ANALYSIS OF PTSD TREATMENTS

In the following section, relevant meta-analyses concerning the treatment of PTSD and CPTSD published between 2005 and 2015 are presented. The studies are ordered by year.

Table 2. *Meta-analyses and Reviews on PTSD treatments (2005–2015).*

Study	Research/focus	Description	Measures	Conclusion
Bradley et al. (2005)	Data from inclusion and exclusion rates, improvement and recovery were examined.	Meta-analysis of studies (1980–2003) on treatments for PTSD. 44 pre vs post. 23 T/WLC and 14 T/ AT. Included: CBT PE and EMDR	Mean ES of change pre versus post: 1.43 ± 0.67 T/WLC: 1.11 ± 0.83 T/AT: 0.83 ± 0.51	44% of those that entered therapy and 54% that completed treatment improved. 30% of referred patients were excluded from the trials.
Schottenbauer et al. (2008)	Nonresponse and Dropout Rates in Outcome studies of PTSD	Review of dropouts and non-response rate in 55 studies of EBT	Ex/PE Dropout range: 0–50%. Non-response range: 20–67%.	Reports high dropout and nonresponse rate for the EBT. Suggests guidelines for reporting these. Empirical studies on alternative methods are needed.
Cloitre (2009)	A description and comparison between CBT approach EMDR and PCT.	Meta-analysis 40 RCT reporting efficacy for PTSD. CBT is the most studied.	ES mean size rank information for PTSD changes by type of tx: Ex: 7.94 Ex+CT: 8.04 CT/CR: 8.83 EMDR: 5.83 PCT: 5.67	High dropout rates of 30% or more were found. Changes in therapeutic approaches, such as phase-based approaches, might help, especially for the more severely traumatized.

Sloan et al. (2012)	The efficacy of Group treatments for PTSD is presented. Groups are not recognized in guidelines as a first-line treatment.	Meta-analyses of 16 studies. Within and between ES.	Within tx: $d = .71$ , 95% CI: [0.51, 0.91] T/WLC: $d = .56$ , 95% CI: [0.31, 0.82] T/AT: $d = .09$ , 95% CI: [-0.3, 0.22]	GT was better than no treatment, although there were no significant results when compared with other active treatments. Individual tx had larger ES than GT. Additional work is warranted to find effective group tx.
Watts et al. (2013)	Efficacy of treatment options for PTSD. Psychotherapy and medication. Included psychotherapies CT, Ex, and EMDR	Meta-analyses: 112 studies included. Primary outcome PTSD symptoms	ES: 1,63, 1,08 and 1,01, respectively.	72% of studies involved CBT. Interpersonal groups were more effective than CBT groups. Studies with more women had higher ES. Psychotherapy was more effective than medication.
Bisson et al. (2013)	Effectiveness of psychological therapies for Chronic PTSD in adults	Cochrane review. Update from 2005. 70 RCT studies. $n = 4,761$	Individual TFCBT and EMDR were more effective than WLC or TAU—standardized mean difference - 1,62; 95% CI [-2,03, - 1,21].	Individual TFCBT, EMDR, non-TFCBT and group TFCBT were more effective than other therapies. Greater drop-out in active treatment. Small sample size and underpowered studies.
Imel et al. (2013)	Drop-out rates among active treatments for PTSD in clinical trials.	Meta-analyses of 46 studies, 17 direct comparisons.	The average drop-out rate was 18%. Group modality and number of sessions increased dropouts.	Trauma-focused treatment resulted in higher drop-out than Present Centered Therapy (PCT).

Barrera et al. (2013)	Evidence for group CBT for PTSD	Meta-analyses of 12 RCTs. $n = 651$ . Comparing GCBT, including groups with and without exposure.	Overall pre-post ES = 1.13. $p < .001$ .	No sign. difference in ES between GCBT, including in group exposure and those who did not. Higher attrition in the exposure groups.
Dorrepaal et al. (2014)	EBT for adult women with child abuse CA-related CPTSD.	The meta-analyses included seven studies, 6 with CBT and 1 with PCT targeting treatment for CA-related PTSD or CPTSD.	The mean recovery rate was 50%. CBT had a higher dropout rate than PCT. ES range from 0.6–2.8 in pre vs post. ES in T/Control ranged from 0.4–2.2.	CA-related PTSD showed large to modest recovery rates. CPTSD had a less favourable recovery rate than PTSD. Not sufficient evidence that predominantly CBT treatments are effective for CPTSD.
Frost et al. (2014)	Evidence for PCT as a treatment for PTSD.	A meta-analysis with 5 RCTs where PCT was the AT and compared with EBT.	Drop-out rates were 14,3% in PCT and 31,3% in EBT. PFGT $d = 0.82$ TFGT $d = 0.63$	PCT had a significantly lower drop-out rate than EBT. PCT was as efficacious as EBT in 3/5 trials. In the other 2 EBTs, a small to moderate favour over PCT was shown. Present Centered GT was favoured over Trauma-focused GT.

Ehring et al. (2014)	Psychological treatment for Childhood abuse-related PTSD.	Meta-analyses: 16 RCT. TF-CBT, non-TF CBT, EMDR and other treatments.	ES Un-controlled ES pre vs post: $g = 1,24$ . Controlled ES Tx/WLC: $g = 0,72$ . Tx/TAU: $g = 0,50$	Trauma-focused tx was more effective than non-trauma-focused. Individual sessions were more effective than pure GT.
Schnyder et al. (2015)	Psychotherapies for PTSD. What do they have in common?	Review comparing seven EBT for PTSD treatment to find commonalities.	STAIR, CT, Narrative Ex, PE, Brief Eclectic PT, CPT, EMDR	Identified commonalities: -Psychoeducation -Emotion regulation -Imaginal exposure -Cognitive restructuring -Emotional targeted -Memory processing

*Note: Tx = treatment, ES = effect size, AT = active treatment, PCT = Present Centered Therapy, EMDR = Eye Movement, Desensitization and Reprocessing, TF-CBT = Trauma-Focused Cognitive Behavioral Therapy, TAU = treatment as usual, WLC = waitlist control, Ex = Exposure, PE = Prolonged Exposure, CPT = Cognitive Processing Therapy, EBT = Evidence-Based Therapy, GT = Group psychotherapy, CA = childhood abuse.*

The most studied treatments for PTSD are various forms of CBT and EMDR. Those are also recommended in guidelines as the first-line treatment for PTSD (Swedish National Board of Health and Welfare, 2017; World Health Organization, 2013). However, several researchers have called for developing and researching additional therapy modalities, especially for individuals suffering from more severe trauma. (Cloitre, 2009; Schottenbauer et al., 2008; Sloan et al., 2012; Watts et al., 2013). Concerns were raised for the high drop-out rates in exposure therapies with 30% or more. (Bradley et al., 2005; Cloitre, 2009; Frost et al., 2014; Imel et al., 2013). Bradley found in a meta-analysis of PTSD studies from 1980-2003 that around half of the patients who completed various forms of CBT or EMDR improved. However, for more severely traumatised patients with prolonged traumas and repeated childhood traumas, which results in a more pervasive impact on the personality, the exposure focus is less clear, and there might be a need to test the effectiveness of other treatment forms.

Schnyder et al. (2015) compared seven evidence-based psychotherapies for PTSD treatment in search of what they had in common. The included therapy modalities were STAIR Narrative Therapy, Cognitive therapy for PTSD, Narrative Exposure Therapy, PE; Brief Eclectic Psychotherapy for PTSD (BEPP), CPT, and EMDR. The

commonalities were (1) Psychoeducation with information regarding trauma and PTSD. (2) Emotion regulation and coping skills. (3) Imaginal exposure, (4) Cognitive processing, restructuring, and meaning-making, (5) Emotions, and (6) Memory processes: reorganization of memory functions and formation of a coherent trauma narrative.

### **3.1.1.1 Summary**

Meta-analyses have shown that 72% of research on trauma treatment has been done on different forms of CBT. According to these studies, practical guidelines for trauma treatment have been developed. However, meta-analyses showed that approximately 40% of PTSD clients still had their diagnoses after treatment with TF-CBT, and the dropout rates were high in exposure therapies, with 30% or more. Many components in the different EBTs for trauma treatment were also shown to be similar.

### **3.1.2. GROUP THERAPY IN PTSD TREATMENTS**

Group therapy has not been recognized in guidelines as an effective treatment of choice for PTSD (World Health Organization, 2013). The following concerns have been raised: (1) Group members may be re-traumatized by each other's trauma history; (2) Disclosing traumatic details in a group setting may allow a patient to make unhelpful comparisons between their trauma history and that of others; (3) Group format may not allow sufficient time for each patient to work through their trauma experience. On the other hand, there are also advantages to group therapy in trauma treatments, such as an opportunity for group members to be with others with similar experiences, which could help reduce the stigma and isolation of having PTSD. A supportive group setting could also help to rebuild a sense of trust and safety, encourage each other, and give each other feedback and new perspectives on traumatic experiences (Barrera et al., 2013).

Two meta-analyses (Barrera et al., 2013; Sloan et al., 2012) found that group treatment was better than no treatment but not as effective as individual treatments. However, participants reported high satisfaction and perceived benefits from the group treatments, and treatment dropouts were comparable with individual treatments for PTSD with a mean of 26.5% (range 0–52%). Sloan et al. (2012) argued that there may be other benefits in group treatments that were not captured in clinical trial outcome measures, such as increased social connectedness and a feeling of not being alone, concurring with the feeling of alienation common in PTSD. They concluded that group treatment is efficacious for PTSD treatment, but that little is known about which group treatments work best for different trauma populations. Since large sample sizes are needed to detect between-group differences, group treatments for PTSD have not been studied as much as individual PTSD treatments.



Classen and colleagues (2001) compared trauma-focused group psychotherapy with present-focus group psychotherapy and a waiting list control group (WLC) amongst childhood sexual abuse (CSA) survivors with PTSD. They questioned whether it was better to focus on working through the traumatic childhood memories or on current life problems. The trauma-focused group aimed to help survivors work through and integrate their traumatic memories and modify negative views of self that were caused by the abuse. In the present-focused group, the survivors were helped to identify and modify maladaptive patterns arriving from their traumatic history. Focusing on the here and now was thought to help them alter their functioning and thereby impact their abuse history. Since the sample size of 55 participants was too small to have statistical power to detect any differences between the two treatment groups, the two groups were combined into one treatment group and compared with the WLC. The result showed a significant reduction in non-assertiveness ( $p < .01$ ) being exploitable ( $p < .05$ ), and in vindictiveness ( $p < .01$ ). It was found that receiving group therapy resulted in a significant reduction of trauma symptoms and dissociation, compared to the WLC.

Schnurr et al. (2003) performed a randomized trial of Trauma-focused Group Therapy for PTSD. The study included 360 male Vietnam veterans randomized to trauma-focused group therapy (TFGT) or present-centred group therapy (PCGT) that avoided trauma focus. In groups of six, they met 30 times, once a week, with a follow-up of five monthly booster sessions. The primary outcome was PTSD severity, measured by CAPs per DSM-IV. The hypothesis was that TFGT would be superior to PCGT. Analyses showed that avoidance and numbing were reduced in TFGT for those who received an adequate dose. Dropout was higher in the TFGT group, and improvement rates were moderate in both groups with no significant difference. Approximately 40% improved with clinical significance in both groups.

Lundqvist et al. (2009) presented a study of group therapy for sexually abused women. Forty-five female outpatients, who had been sexually abused in childhood, and met the criteria for PTSD, were offered a two-year phase-divided group therapy. They answered the social interaction (ISSI) and social adjustment (SAS-SR) questionnaires before, after treatment, and at 12 months follow-up. ISSI measures availability and satisfaction with relationships. The pre/post-test showed a significant improvement in the total score in the study group ( $p < .001$  and  $d = 0.55$ ). The SAS-SR measures seven major areas of functioning. The total score showed a statistically significant improvement in the study group ( $p < .001$  and  $d = .053$ ), with the highest improvement in the subscale: work/studies/homework ( $d = 0.84$ ). The waiting list group, instead, showed deterioration during the waiting period. The group therapy model was based on psychodynamic and object relation theory, and the frame was from Yalom's model (1985).

Droždek et al.(2012) evaluated the effectiveness of three different trauma-focused day-treatment group programs for PTSD in male asylum seekers and refugees. They

assessed three treatment groups ( $n = 56$ ) and a waitlist control group ( $n = 16$ ) of Iranian and Afghani subjects assessed with self-rating symptom checklists for PTSD, anxiety, depression and psychoticism one week before and two weeks after treatment. Both individual and group treatment, including non-verbal therapies, were used. The treatment was designed to last for one year (85 group sessions) with biweekly group psychotherapies of 90 minutes in length, combined with two or three nonverbal therapies (psychomotor, music, and art therapy, each of 75 minutes.) in the same week. The result showed that the treated participants improved significantly in all symptoms measure. The study indicates that group psychotherapy combined with non-verbal treatments in a day-treatment setting improved mental health in refugees with PTSD. Clinical observation also showed that helping clients to verbalize their personal traumatic experiences in the group setting strengthened group cohesion and bonding and decreased the feeling of isolation in the clients. There were no dropouts in the groups.

Castillo et al. (2014) examined the effectiveness and length of a Group CPT intervention for PTSD in a sample of 271 female veterans distributed in 51 groups. The most commonly reported trauma type was sexual abuse, and the average age was 45 years. The method used was manualized cognitive therapy for PTSD. Treatment lengths of 8, 10, or 12 group sessions were compared. The study showed a significant decrease in PTSD symptoms across different treatment lengths, with 22% no longer meeting the criteria for PTSD. Pre and post-measure of PTSD symptoms by PCL showed an improvement in the eight-session group with an effect size (ES) of 0.43, the ten-session group with  $ES = 1.15$  and the 12-session group with  $ES = 0.60$ .

### **3.1.2.1 Summary**

Group therapy for PTSD was found to be better than no treatment but did not show as good results as individual treatments, even though participants reported high satisfaction and benefits from group therapy. An explanation might be that other advantages of group therapy (such as feeling connected to others with similar experiences) were not captured in the clinical trial outcome measures. Furthermore, there was less research on group therapy than individual therapy, which could have influenced the results. Present Centered Group therapy seemed to work as well as Trauma focused-CBT groups and had lower dropouts. The studies showed a lack of knowledge concerning which group therapy model works best for different trauma populations. More studies are needed to compare different group therapy modalities.

### **3.1.3. GROUP MUSIC THERAPY IN PTSD TREATMENT**

The following section will present articles on active Group Music Therapy (GMT) in PTSD treatments.

MacIntoch (2003) described her work in a GMT setting with survivors of sexual abuse. The participants suffered from complex PTSD. The women were asked to bring their favourite music as a check-in with the group. Breathing techniques were taught prior to sharing traumatic memories. Another grounding method was toning (intense and focused singing on a single pitch on a vowel sound). Many abused women had been denied telling their truths, so they needed help finding their voices and telling their stories. Improvisational songwriting techniques were introduced. African drums were brought for the women to play. The author claimed that from drumming to singing and songwriting, many ways opened up for unconscious memories, feelings and thoughts to be accessed and transported through the music into the conscious experiences for processing and healing.

Teague et al. (2006) conducted a study investigating the effect of GMT and other creative arts methods on women who had experienced intimate partner violence (IPV). The seven participants in this study lived in a shelter for women who had experienced IPV. The group met in six sessions, 1.5 hours weekly. The participants completed VAS scales measuring depression, anxiety, and self-esteem before the first session, immediately after the final session and three weeks later. The study used repeated measurement design and post hoc analyses. A significant decrease in depression was found. No significant effects were shown on anxiety or self-esteem. This study suggests combining expressive arts with music therapy may lead to positive treatment outcomes. Further research on the effect of creative arts therapies with a larger sample of women exposed to domestic violence is needed.

Carr et al. (2012) presented an exploratory randomized controlled trial with mixed methods evaluating GMT for patients with persistent post-traumatic stress disorder. The study involved qualitative content analysis and patient interviews. Patients ( $n = 17$ ) still suffering from PTSD after completion of CBT treatment were randomly designed for treatment ( $n = 9$ ) or a control group ( $n = 8$ ). The group who got treatment had ten weekly GMT sessions. The control group was offered the same intervention at the end of the study. The treatment group reported a greater reduction in symptom severity than the control group, with a statistically significant mean difference of  $-20.18$  (95% CI:  $[-31.23, -9.12]$ ;  $p = .0035$ ). A reduction in depression scores BDI-II was also seen but not significant. Music therapy was experienced as helpful by the participants. Limitations were the small sample size and lack of blinding.

In two clinical descriptive studies, Bensimon and colleagues gave examples of how active music therapy has been used in trauma treatment. Bensimon et al. (2008) explored the role of drumming in a music therapy group for six young soldiers suffering from PTSD. They participated in sixteen 90 minutes weekly drumming music therapy sessions. The participants started with basic rhythmic patterns but gradually challenged themselves and moved into more complex rhythms, which needed a higher concentration and movement control to synchronize with the other participants drumming. A common symptom of PTSD is a sense of helplessness and

loss of control. Regaining control was thought necessary for recovery. Bensimon et al. (2012) suggested a GMT treatment model for traumatized soldiers and tested the model on a small sample of six soldiers suffering from PTSD using a mixed-method design. The findings were discussed from the perspective of Peter Levine's pendulum therapy model (Levine, 1997). This study demonstrated how music could help access traumatic memory. Exposure to traumatic memories was done through improvising the trauma. The protagonist instructed the group on exactly how to play. Different instruments, such as metal and wooden, were available for the participants. The metal instruments seemed to arouse feelings connected to the trauma, while the wooden instruments often facilitated pleasant feelings such as relaxation and joy and associations with nature sounds (rain and flowing water). The participants conveyed that playing the trauma together was a different experience than just talking about it. Drumming very loud helped release anger after having worked with trauma processing. The method of pendulation was used during the therapy process (see section 2.7.5). Being able to experience the pendulum movement is seen as a good prognostic sign of recovery (Levine, 2010; Levine et al., 2018). The sessions ended by listening to relaxing music to help the participants leave the sessions more relaxed. After the GMT sessions ended, all participants provided positive feedback about the therapy and its impact on their daily lives. They reported improvement in their well-being and a decrease in flashbacks. The authors suggested that music therapists plan musical activities for pendulation while working with PTSD patients. The mixed method analyses of verbal and musical contents resulted in the following conclusions: Participants learned to express repressed negative emotions constructively via expressive art media and recognize and empathize with their own and others' feelings and situations. They also learned to communicate and support each other via musical improvisation. Songs helped them to tell and share their stories and unresolved issues.

### **3.1.3.1 Summary**

Active group music therapy has been used in various settings. In therapeutic work with physically and sexually abused women, improvisation, songwriting, and African drums were used. The aim was to help the women find their voices again, daring to express themselves since many of them had been silenced by perpetrators. In music therapy with traumatised soldiers, improvisation facilitated exposure to their traumatic memories, drumming for anger release and relaxing music for grounding. The ability to pendulate between traumatic material and safety was considered prognostic for recovery. Results from the studies showed decreases in depression scores and PTSD symptom severity. Making music together opened up for playfulness, feelings of togetherness and safety, thus strengthening the social engagement system (Porges & Dana, 2018).

### 3.1.4. INDIVIDUAL MUSIC THERAPY IN PTSD TREATMENT

This section will show examples of how active and receptive individual music therapy (MT) has been used in trauma treatment. Since articles were sparse, also chapters from music therapy literature were used.

Dr Diane Austin, the developer of the voice-based Austin Vocal Psychotherapy model of MT, points out the importance of giving trauma a voice since survivors of childhood abuse often have been silenced and emotionally neglected by their primary caregivers (Austin, 2002). For this reason, she has developed a method named Vocal Holding, in which the therapist uses two chords chosen by the client to establish a secure musical and psychological container for vocal improvisation. The simplicity and the hypnotic repetition of the two chords in a rocking, rhythmic motion, singing on single syllables, produces a trancelike state that easily accesses the unconscious. According to Austin, this steady musical container allows clients to explore new ways of being, experience creative and playful self-expression and give space for feelings to emerge.

Orth et al. (2004) have described how different active and receptive music therapy methods have been used together with psychotherapy as part of a phasic treatment sequence for the treatment of traumatized refugees. In the same text, they also problematize the use of BMGIM with traumatized refugees because they found that the music used in the method was unfamiliar to this client group.

Hernandez-Ruiz (2005) explored the effect of music therapy on anxiety reduction and improved sleep patterns in 28 abused women in shelters. A pretest-posttest design with a control group was used. The experiment group got progressive muscle relaxation and music listening for 20 min. Each individual selected their own music. The control group was instructed to lie quietly for 20 min. The result significantly affected sleep quality and anxiety reduction in the experiment group but not in the control group.

Sutton & Baker (2009) illustrated in case studies the importance of silence in trauma therapy work with music therapy. They pointed out that trauma survivors tend to fill every emptiness and silence to avoid traumatic material. Listening to inner sounds could be experienced as fearful since it could bring the client in contact with avoided traumatic memories and body sensations. The moments of silence were essential for phrasing to become possible, giving space for musical form and structure to emerge, through which the client could move out of the traumatic material and become intersubjectively connected with the therapist and themselves.

Jespersen & Vuust (2012) conducted a similar study to Hernandez-Ruiz (2005) on the effect of music listening on sleep quality, targeting traumatized refugees. Fifteen refugees with sleep problems participated in the study. The aim was to investigate

whether sleep quality could improve by listening to relaxing music at bedtime and if that also would affect the trauma symptoms and well-being. The relaxing music was nested in an ergonomic pillow. They used a two-group pretest/posttest design with repeated measurements for sleep quality. Both groups got the ergonomic pillow. The intervention group received music but the control group only the ergonomic pillow. The result showed significant improvement in sleep quality and well-being in the intervention group but not the control group. Trauma symptoms were not affected in either group.

### **3.1.4.1 Summary**

These studies emphasized the importance of helping clients build safety and trust in the therapeutic relationship to deal with traumatic memories. Austin described in her method Vocal Holding how she could help clients “find their voice” through the simplicity of singing over two harmonies played predictably in a rocking mood. Sutton discussed how traumatized clients tend to “run from themselves”, being scared to listen inside to avoid traumatic material, and how that makes the improvisation empty and unstructured. In helping them to dare to find moments of silence and listening within, it was possible to connect to the therapist through the music and thus move from the traumatic memory to the here and now. In two studies, listening to relaxing music enhanced sleep quality and decreased trauma symptoms. Sleep improved, but trauma symptoms stayed the same, indicating that only listening to music is insufficient for trauma processing.

### **3.1.5. MODIFIED GIM FOR TRAUMA TREATMENT, GROUPS AND INDIVIDUALS.**

Several modifications have been made to the original BMGIM to suit the more vulnerable trauma group for whom the full BMGIM is too challenging. This section will describe both use of modifications and full BMGIM in trauma work.

Blake and Bishop (1994) reviewed the use of BMGIM and group GIM in an inpatient psychiatric setting to treat patients with PTSD and referred to an unpublished study of Bishop that examined the use of individual GIM with adult female survivors of childhood abuse in an acute psychiatric setting. Bishop found that when empowering images were integrated with traumatic imagery material, positive healing experiences started to evolve, which helped patients in the recovery process. In group GIM the level of structure and containment in each component needed to be greater than in the individual process. There was no guiding (meaning that the therapist asks short questions during the music imaging phase to help the client deepen the imagery), the music pieces were shorter, and the participant remained sitting. A modification was to experience music with eyes open, supported by writing, drawing or movement. Blake and Bishop further concluded that both individual and group GIM could effectively treat PTSD patients in the inpatient psychiatric setting. They stated that

GIM had shown efficacy in addressing PTSD symptoms such as hyperarousal, intrusion, and constriction and fostering empowerment and reconnection. GIM seemed to facilitate contact with subconscious feelings, images, and memories.

Blake (1994) developed an approach in her individual GIM work with Vietnam veterans named Directive Imagery and Music (DIM). In DIM, a specific traumatic memory was selected for processing and combined with three to four pieces of music. The role of the music was to accompany and reinforce the memory, and direct guiding was used to help the client stay in the battle memory. In the postlude, New Age music was provided to calm and stabilise the patient. The purpose of the music was not to facilitate spontaneous imagery but to process the specific memory.

Goldberg (1994) developed a form of group GIM similar to Blake and Bishop, but with the difference that she used music during the induction and imagery experience and continued throughout the music with a structured guiding (talk-over) so that imagery would not become frightening or overwhelming. The aim was to find comforting and positive images, build ego strength and deal with here-and-now issues, and not work through traumatic memories, which differs from Blake and Bishop, who let the clients travel unguided in the music and worked with the client's images in the postlude. Goldberg called her modification Music and Imagery (MI). Goldberg and Summer started to teach the method in BMGIM training in the 1990s. MI was developed for clients who could not benefit from the full-length BMGIM sessions and used non-classical music to provide smaller "containers". Furthermore, the imagery experiences were more focused. The therapist used a talk-over during the music, with a continuous flow of suggestions, to hold focus and engagement in the proposed imagery or left brief openings for the client to find their own imagery. Goldberg called these short pauses (1–2 minutes) in guiding the "windows to the unconscious".

In his dissertation, Körlin (2005) presented a group therapy format in an outpatient setting. The program, Spectrum, was a multimodal CAT group comprising GIM, Creative arts, Body Awareness, Psychodynamic and Occupational therapy. The treatment was a four-week program with groups of 8–10 participants. The groups were blended with men and women, although primarily with women. A so-called continuity person followed the group in all the different group therapies to foster group cohesiveness. The patients could stay overnight during the week but not during weekends. To be included in the group treatment, patients had to be past the acute state of their condition and willing to explore their personal history. Other inclusion and exclusion criteria were suicidality, physical acting out, reflective capacity, ability, interest in working with imagery etc. The patients ( $n = 43$ ) filled in various self-rating scales such as SCL-90 (Symptom Checklist -90), IIP (Inventory of Interpersonal Problems), SOC (Sense of Coherence), RSQ (Relation Style Questionnaire) and DES (Dissociative Experience Scale). SCL-90 showed a significant improvement in the total score. Improvement was also documented in the IIP as well as in SOC. In IIP, the subscales Exploitable and overly Expressive showed the best results. In SOC,

Comprehensibility and Meaningfulness stood out. 88% of the patients completed the treatment. The treatment result showed a large variation within the diagnostic subgroups. Interestingly the traumatised clients had better results in all the outcome measures compared to the non-traumatised clients.

Körlin (2008) also developed a modified GIM method for clients with complex PTSD and dissociation, focusing on self-regulation of the ANS through breathing, music listening and imagery. The method is called Music Breathing- Breath Grounding and Modulation of the Bonny Method of Guided Imagery and Music (MB). MB builds on four components: (1) Silent Breathing for Grounding. The aim is to establish a safe inner space; (2) Music Breathing for Grounding. Music is used as a support for breathing; (3) Music Breathing for Dissociation. Dissociation and flashbacks interfering with breathing are addressed; (4) Music Breathing for Integration. Music is allowed to have more dynamics with elements of surprise and dialogue. The Breathing follows the music with its swelling and receding. The breathing space becomes modulated by more intense imagery and emotions. In this stage, the processing takes the form of symbolization, transformation, and integration. The method has developed significantly and is further described in Körlin (2019b).

Bunt (2011) presented a case study with 17 GIM sessions with a client with CPTSD. Inspired by Jung, Levine, and Herman with her phase-oriented treatment stages approach, he described the client's process of healing and integrating the loss of a husband and childhood traumas. The music choice was secure and predictable in the early phases of therapy and more complex and powerful later in the process. With the help of building trust in the therapeutic relationship and the transformative power of the music, she could process the traumatic experiences. This client benefitted from the use of full BMGIM in sessions.

Maack (2012) compared four groups in her PhD Thesis: (1) Women with Complex PTSD who received 50 individual sessions of Psychodynamic Imaginative Trauma Therapy (PITT); (2) Women with Complex PTSD who received 50 individual sessions of Bonny Method of Guided Imagery and Music (BMGIM); (3) A waiting list control group; (4) A group of women who had finished trauma therapy with GIM at least one year ago. Relevant questionnaires were filled in before treatment, after 25 and after 50 sessions. The result showed that the GIM group participants had a significantly better outcome than the PITT group. Both groups had significantly better results in all scores than the waiting list group.

Beck (2012) did a mixed method study in her dissertation exploring the use of GIM with clients on stress leave. She discussed the importance of pendulation (oscillating between resourceful inner images and stressful experiences) and underscored the importance of staying in "the window of tolerance" to not being overwhelmed. She looked at a trauma perspective on stress and identified traumatic incidences leading up to sick leave-where mobbing, rejection, double bind, etc., seemed to be



experienced similarly in the body as to a physical death threat. In a randomized controlled trial with 20 clients on stress leave, clients in the GIM group were compared to a waiting list control group. In the GIM group, the participants received six individual GIM sessions each, focusing on body images and bodily sensations. The music duration in sessions could be as short as 10 minutes if necessary, but it was mostly 30–45 minutes and gravitated into full BMGIM sessions. When working with more problematic areas, Beck used pendulation (Levine, 2010) by instructing the client to find resourceful images in the relaxation phase before the music started that could be used in the music listening phase, while the client worked with the more traumatic experiences. The result showed a significant decrease in cortisol, anxiety, disturbed mood and physical stress symptoms, and increased well-being and sleep quality in the GIM group compared to the waiting list controls. In a thematic analysis of the GIM transcripts from the sessions, four main themes stood out: (1) relationship to the body self, (2) relationship to the inner world, (3) relationship to others and (4) relationship to surroundings. Beck found that GIM could help to release freeze and immobility states, thus promoting a feeling of calmness and increases in energy levels.

Gao (2013a, 2013b) developed a music psychotherapy approach for treating PTSD named MER (music entrainment and reprocessing). The method had influences from EMDR. The basic premise for this intervention was that traumatic information is held in separate neuronal networks and must be able to bridge itself to more positive adaptive neuronal networks in the individual's memory. The method combined ideas of musical entrainment and imagination with the framework of EMDR. MER was used in a trial with 56 clients suffering from PTSD. Amongst them, 46 had single trauma, and ten had experienced two or more traumas. The number of sessions varied from one session (46.7%), two sessions (18.5%), three sessions (10.9%), four sessions (4.3%) and five sessions (2.2%). Thirteen participants (14.9%) did not complete the treatment. Treatment was completed when the SUD (Subjective unit of disturbance [ranging from 0–10]) was between 0–2. In a follow-up survey on the long-term effectiveness of the treatment, 26 clients responded. Of these, 19 clients reported no relapse at all. Five clients had relapsed.

Bonde & Nygaard Pedersen (2015) presented a study with GrpMI in rehabilitating adult psychiatric outpatients, based on two years of work with this client group using receptive music therapy. The participants had different diagnoses. Psychotic patients were excluded. The common problem area was social anxiety. To be included in the study, the participants needed to be relatively well functioning, i.e., able to manage life outside the psychiatric hospital. All potential participants were assessed individually and invited to a music and imagery experience listening to Tveitt's *O be ye most heartily welcome* (Op. 151, Suite No. 1, Piece No. 1), a piece with a mixed intensity profile (having some dynamics, tensions and surprises). If the participants could produce imagery, tolerated the music, found it meaningful and were willing to report their experience, they were considered suitable for the GrpMI groups. The groups were small (2–4 patients with two therapists, one male and one female). Each

group had 9–15 music therapy sessions once a week. The study showed that music with a mixed supportive- challenging profile could be used in GrpMI with relatively well-functioning psychiatric patients (GAF score over 40), and the specific piece with a mixed intensity profile, *O be ye most heartily welcome*, worked well as an assessment tool for inclusion or exclusion in the GrpMI therapy.

### 3.1.5.1 Summary

Different adaptations of BMGIM, for groups and individuals, have been developed to suit the more fragile traumatised client groups (i.e., persons with PTSD, complex PTSD and dissociative disorders). These modifications are characterized by lighter relaxations and more holding inductions using shorter and more supportive music to keep the process within tolerable arousal levels for the client. Methods such as Music Breathing have been developed to enhance self-regulation, providing a more stabilising and phase-oriented approach to suit clients with CPTSD and dissociation. Influences from other trauma therapy forms, such as clinical hypnosis, EMDR and Somatic Experiencing, can be seen. DIM (Directed Imagery and Music) and MER (Music Entrainment and Reprocessing) have a more direct trauma processing focus with direct guiding and focus on the client's trauma memory. Several authors mentioned that pendulation between resourceful images and traumatic material was crucial for safeguarding against overwhelm and that GIM facilitated contact with subconscious feelings, images and memories. However, also studies using the full BMGIM with good results are presented. There is an exciting development going on in the field. Nevertheless, there is a lack of RCTs with physiological measurements of the effect of group GIM on trauma symptoms. Thus, further studies are needed.

### 3.1.6. CREATIVE ARTS IN PTSD TREATMENT

Creative arts therapy (CAT) is a meta-term for the different arts-based psychotherapies (music, dance/movement, drama, art, poetry/storytelling, and expressive arts). In this PhD study, expressive arts have been used in the context of Group Music and Imagery (see section 5.3). The following section will review some studies regarding CATs and PTSD treatment.

Lefevre (2004) presented a case study using CATs to process traumatic sexual abuse. She explored the usefulness of expressing spontaneous imagery and metaphors in creative artwork to process traumatic memories. Initially, the client had limited ability to play and generate spontaneous imagery. However, as trust and a sense of safety grew, the playfulness and capacity for imagery-making became stronger, punctuating the client's endless flow of words and making her more anchored in exploring different themes or feelings, which helped in processing the traumatic memory.

Talwar (2007) proposed an Art Therapy protocol for accessing traumatic memory through art making, named ATTP (Art Therapy Trauma Protocol). The protocol for

trauma processing in EMDR inspired her. She highlighted that in trauma treatment, the non-verbal memory of the fragmented sensory and emotional elements of the traumatic experience was essential. Art therapy could help to integrate right and left-brain functioning, thus facilitating the integration of the traumatic experience. In ATTP, the client starts by verbalizing a memory of a traumatic event. After that, the client makes a drawing followed by being asked to name the dominant emotion associated with the drawing, identify a negative self-representation or negative cognition such as “I’m a bad person, or I’m worthless”, and find a desired positive cognition such as “I’m a good person, or I’m lovable” together with ratings on a VOC scale (Validity of Cognition). The client continues to draw, alternating between the dominant and non-dominant hand, using a new sheet of paper each time. No research study has been made on the method, but the author claims positive results in trauma processing.

In her PhD thesis, Meyer DeMott (2007) made a phenomenological study of Bosnian war refugees with a focus on returning home. It was a longitudinal study of Bosnian war refugees with an emphasis on documentary filmmaking and art as testimony. In the film “Returning to Life”, she used the metaphor “the house” for the body, the family and the society.

Green (2011) provided an overview of how creative arts are effective in helping traumatized individuals recover. Trauma survivors often cannot express in words what has happened to them. In order to heal, there is a need for them to tell their stories. Creative arts can offer other ways to reenact and retell their traumatic experiences and help to reconstruct and transform them. Green found few evidence-based, strictly controlled studies on art therapy and music therapy in general and even fewer on PTSD. Most studies were case studies.

Shouten et al. (2015) carried out a systematic review of Art Therapy's effectiveness in treating traumatized adults. The authors pointed out that around 30% of the traumatized clients did not benefit from the evidence-based treatments, especially the more severely traumatized ones. Creative art therapies are different from other therapies by using experiential and nonverbal means, shaping and forming feelings and memories with the help of various art materials and art forms. Art therapy has mostly been used in combination with trauma-focused therapies such as EMDR, TF-CBT, Narrative Exposure Therapy (NET) etc. In this review, the inclusion criteria were outcome measures and control conditions. Of the 38 studies that were found, 32 studies were excluded due to a lack of outcome measures and not primarily focusing on art therapy. Three of the six remaining studies were excluded because of a lack of a control group. After finding three additional studies in a nonpublished meta-analysis, six studies were included with a sample of 223 participants (102 in the experiment group and 120 in the control group). In two of the studies, art therapy was combined with other treatments. In the other four, art therapy was the only treatment. The control condition was art control or TAU. Mandala drawing was used in three

interventions, group art therapy in one and art therapy in combination with psychotherapy in two studies. Half of the studies reported a significant decrease in PTSD symptoms ( re-experiencing, avoidance and anxiety) with large to medium ES (0.76–1.96), and one study showed a reduction in depression with ES = 1.05.

### **3.1.6.1 Summary**

The non-verbal components in creative art therapies are highlighted by the authors as ways to get in contact with feelings and body sensations, reducing depression, dissociation, anxiety, and sleep problems, which might depend on the creative art therapies' capacity to access dynamic vitality affects (Stern, 2010), implicit and nonverbal memories, imagery and imagination, thus using a more embodied way of processing. According to Talwar, the different creative art methods also have different ways of processing bilaterally (bilateral stimulation is a method used in EMDR for trauma processing). Reaching both hemispheres in trauma processing can be essential for integrating trauma memories. There are many case studies in CATs, but there is a lack of RCT with outcome measures and control conditions.

## **3.2. UPDATED LITERATURE SEARCH 2016–2021**

In the next section, an update will be presented, starting with meta-analyses and reviews of the development and efficacy of PTSD treatments, both individual and group treatments.

The updated search was carried out in August 2021.

### **3.2.1. META-ANALYSIS OF PTSD TREATMENTS**

Several meta-analyses have been conducted after 2015, supporting evidence-based treatments for PTSD. Cusack and colleagues included 64 trials with participants with severe PTSD symptoms and found a large effect size for decreased PTSD symptoms in exposure-based therapies, Cognitive Processing Therapy (CPT), CBT Mixed therapies, EMDR and Narrative Exposure Therapy (NET). However, there was insufficient evidence to determine which treatment best fit particular trauma populations, and patient preference was not considered. (Cusack et al., 2016). Karatzias and colleagues reviewed 51 RCTs searching for psychological interventions for PTSD, where the participants also had at least one of the three DSO features in the CPTSD symptom cluster. They related their review to the disagreement on whether trauma-focused treatments were suitable for CPTSD and supported the proposal from Herman that phase-based treatments are preferable for complex traumatisation (Herman, 2001; Karatzias, Murphy, et al., 2019). CBT, Exposure, and EMDR were superior in reducing PTSD symptoms compared to TAU, with ES ranging from 0.90–1.26. However, the evidence-based treatments (EBTs) had a low to moderate effect on the DSO symptoms. Mahoney and Schwartz (Mahoney et al., 2019; Schwartze et

al., 2019) reviewed the efficacy of group treatment in PTSD. Mahoney reported large ES ( $g = 0.98$ ) in trauma memory processing groups compared to TAU, and Schwartz found significant results for CBT group therapy versus no treatment with an ES of ( $g = 0.70$ ). However, most included studies (75%) were CBT studies. In one meta-study, 15 novel interventions for PTSD were reviewed for efficacy (Metcalf et al., 2016). The treatments included acceptance and commitment therapy (ACT), acupuncture, art therapy, music therapy, canine therapy, emotional freedom technique (EFT), mantra-based meditation (MBM), mindfulness-based stress reduction, outdoor therapy, rewind therapy, thought field therapy (TFT), traumatic incident reduction, visual, kinesthetic dissociation, and yoga. Only four interventions were RCTs with sufficient quality to be included. Those were acupuncture, EFT, MBM, and yoga. However, they argued that these therapies are grounded in body/mind philosophies and do not address emotions or cognitions. They concluded that there was insufficient evidence to support the efficacy of the emerging interventions. However, the authors stated that if efficacy could be demonstrated, the interventions could become important for the field, especially for those patients that do not benefit from the established therapies.

### **3.2.1.1 Summary**

EBT therapies still hold the line as treatments of choice even though there are some concerns regarding treating the more complex traumatized individuals. Group therapy is better than no therapy, and the research on the new emerging therapies holds too low quality to show evidence for efficacy. Nevertheless, there seems to be a need to develop additional therapy methods for the clients where the EBTs do not work and also to give the client possibilities for choice regarding treatment methods. As Cloitre states, “The ‘one size fits all’ approach to trauma treatment: should we be satisfied?” (Cloitre, 2015, p. 1). There is obviously a need for high-quality research on emerging therapies to establish the level of efficacy.

### **3.2.2. META-ANALYSES OF MUSIC THERAPY, GIM AND CREATIVE ARTS FOR PTSD TREATMENT**

Since 2015 meta-analyses and reviews have started to show up in the arts-based psychotherapy field, which is promising, even if the sample sizes and the number of studies included still are small. Below is a presentation ordered by year of publishing (Table 3).

Table 3. Meta-analyses and systematic reviews for MT, GIM and CAT (2016–2021).

<b>Study</b>	<b>Research/focus</b>	<b>Description</b>	<b>Measures</b>	<b>Conclusion</b>
Beck & Mumm (2015)	Review of MT research in PTSD treatment	Ten studies using MT, MI or GIM in PTSD treatments are presented.	N/A	Decrease of all three components of PTSD across studies.
Van Lith (2016)	A systematic review of art therapy approach in mental health. Four main areas for art therapy were found: Depression, BPD, Schizophrenia and PTSD. Here the PTSD studies will be presented.	Eleven studies for PTSD were found. Both individuals and groups. One RCT. Two studies combined EMDR and art therapy. Two studies presented CBT art interventions. Two studies were neurobiological art therapy.	N/A	A summary of different approaches of art therapy in mental health in treating PTSD. Most studies came from the USA with a trend to leave clinical models and adapt to different EBT approaches to suit the cultural context.
Landis-Shack et al. (2017)	A theoretical review that suggests PTSD clients could benefit from MT	Four studies were found examining the role of MT in PTSD treatment.	Only one RCT (Carr et al., 2012), using active and receptive MT, measured PTSD symptoms. They reported significantly reduced PTSD symptoms. $p = .004$ .	Music can potentially reduce cortisol levels and stress and increase dopamine levels and feelings of connectedness.
McKinney & Honig (2017)	Review evidence that a series of BMGIM could foster positive	Nine studies $n = 275$ . Randomized, non-randomized	They measured anxiety, depression, mood	Promising evidence that a series of BMGM can improve

	health outcomes in adults.	trials and repeated measures reporting psychological or physiological outcomes after a series of at least 6 BMGIM.	disturbance, interpersonal problems, QoL, SOC, PTSD and dissociation. Four studies included physiological measures: (blood pressure, pain, beta-endorphin, and cortisol). Medium to large ES were found.	psychological and physiological health with medium to large effect sizes.
Baker et al. (2018)	Efficacy of creative arts therapies in the treatment of adults with PTSD	A systematic review. Seven studies met the inclusion criteria. Art therapy: 4. Music therapy: 2 and drama therapy: 1 study.	GRADE was used to rate the quality of evidence for each intervention—poor quality of all trials.	The review suggests that CATs may be effective for treating PTSD symptoms. Low or very low quality of evidence for creative art therapies in treating PTSD.
Jerling & Heyns (2020)	Exploring the influence of GIM on the well-being of clients. Both individual and group GIM with adaptations were included.	A systematic review of 14 studies with samples ranging from 6–61. (10 quantitative, one qualitative, and three mixed methods).	Various measuring tools were used, including well-being, SOC, resilience, efficacy and confidence.	The authors concluded that increases in well-being were found across the studies, even though the measuring instruments were different.

*Note: QoL = quality of life, CAT = creative art therapy, SOC = sense of coherence, EBT = evidence-based therapy.*

McKinney and Honig (2017) conducted the first GIM systematic review. They included studies with the original individual BMGIM and the influence on wellbeing.

Jerling and Heyns (2020) published another GIM systematic review that also explored the effect of GIM on well-being. This review was the first one that included different GIM adaptations and group GIM. Both reviews found positive outcomes regarding improvement in psychological and physiological health. Jerling and Heyns pointed out that GIM for groups seemed to be effective and that it would be important with further studies in group GIM and to compare group GIM with individual GIM. These two reviews were not focused on PTSD treatments specifically.

In the area of Music therapy in PTSD treatment, Beck and Mumm (2015) and Landis-Shack et al. (2017) found decreases in all PTSD symptoms across the various studies; however Landis-Shack reported that only four empirical studies exploring MT in PTSD treatment were identified, and of them, only one used specific PTSD outcome measures. Van Lith (2016) explored art therapy approaches to mental health. She included eleven PTSD studies in the review, whereas nine came from the USA. The approaches were adapted to the guidelines for PTSD treatments with innovations of combinations of CBT and EMDR with art therapy. Baker et al. (2017) included seven creative art therapy studies for PTSD treatment. Of them, two were MT, four were art therapy, and one was drama therapy. Baker did not find any studies in dance or movement therapy. The sample sizes ranged from 11–260. The quality of the studies was low to very low, often due to a small sample size, a lack of blinding and no follow-up measuring. One MT study (Carr et al., 2012) and two Art therapy studies showed a significant reduction in PTSD symptoms (Campbell et al., 2016; Wang et al., 2015).

Furthermore, a book chapter (Ahonen, 2019) summarized the development of GIM adaptations (both group and individual) for PTSD. She pointed out how several therapists (Beck et al., 2017; Körlin, 2008; Maaack, 2015) had given their client homework with music and breathing for stabilisation. Maaack (2015) introduced a protocol for the intensity level of trauma reactions, intending to adapt the GIM treatment to the client's intensity level of distress.

Trauma-focused GIM-based therapies were introduced by Beck et al. (2017) using an MI-GIM continuum for traumatized refugees and in Articles 1 and 2 of this thesis as a GrpMI intervention for women with PTSD/CPTSD. In these studies, Somatic Experiencing influenced the GIM intervention method. In a more extensive RCT study with trauma-focused GIM for refugees, Beck and colleagues found that GIM was not less effective than verbal, psychological treatment (Beck et al., 2021). Story and Beck (2017) did a feasibility study with GIM for female military veterans who had been sexually abused ( $n = 5$ ). Participants received ten individual sessions inside the MI-GIM continuum. PCL-5 (a PTSD checklist) was used and showed a clinically significant reduction in PTSD symptoms. A longitudinal study was developed with Expressive Arts as an early intervention, called Expressive Arts in Transition (EXIT), for unaccompanied asylum-seeking adolescents between 15 and 18 years old (Meyer DeMott et al., 2017). The group intervention was based on the stabilisation phase in a phase-oriented trauma treatment (Herman, 1996) focusing on calming, safety, self-



efficacy, hope and connectedness. The intervention was compared with LAU (life as usual). The result showed that the boys in the EXIT group, in the 25-month follow-up, had higher life satisfaction and hope for the future than the LAU group.

### **3.2.2.1 Summary**

The updated literature review from 2015–2021 demonstrated that several innovations have been developed. Systematic reviews and meta-analyses in creative art and GIM are published. The development continues by incorporating parts from the evidence-based therapies for PTSD into the arts therapies. Phase-based approaches for trauma treatments are presented, and the methods are understood from a neurobiological knowledge of trauma and ANS. However, more research is needed, especially RCTs and mixed-method studies.

### **3.2.3. THE STATE OF THE ART**

In the following part, a summary of the answers to the questions of the literature scope will be presented.

#### **1. What are the recommended individual therapy methods in the treatment of PTSD / CPTSD, and how effective are they?**

The most studied and recommended therapy forms for PTSD treatment are primarily different forms of CBT and secondary EMDR (72% of the studies were done on CBT). Both therapy forms have shown to be effective with large ES on decreasing PTSD symptoms but with a low to medium effect on decreasing DSO symptoms related to CPTSD. Furthermore, it was reported that dropout rates were high in exposure therapies. Some researchers highlight the need to develop novel trauma treatment methods for those who do not benefit from EBTs. They also highlight the importance of different treatment forms to give the client a choice. Different trauma-focused treatments have many similar components, such as psychoeducation, emotion regulation, imaginal exposure, cognitive restructuring and building a coherent trauma narrative. In the updated literature scope from 2016–2021, the EBTs (CBT and EMDR) remain the most studied and effective treatments.

#### **2. What are the recommended group therapy treatments for PTSD, and how effective are they?**

Group therapy has not been recommended as the treatment of choice for PTSD. Objections are that group members re-traumatise each other with their trauma experiences and that the group format does not allow enough time for each person's trauma processing. Another view is that the group setting can help reduce the feeling of isolation and build a sense of trust and safety, thus getting away from the feeling of being alone. Trauma-focused CBT group

(TFGT) has been compared with present-centred group therapy (PCGT) and found to be as effective. Group therapy for trauma has not been studied as much as the individual formats and has shown less promising results. However, group members have reported being content and benefiting from the treatment. One explanation could be that the benefits of group treatment are not captured in the outcome measures used in the studies.

### **3. How have Music Therapy (MT), Creative Arts Therapy (CAT) and Guided Imagery and Music (GIM) been used in the treatment of PTSD/CPTSD?**

In group MT, improvisation, songwriting and African drums have been used in groups with women exposed to interpersonal violence and with refugees. Furthermore, in individual MT, vocal psychotherapy using vocal holding (toning) to help survivors of childhood abuse find their voice and music listening to reduce anxiety and enhance sleep quality for abused women is presented. Different forms of modified GIM, both individual and group settings with shorter music listening phases and more holding inductions, are described together with innovations such as Music Breathing (MB), short music journeys (KMR), Directed Imagery and Music (DIM), and Music Entrainment and Reprocessing (MER). In CATS, the non-verbal components are highlighted as ways to increase contact with emotions and bodily sensations, thus enhancing embodiment and facilitating contact with implicit memories and imagery. Influences from hypnosis, EMDR and Somatic Experiencing can be seen. A phase one (stabilisation) group intervention for asylum-seeking boys, Expressive Arts in Transition (EXIT), was developed based on phase-based trauma treatment.

Since 2015 more systematic reviews and meta-analyses have been conducted, and the field continues to develop, influenced by the evidence-based therapy forms for PTSD, where parts are mixed with and further developed with the arts-based psychotherapy methods. However, there are still too few RCT studies in arts-based psychotherapy methods for them to be recognized and recommended in treatment guidelines for PTSD or CPTSD.

# CHAPTER 4. AIMS AND RESEARCH QUESTIONS

The literature review showed that research on GrpMI in the treatment of complex PTSD clients is sparse or missing altogether. Randomized controlled trials (RCTs) are few and often with small sample sizes. Furthermore, even fewer GrpMI studies were found that used physiological measurements to evaluate ANS regulation when evaluating treatment effects. To fill these gaps, the objectives and research questions (RQs) listed below were formulated.

The overall aim of the research was to explore the effect of 12 sessions of trauma-focused Group Music and Imagery (Tf-GrpMI) on women suffering from complex traumatisation.

## 4.1. RESEARCH QUESTIONS AND HYPOTHESIS

### 4.1.1. QUANTITATIVE QUESTIONS

The research question that guided the thesis as a whole was whether participation in phase-oriented trauma-focused Group Music and Imagery could result in changes of trauma-related symptoms compared to a waiting list control group.

#### Primary question

1. Can Tf-GrpMI reduce PTSD symptoms in women suffering from PTSD or CPTSD compared to a waiting-list control group?

#### Secondary questions

2. Can Tf-GrpMI decrease anxiety and depression in women suffering from PTSD or CPTSD compared to a waiting-list control group?
3. Can Tf-GrpMI reduce disturbances in self-organization symptoms in women suffering from PTSD or CPTSD compared to a waiting-list control group?
4. Can Tf-GrpMI decrease dissociation in women suffering from PTSD or CPTSD compared to a waiting-list control group?
5. Can Tf-GrpMI improve the quality of life in women suffering from PTSD or CPTSD compared to a waiting-list control group?

6. Can Tf-GrpMI increase capabilities for regulating the ANS in women with PTSD or CPTSD as measured by HRV and other physiological measures compared to a waiting-list control group?

#### **4.1.1.1 Null Hypotheses**

##### **Primary outcome:**

1. The participants will not experience reduced PTSD symptoms

##### **Secondary outcomes:**

2. The participants will not experience reduced anxiety and depression.
3. The participants will not experience reduced DSO symptoms.
4. The participants will not experience decreased dissociation.
5. The participants will not experience improved quality of life.
6. The participants will not gain greater ANS flexibility.

#### **4.1.2. QUALITATIVE QUESTIONS**

(In a multiple case study).

1. What characteristic features and developmental processes are observed in the imagery of individuals, with PTSD/CPTSD, during participation in phase-oriented Tf-GrpMI?
2. In what way might the choice of music influence participants' imagery?
3. How do the participants experience the phase-based Tf-GrpMI intervention?

As indicated in the research questions, the research design was initially planned as a mixed-method study using a Convergent Parallel Mixed Method Design (Creswell, 2014). The qualitative part aimed to explore how the participants experienced taking part in the intervention with Tf-GrpMI, analyse their artwork and imagery in search of developmental features and relate that with the music used in sessions. However, since the Trauma-centre where the research was located was unexpectedly closed during the data collection period, only the quantitative part could be carried out. Nevertheless, in the feasibility study, a minor part of the qualitative research was conducted answering question 3. These circumstances make this study mainly a quantitative research study, using a convergent mixed design with an embedded qualitative part.

## 4.2. ARTICLES ADDRESSING THE RESEARCH QUESTIONS

The first pilot study (Article 1) aimed to explore the feasibility of the intervention and the physiological recording procedure. RQs nr 1, 2, 4, 5, and 6 were addressed, and the qualitative RQ nr 3: how the participants experienced the Tf-GrpMI intervention. In the second article (Article 2), the randomized controlled study, the focus was on answering the primary hypothesis that 12 sessions of Tf-GrpMI could decrease PTSD symptoms as well as the secondary hypothesis if Tf-GrpMI could reduce anxiety, depression, the DSO symptoms, dissociation and increase well-being answering RQs: 1,2,3,4 and 5. In the third unpublished manuscript (Article 3), the main purpose was to report the physiological biomarkers measuring arousal and reactivity before and after the Tf-GrpMI intervention using a script-driven imagery procedure (see section 5.4). Secondly, the article investigated if the physiological measures correlated with the self-rated PTSD symptoms answering RQ 6.

## 4.3. EPISTEMOLOGICAL AND ONTOLOGICAL PERSPECTIVES

Quantitative research is rooted in the objectivistic perspective and positivistic tradition (Hiller, 2016). In positivism, only observable or measurable experiences are accepted as analysis data. There is a belief that absolute truth can be found and measured, including interpersonal and social experience, treating persons as objects. Objectivistic research, in contrast to qualitative research, is thought to produce neutral knowledge. Objectivism builds on *realistic ontology*, assuming that reality exists out there and can be discovered through repeated observations during highly controlled conditions (N. Cohen, 2016). However, this positivistic assumption has been criticized, and a less rigid theoretical perspective, post-positivism, developed. In post-positivism, findings are not seen as absolute truth, and there is a recognition that researchers' bias can influence the observations. Since objectivity is essential in quantitative research, the researcher must find ways to minimize the risk of bias in methods and conclusions (N. Cohen, 2016; Creswell, 2014; Robson, 2011). For this purpose, guidelines have been developed, such as the CLEAR checklist of non-pharmaceutical trials, CLEAR-NPT (Boutron et al., 2005; McKinney & Honig, 2017), with checkpoints regarding the method for randomization, blinding of participants (not feasible in a psychological study such as this), blinding of the interventionist, blinding of outcome assessors, treatment fidelity, care providers skills, participants adherence, careful registration for and numbers of dropouts in each randomized group, and the intention-to-treat principle. There are two other trial guidelines, the CONSORT statement (the CONSORT Group et al., 2010) and the SPIRIT guidelines (Chan et al., 2013). In objectivistic research, experimental and quasi-experimental designs are utilized, such as randomized controlled trials, repeated measurements, or crossover designs.

Qualitative research, on the other hand, builds on interpretivistic knowledge holding the view that knowledge is a human construct, arriving from how humans interpret

their experiences of and in the world. Interpretivism builds on *relativistic ontology*, where the researcher tries to understand the meanings that a particular person gives an experience, given their values, political standpoints, culture, life circumstances, history, etc. The interpretation is specific to that individual and not generalizable to others (Braun & Clarke, 2013; Hiller, 2016). Subjectivity and relativity are natural aspects of this research. The data are usually collected through written or spoken words or images (i.e. interviews, texts or artwork). In interpretivistic research, both inductive and deductive processes are utilized. In the inductive or bottom-up process, a coding procedure identifies themes from the data to generate theory. In the deductive or top-down process, coding is guided by the researcher's theoretical interest or the search for answers to specific research questions (Braun & Clarke, 2006, 2013; Hiller, 2016). Interpretivistic epistemology includes many qualitative perspectives, such as constructivism, social constructivism, phenomenology and hermeneutics. In constructivism, the focus is on understanding phenomena from the researched person's perspective. Knowledge is seen as relative, with multiple meanings, where no one is more right than the other. In the social constructivists' view, persons sharing sociohistorical context and language intersubjectively co-construct their meaning-making of experiences. It is not just constructed in one individual's mind (Hiller, 2016). For the phenomenologic researcher, the focus is on understanding the lived experience (the perceptions, cognitions and language surrounding the experience), and humans are understood as beings in the world and cannot be described apart from it. As Hiller puts it:

Thus, human consciousness is seen as inextricably linked to the experience one has in the world, and likewise, the world is seen as only meaningful through having been encountered by a conscious being that ascribes meaning to it. (Hiller, 2016, p. 109)

The phenomenologist seeks to find the essence of the experience. In hermeneutics, the interest is in understanding the process of understanding itself rather than what is understood (Robson, 2011). Moving between the parts (the people studied, their socio-historical context, artworks, actions, linguistic description of the experience as well as the researcher's) and the whole, and back again, to deepen understanding is known as the hermeneutic circle. The parts can only be understood in relation to the whole and vice versa (Hiller, 2016).

The mixed method design is a flexible research design where qualitative and quantitative data are collected and integrated to provide a larger picture of the investigated problem (Bradt et al., 2013). A mixed design gives space to both objectivistic and interpretivistic views, following the pragmatic worldview, where the truth is both independent of the mind and in the mind, not one or the other. "Pragmatists have believed in an external world independent of the mind as well as lodged in the mind" (Creswell, 2014, p. 11). Pragmatism frees the researcher to choose multiple approaches in collecting and analysing data (Creswell, 2014).

In mixed method design, the data collection can be done simultaneously (Convergent Parallel Mixed Methods) or sequentially, either starting with the quantitative part (Explanatory Sequential Mixed Methods) or the qualitative part (Exploratory Sequential Mixed Methods). In the embedded mixed method design, one data set plays a secondary role and the other the primary; for example, a qualitative branch can be nested in a bigger quantitative study or vice versa. Data collection in the embedded design can be done both simultaneously or sequentially (Bradt et al., 2013; Creswell, 2014).

In the convergent design, the collected data are analysed separately and then compared. One way to merge the two strands of the research is to report the statistical findings and compare them with the qualitative data's themes to see if they confirm or disconfirm the statistical results. Another way can be to start with the qualitative findings and then compare them with the statistical findings. In the explanatory sequential design, the data from the quantitative part are analysed first, and the qualitative part is then planned as a follow-up to explore the quantitative results more in-depth. In the exploratory sequential design, the data from the qualitative part are analysed first, which might result in a model that can be further tested with quantitative measures (Burns & Masko, 2016; Creswell, 2014; Magee, 2016; Robson, 2011).

This study can be described as real-world research as it was conducted with traumatised women in a specialist trauma clinic (Robson, 2011). A pragmatic worldview guided the study, and data were collected and analysed in multiple ways to allow for both objectivist and interpretivist knowledge. The aim was to gain a richer understanding of the effects and the participants' experiences of Tf-GrpMI and an opportunity to triangulate the findings. The RCT study had a quantitative approach using a randomized controlled trial with parallel groups. The feasibility study had a convergent parallel mixed method design with qualitative and quantitative data collected and analysed simultaneously and then compared with each other to shed further light on the research question. For the study as a whole, the mixed method has an embedded mixed method design with a smaller qualitative strand nested in the larger quantitative study.





# CHAPTER 5. METHODS AND MEASURES

This chapter provides an overview of the project's research design, a description of the clinical intervention (not found in the articles), the research participants, and the methods and outcome measures used in Articles 1–3.

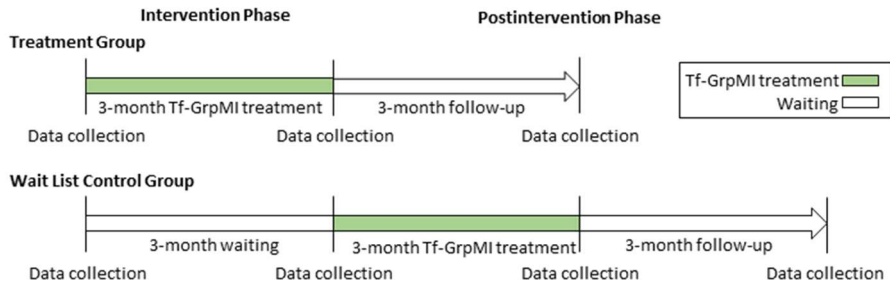
## 5.1. THE RESEARCH DESIGN

The first study (Article 1) is a pilot study aimed at exploring the feasibility of the intervention and whether the measurements are tolerable. This study included two groups with five participants each. The study used a mixed methods design with qualitative analyses, inspired by thematic analyses, of semi-structured interviews (done after the end of treatment) and repeated outcome measures at pre- and post-treatment and at three-month follow-up. A combination of physiological measurements pre- and post-treatment was tried out for feasibility.

The second study (Article 2) is a randomized controlled trial (RCT) with a parallel group design comparing a treatment (T) group to a waiting list control (WLC) (Figure 4). The participants filled in self-rating scales and underwent psychophysiological measurements, recorded during a script-driven imagery method. Data were collected before and after treatment and at the three-month follow-up in the T group. The WLC condition data were collected pre and post a three-month waiting period. The WLC group got the same treatment after having served as a control and was also measured after receiving their 12-session Tf-GrpMI treatment. Both the interaction effect of T/WLC and the within-group results were analysed. Data for a qualitative part of the study was collected (semi-structured interviews and photos of their drawings) but have not yet been explored.

The third article (Article 3) is part two of the RCT in which the results from the recorded physiological data collected during a script-driven imagery (SDI) procedure are presented. Physiological data were compared with data from the self-rating scales. Arousal and reactivity measures of heart rate and electrodermal biomarkers, sampled during SDI, were analysed for differences between group and within-group pre and post-intervention.

Figure 4. Study design for the randomized controlled trial.



## 5.2. PARTICIPANTS

The participants were recruited from a list of clients referred for treatment to a private clinic specialized in trauma treatment (the Crisis and Trauma Centre) in the Stockholm area (Sweden). The inclusion criteria were being female and having a history of physical/psychological and/or sexual abuse, which has led to a diagnosis of PTSD or CPTSD. Interested subjects were assessed for eligibility.

### 5.2.1. INCLUSION AND EXCLUSION CRITERIA

*Inclusion criteria.* “To be accepted in the study, potential participants should: (1) be suffering from PTSD / CPTSD, (2) be sufficiently stabilised to tolerate being exposed to trauma treatment and listen to other persons’ stories, (3) be able to speak good enough Swedish to express themselves without an interpreter, (4) have the interest to work with their problems using artistic expressions and (5) be able to symbolize and work with inner images” (Rudstam et al., 2017, p. 207).

*Exclusion criteria.* “The exclusion criteria were: (1) difficulties in understanding or making themselves understood in Swedish, (2) severe personality disorder or neuropsychiatric disorder, (3) ongoing alcohol or drug abuse, (4) psychotic disorder, (5) acute suicidality, (6) ongoing severe medical condition(s), or (7) serious psychosocial problems. If the participants were found to be potentially vulnerable or disruptive according to the exclusion criteria or not interested in participating in group therapy with music and expressive arts, they were offered treatment as usual at the clinic” (Rudstam et al., 2017, p. 207).

## 5.3. CLINICAL INTERVENTION

The three-month active treatment intervention used in both studies consisted of 12 trauma-focused group music and imagery (Tf-GpMI) sessions. Each session lasted 2.5

hours. Tf-GrpMI is a combination of GIM, MB, KMR and EXA, inspired by Somatic Experiencing and Clinical Hypnosis. The intervention followed a flexible manual with the possibility of adjustment when needed. Each session included a warm-up phase, followed by a music journey and painting, and then further processing of the imagery evolved during the music journey using different expressive arts techniques.

### 5.3.1. THEMES IN THE PHASE-BASED TRAUMA-FOCUSED GRPMI

**Session 1–4: Stabilisation phase.** The first phase emphasised building safety and trust in the group, starting with the participants presenting themselves and why they wanted to participate in the treatment. The next step was to learn different stabilisation techniques, such as music-breathing and body scanning. The themes for the music journeys in the stabilisation phase were to find imaginal or real safe and calm places, resources, and helpers (such as imaginal/or real wise figures, animals, and strong protectors) and to formulate goals and localize obstacles through metaphors. Furthermore, the sessions included psychoeducation around ANS, trauma, dissociation, and active and passive defences. The music pieces played in the stabilisation phase were calm, predictable, and safe, and chosen according to the Supportive Fields of the Music Taxonomy (see Table 1) (Wärja & Bonde, 2014).

**Session 5–8: Trauma processing phase.** The music journeys in this phase focused on empowering and strengthening boundaries and, in imagination meeting perpetrators. The participants processed the evoked imagery further by practising active defences (see section 2.7.5.) through movements, active music-making, formulating a boundary-setting letter to the offender (a “take no shit”-letter), and working with monodrama (Knill et al., 2005). The aim was to renegotiate the traumatic memory by discharging the physiological activation stored in the negatively valenced memory and find the action that leads to resolution, maybe by expressing an uncomplete defence response that was not possible at the time, such as escaping, expressing anger or marking a boundary (F. Corrigan & Grand, 2013; Levine, 1997, 2010; Ogden et al., 2006; van der Kolk, 2015). The music pieces in this phase were characterized by more power and complexity to build up and strengthen the active defences. According to the Music Taxonomy, music pieces corresponding with the: Supportive-challenging fields were chosen (see Table 1) (Wärja & Bonde, 2014).

Another focus for the music journeys in this phase was to work with ego states and increase compassion for wounded younger self-states (Karatzias, Hyland, Bradley, Fyvie, et al., 2019; Schwartz, 1995; Watkins & Watkins, 1997). The music used here was melodic and soft with warmth and beauty, aiming to facilitate self-compassion. Music from the Supportive field in the taxonomy was used (Wärja & Bonde, 2014).

**Session 9–11: Integration.** The music journeys focused on integrating and creating a coherent trauma narrative. The participants looked at all the paintings done at previous sessions and wrote their life stories. The narratives were then shared in the group, and

unfinished aspects of the narrative were further processed in music journeys. In addition, the evoked imagery was explored through expressive arts techniques. The aim was to help clients integrate the traumatic experiences, i.e., to make them realise that the adverse events have happened to them but belong to the past and are now over. Finally, the clients summarized what they had learned from the group treatment experience. The music used in this phase depended on the themes of the group and was from both Supportive and Mixed Supportive - Challenging fields of the Music Taxonomy (see Table 1) (Wärja & Bonde, 2014).

**Session 12: Saying goodbye.** The participants created installations of all the drawings and writings from the sessions. They shared transformative moments and gave each other feedback on their processes in the group. The last music journey focused on saying goodbye and looking into the future.

### **5.3.1.1 Treatment Fidelity.**

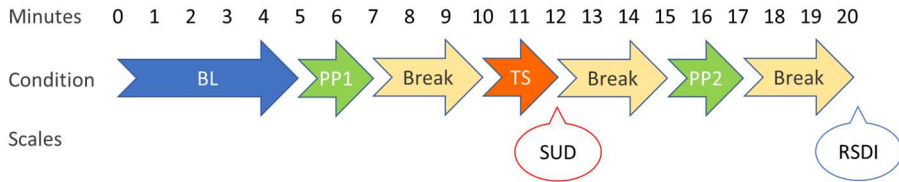
Before each session, I wrote a session protocol according to the flexible manual developed during the pilot project, and after the session I wrote an account of the group session for fidelity checking. My co-therapist checked compliance with the flexible manual.

## **5.4. SCRIPT-DRIVEN IMAGERY PROCEDURE**

A script-driven imagery method was used to collect psychophysiological measures analysed in Article 3 (Figure 5). Different physiological variables were continuously recorded during a 20-minute period consisting of alternating conditions of rest and personalized script exposures. The two ideographic scripts used, one peaceful and one traumatic, were prepared in advance by the participant and the researcher in collaboration. The participant was asked to choose one memory of feeling safe /calm and one traumatic memory and write them down in present tense and first-person perspective. The researcher then prepared scripts of two minutes in length from each of the two memories and presented them orally to the client during the exposure phases of the SDI procedure. As a prerequisite, the traumatic memory was determined to be between 7–10 and the safe place between 0–3 on the Subjective Unit of Distress (SUD) scale (Wolpe, 1969). The SUD scale is a Likert scale that measures the level of disturbance (between 0–10).

Figure 5. The Script-Driven Imagery procedure.

Schematic overview of the timing of the Script-Driven Imagery procedure conditions and assessment instruments.



Note: BL = baseline, PP1 = peaceful place first time, TS = trauma script, PP2 = peaceful place second time, SUD = subjective unit of distress, RSDI = response to script-driven imagery scale.

The SDI procedure included the following conditions: (1) 5 min adaption, baseline, (2) safe/calm place (memory)-script of 2 minutes, (3) 3 minutes break, (4) trauma script of 2 minutes, (5) 3 minutes break, (6) repeat of safe/calm place (memory)-script of 2 minutes, and (7) 3 minutes break.

Immediately after the trauma script, the participants reported their level of distress by providing a SUD score between 0–10.

After the physiological assessment, the participant was asked to fill in the response in the script-driven imagery scale (RSDI), a self-report scale evaluating the experience of listening to the trauma script (Hopper et al., 2007). The physiological data gathered during the script-driven imagery experience was applied to measure the capacity for achieving ANS flexibility. The script-driven imagery method used in the study has been modified from the original (Pitman et al., 1987) that used a 30-second length of scripts. This study adapted the modified method described by Sack et al. (2004), where the script had been lengthened to two minutes since the main interest was to measure regulatory and arousal modulation capacity. In both Sacks and Pitman's versions, there are five scripts, where the traumatic memory is personalized, whereas the other scripts (relaxation and neutral scripts) are standardized (such as the imagination of washing dishes). In this study, a personalized script was also used for the safe/calm place since there is no guarantee that the standard scripts for neutral experiences do not cue traumatic memories in the subject. According to the pendulation theory (Levine, 2010) and the safe place installation (used in EMDR and clinical hypnosis), a personalized safe /calm place or memory would presumably give a better measure of their recovery capability. In this trial, first person and present tense were used in the script. Both first-person and second-person perspective has been used in earlier trials with script-driven imagery techniques (Pitman, 1987; Sack, 2004; van der Kolk, 2007). The participant filled in the RSDI scale right after the trial. It consists of 11 items. Items 1–4 measure re-experiencing, items 5–7 avoidance, and items 8–11 dissociation. The RSDI scale helps to compare the subject's personal experience of

listening to the trauma script with the physiological measurements taken during the listening.

## 5.5. OUTCOME MEASURES

The self-rating scales were obtained before and after treatment and at the three-month follow-up. For a detailed description of the data collection procedure, see Article 1 and Article 2 (Rudstam et al., 2017, 2022).

### 5.5.1. SELF-RATING SCALES

The self-report scales used in this doctoral thesis were pragmatically chosen because they were part of the Crisis and Trauma Centre's standard set of routinely used assessment instruments. They are the PTSD Checklist for DSM-5 (PCL-5), the Dissociative Experiences Scale (DES), the Somatoform Dissociation Questionnaire-5 (SDQ-5), the Hopkins Symptom Checklist (HSCL-25), and the Positive States Of Mind Scale (PSOMS).

**The PCL-5** is a scale with 20 items that measure PTSD symptoms (Weathers et al., 2013). PCL-5 is constructed in accordance with the PTSD criteria in DSM-5. It measures re-experiencing, avoidance, changes in the perception of self and others, and hyperarousal. The cut-off score is estimated to be 33, and the internal consistency is good (Cronbach's  $\alpha = .96$ ) (Bovin et al., 2016).

**The DES** has 28 items and measures psychoform dissociation (Bernstein & Putnam, 1986). A cut-off score of 30 was suggested for a probable presence of dissociative disorder, and a DES Taxon (subscale with eight items) was applied to identify severe dissociation (Waller et al., 1996). The reliability and validity of the Swedish version are good. (Körllin et al., 2007). Cronbach's  $\alpha$  was found to be .87.

**The SDQ-5** is a shortened version of the SDQ-20 measuring somatoform dissociation (Nijenhuis et al., 1997) with a recommended cut-off point of 8 for somatoform dissociation. The SDQ-5 has shown a high sensitivity to discriminate between dissociative and non-dissociative individuals. A score of 12 or more indicates dissociative disorders (Nijenhuis et al., 1997).

**The HSCL-25** measures anxiety and depression. It has 25 items, item 1–10 (HSCL-25-I) measures anxiety, and item 11–25 (HSCL-25-D) depression (Derogatis et al., 1974; Nettelbladt et al., 1993). The scale has Cronbach's  $\alpha = .94$  (Glaesmer et al., 2014).

**The PSOMS** has six items and assesses the experienced level of functioning. The PSOMS measures well-being, having good relationships, concentration, the ability to

relax and enjoy, and the ability to take care of self and others. The inner consistency is acceptable, with Cronbach's  $\alpha = .77$  (Adler et al., 1998).

## 5.5.2. PSYCHOPHYSIOLOGICAL MEASUREMENTS

The psychophysiological measurements recorded during the SDI procedure were heart rate (HR), skin conductance (SC), finger temperature, forearm electromyography (EMG), and respiration. However, only HR and SC were analysed. The measures were obtained using the NeXus-10 MKII physiological monitor system with the Biotrace software version 2013A (Mind Media B.V., the Netherlands).

### 5.5.2.1 Cardiovascular measures

**Heart rate (HR)** was measured from the blood volume pulse recorded by photoplethysmography, and the interbeat intervals (IBI) were further processed in Kubios HRV Standard software version 3.4.2. (University of Kuopio, Finland), to calculate different measures of heart rate variability (HRV). HR and HRV are controlled by both the sympathetic and the parasympathetic branches of the ANS. High-frequency HRV is primarily mediated by the parasympathetic branch, making it a plausible measure of parasympathetic activity. Low HRV has been found in PTSD (H. Cohen et al., 1998) and is associated with stress and health problems (Porges, 2011; Thayer & Lane, 2007). An increased HRV is thought to reflect reduced sympathetic activity and to improve self-regulation, and social engagement, which makes it interesting for assessing treatment outcomes (Petrocchi & Cheli, 2019; Porges, 2003, 2011; Whitehouse & Heller, 2008).

Short-term HRV consists of two overlapping processes. The relationship between ANS's sympathetic and parasympathetic branches and the respiratory sinus arrhythmia (RSA) with its regulatory influence on HR and HRV (Shaffer & Ginsberg, 2017). HRV measures are divided into:

- 1) ***Time-domain measurements:*** a quantification of the amount of HRV observed during a specific time frame that can be both short (5 min or less) and long (often 24 h) term range. Many different time measures exist and are derived from inter-beat interval (IBI) differences. However, the measures recommended by the Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996) include the standard deviation of all intervals recorded (SDNN; estimate of overall HRV), the standard deviation of the averages of intervals in all 5 min segments of a recording (SDANN; estimate of long-term components of HRV), and the root mean square of successive IBI differences (RMSSD; estimate of short-term components of HRV).
- 2) ***Frequency-Domain measurement:*** represents different frequency bands, meaning that HRV is separated into its underlying spectral components, the ultra-low

frequency range (ULF;  $\leq 0.003$  Hz), the very low-frequency range (VLF; 0.003–0.04 Hz), the low-frequency range (LF; 0.04–0.15 Hz), and the high-frequency range (HF; 0.15–0.4 Hz). Shaffer compares it with “a prism that refracts light into its component wavelengths” (Shaffer & Ginsberg, 2017, p. 5).

The HRV measures used in Articles 1 and 3 are a time domain measure in the form of RMSSD and the frequency domain measures of LF and HF HRV, the Total power of all HRV, and the LF/HF ratio.

**RMSSD** (ms) is a measure that reflects the beat-to-beat variability between normal heartbeats. The time differences between heartbeats (the IBI), measured in milliseconds, are obtained. After squaring each obtained value, the result is averaged, and the square root is taken from the total. RMSDD is used primarily to attain the vagally mediated HRV changes (Shaffer et al., 2014). This measure was chosen in this study because it is recommended for measuring periods of 5 minutes or less (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996).

**LF** ( $\text{ms}^2$ ), low-frequency HRV (0.04–0.15 Hz), is usually recorded over a minimum of two minutes (Shaffer et al., 2014). LF power reflects both sympathetic and parasympathetic activity but is primarily seen as a measure of sympathetic activity. The SNS cannot produce rhythms over 0.1 Hz. Porges (2007) proposed that when the breathing pace is at 0.1 Hz (around six breaths/minute), the LF band is influenced by both the ventral and dorsal vagal nerves.

**HF** ( $\text{ms}^2$ ), high-frequency HRV (0.15–0.4 Hz), reflects parasympathetic activity (Berntson et al., 1997; Shaffer et al., 2014) and is also called the respiratory band since most of the variations that are attributed to respiration occur in this band. HR increase during inhale and decrease during exhale, as first described by Ludwig (1847), a phenomenon known as respiratory sinus arrhythmia (RSA) (Porges, 2011; Shaffer et al., 2014).

The **LF/HF ratio** estimates the automatic balance between LF and HF bands. The assumption underlying this measure is that LF power is generated by the SNS and HF by the PNS, indicating that a low LF/HF ratio may reflect PNS dominance and a high LF/HF SNS dominance. However, this must be interpreted with caution since LF can also be mediated by PNS activation (Billman, 2013; Shaffer et al., 2014). Furthermore, it has been recognized that both branches can be activated simultaneously, making the relationship more complex (Shaffer et al., 2014).

**Total power** ( $\text{ms}^2$ ) is the sum of the power in the ULF, VLF, LF and HF bands for long-term recordings and the VLF, LF and HF bands for short-term recordings. Total power reflects the overall autonomic activity.



### 5.5.2.2 Electrodermal activity measures

The **Skin conductance level (SCL)** measures sweating and is solely controlled by the sympathetic branch. It is assumed to be an indicator of arousal. In this study, skin conductance SCL is measured using two Ag-AgCL Velcro snaps-on electrodes attached to the index and ring finger of the non-dominant hand. The sensor measures sweat changes in 1/1000 micro-siemens (Bauer et al., 2013; Boucsein et al., 2012)

The **Non-specific skin conductance response (NS-SCR)** measures phasic changes in the electrical conductivity of skin that occur without identifiable eliciting stimuli, most often expressed as the number of sweat responses peaks during a specific time range. NS-SCR is a measure of emotional reactivity and sympathetic activation. (Amiri et al., 2016).

## 5.6. STATISTICAL ANALYSES

The significant level alpha was set to .05 for both studies (Article 1-3). No adjustment for multiple comparisons was made since PTSD symptoms were the primary outcome in Article 2 and the explorative nature of Article 3. The statistical analyses were performed with IBM SPSS Statistics for Windows version 22 (Article 1) or 25 (Articles 2 and 3). R Statistical Software version 3.6.2 (R Core Team, 2019) with different statistical packages were used in papers 2 and 3.

The required sample size for the RCT study was calculated a priori using G\*Power software version 3.1.6 (Faul et al., 2009). The large ES of 0.4 (Cohen's *f*), selected for the analysis, was based on data from the feasibility study, Crisis and Trauma Center's treatment outcome evaluation (2012), and conventional ES for psychotherapeutic treatments of PTSD complaints obtained from various review articles (Bisson et al., 2007, 2013; Bradley et al., 2005; Cusack et al., 2016; Watts et al., 2013). With an alpha level of .05 and power = .80, the calculated desired sample size for mixed repeated measure ANOVA was  $n = 52$ .

As a general rule, missing values were mean value substituted if the total number of missing items for an individual scale were less than 8%. The whole scale was dismissed if missing items were more than 8%. In Article 2, 0.3% of all items were missing, and the mean value was substituted, but no individual scale had to be excluded. Similarly, in Article 3, a condition measurement would be removed from the analysis if more than 8% of the 2 minutes physiological data of the measured modality consisted of artefacts. However, no data had to be rejected based on this rule.

### 5.6.1. THE FEASIBILITY STUDY

The pilot study used an analysis of variance (ANOVA) for repeated measures to calculate the self-rating scales' results from pre-, post, and follow-up measures. The

data was tested for normality using the Kolmogorav-Smirnov statistic procedure. Two scales (SDQ-5 and DES-T) violated the assumption of normality and were square-root transformed before the ANOVA analysis. The effect size of Cohen's  $d$  was calculated for the pre-to-post and pre-to-follow-up treatment measures.

### 5.6.2. THE RANDOMIZED CONTROLLED STUDY

The RCT analyses were performed per protocol (including only participants who completed the treatment). After screening the data for normality, a two-way mixed ANOVA was conducted to analyse the interaction effect and a repeated measures ANOVA for the within-groups effect. SDQ-5 and DES-T were not normally distributed and therefore analysed with the nparLD R-package for non-parametric ANOVA-type statistics (ATS) (Noguchi et al., 2012). Cohen's  $d$  effect sizes were calculated for the between-group differences for continuous variables. For the within-group effects, the average standard deviation of both repeated measures was used as a standardizer to compute Cohen's  $d_{av}$  according to an approach described by Cumming (2012) (Lakens, 2013).

$$\text{Cohen's } d_{av} = \frac{M_{diff}}{\frac{SD_1 + SD_2}{2}}$$

Cohen suggested  $d = 0.2$  as indicating a small effect size,  $d = 0.5$  medium, and  $d = 0.8$  as a large effect size (J. Cohen, 1988).

The demographic characteristics at baseline and the clinical variables were compared with chi-square tests for categorical variables and two-tailed independent  $t$ -tests for the continuous variables. The strength of the association between the categorical variables was estimated with Cramer's  $V$  statistics (Cramér, 1999).

If the total number of missing items for an individual scale were less than 8%, the missing values were mean value substituted. The whole scale was dismissed if missing items were more than 8%. No scale had to be excluded due to that reason.

The data from the psychophysiological measurements were recorded during a script-driven imagery procedure. The physiological data were further compared with the changes in the self-rated PTSD symptoms. HR level, the time and frequency domain of HRV, and SC level and NS-SCR were calculated. If the assumption of normality was violated, the data was log-transformed. A linear mixed effect model (LME) was used to analyse the treatment effect. NS-SCR was analysed with the nparLD R-package for non-parametric ANOVA-type statistic (ATS) due to violation of normality despite log transformation. The reactivity measures, defined as differences between trauma script and baseline values, were analysed using LME with baseline as a time-varying covariate modelled as a fixed effect and the trauma script as a dependent variable.

The correlation between changes in PTSD symptoms and changes in psychological reactivity was analysed with Pearson's correlation (two-tailed).

## 5.7. QUALITATIVE ANALYSIS

The feasibility study included a qualitative analysis with a phenomenological approach of the semi-structured interviews conducted after treatment to explore the participant's experiences of the GrpMI treatment. The interviews were video recorded, and the interviewer wrote down the participants' answers during the interview. The interviewer notes were checked for accuracy with the video recordings and analysed by the researcher using a method inspired by thematic analyses (Braun & Clarke, 2006, 2013; Kvale & Brinkmann, 2014). The analysis was theoretically driven and deductive, searching for answers to a previously defined research question. There was an essentialist /realist approach, reporting the experiences of the research participants (Braun & Clarke, 2006). Selective coding with data-derived (semantic) codes (Braun & Clarke, 2013) was used to analyse the written accounts of the interviews conducted after the Tf-GrpMI intervention to find patterns related to the research question: How do participants experience the phase-based Tf-GrpMI intervention?

In the qualitative analysis, the following procedure was used: (1) the material was read through to familiarize with the data, (2) initial coding was performed by finding the natural meaning units that related to the research question, (3) the meaning units were categorized into themes, (4) the themes were checked against the data, (5) the number of participants expressing each theme was summarised, and (6) a mind map was constructed.

Point 5 was added to the procedure and is not part of the classical thematic analysis. I included the quantification of themes to estimate the weight of each theme in the sample.

### 5.7.1. CONVERGING THE TWO DATA STRANDS

The findings from the statistical analyses in the feasibility study were compared with the themes found in the qualitative analysis to determine if the findings were confirmed or disconfirmed. The aim was to triangulate quantitative and qualitative data by investigating whether the statistical outcome of the GrpMI intervention on PTSD symptoms also was reflected in how the participants experienced the treatment.

## 5.8. ETHICS

The Regional Ethical Review Board in Stockholm, Sweden (Registration number: 2015/895-31) approved the research with a decision date of 1 July 2015 and the research is registered at the ClinicalTrials.gov trial registry (Registration number: NCT03503526).

Informed written consent was obtained from all participants (see Appendix B).

All aspects of the present study were explained to the research persons during the assessment interviews, including the associated risks and purpose, and that participation was voluntary. Participants were assured that they had the right to withdraw from the study at any point and were entitled to other treatment options if they chose not to proceed with the Tf-GrpMI treatment. Additionally, they were informed that the post-treatment interviews would be recorded, and the artworks captured through photography would be utilized in the research project. They were also informed that their identities would be protected through pseudonymization, ensuring that no personally identifiable information would be used in the analysis or presentation of results and that all collected materials would be handled confidentially.

After serving as a control group, the WLC group, for ethical reasons, received the same treatment as the experimental group. As the treatment period consisted of 12 group sessions, the WLC group did not have to wait longer than three months for treatment, which was the usual waiting time at the Crisis and Trauma Centre.

If the research participant experienced no relief or enhanced quality of life after the three-month follow-up (after the study ends), a new assessment would be done for further treatment at the centre.

Upon enrollment, participants underwent pseudonymization and were allocated a unique study identification number. The key to identifying participants was carefully preserved in an encrypted file, securely stored on a separate hard drive in a restricted and secure area. The pseudonymized data was stored on an access-controlled server and backed up to a local storage device without internet access to safeguard confidentiality.

Moreover, any artistic creations, such as paintings and writings produced during the sessions, are securely stored in a locked cabinet at the Expressive Arts Institute. Similarly, the questionnaires are held in a locked filing cabinet to ensure their protection and confidentiality.

## CHAPTER 6. RESULTS

In this chapter, the research questions from the three articles will be presented together with the results.

### **6.1. TRAUMA-FOCUSED GROUP MUSIC AND IMAGERY WITH WOMEN SUFFERING FROM PTSD /CPTSD: A FEASIBILITY STUDY.**

The study consisted of two groups, with five participants in each group, given a total sample of 10 women. The participants had a background of physical and/or sexual abuse and psychological abuse or neglect and were diagnosed with PTSD or CPTSD. The mean age was 42 years. The feasibility of the intervention and the measuring methods were explored to answer the following research questions (RQ):

**1. *What is the feasibility of using GrpMI and expressive arts in group treatment for women diagnosed with PTSD or CPTSD?***

The participants were compliant and followed the 12 sessions of GrpMI treatment. Five women participated in all 12 sessions, three in 11, one in 10, and one in 9. The treatment program seemed feasible since the treatment adherence was high and there was no dropout.

**2. *What are the effects of the treatment intervention on PTSD symptoms, dissociation, and quality of life?***

The effects of the treatment were analysed with repeated-measures ANOVA at pre- and post-treatment and a three-month follow-up. A significant reduction was found in PTSD symptoms, dissociation, anxiety, and depression with medium to large effect sizes measured by Cohen's *d*, and the results were maintained at follow-up. Changes in the Positive States Of Mind scale (PSOMS) measured quality of life and did not reach a significant level. However, a medium Cohen's *d* was found for PSOMS when comparing pre-treatment to follow-up.

**3. *Is it possible to assess the capabilities for regulating ANS in this population through psychophysiological measures?***

The assessment of the ANS regulation using script-driven imagery and psychophysiological measurements was found tolerable and acceptable by the study participants. Many participants were curious about the measurements and what they would show, which might have helped to make it more tolerable.

#### **4. *How do the participants experience the GrpMI and expressive arts sessions?***

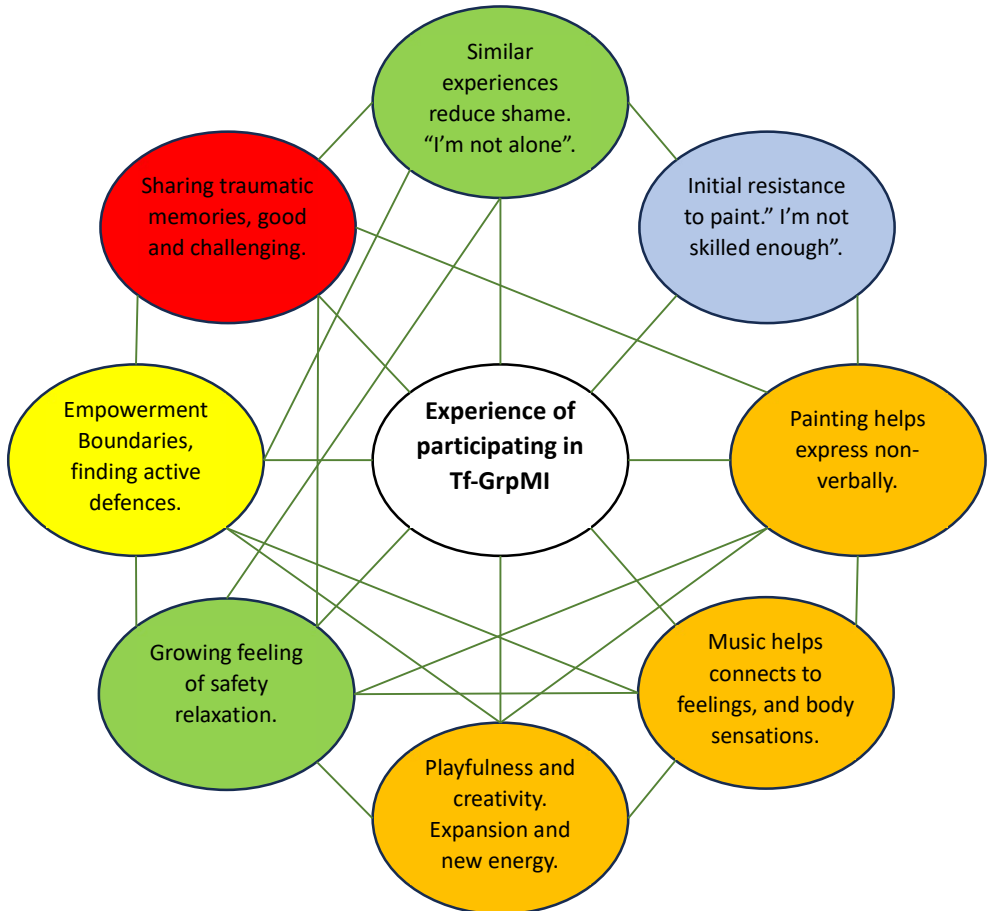
Semi-structured interviews were used to explore the participant's experiences of the group intervention with GrpMI. The interviews were conducted and recorded by a co-worker (after the end of the treatment period) and further analysed by the researcher using a method inspired by thematic analysis. The analysis resulted in the following eight themes: (1) Music helped establish contact with feelings and bodily sensations (seven participants); (2) Painting helped to express experiences that were difficult to express in words (four participants); (3) Being in a group with others that shared similar experiences was helpful and diminished feelings of shame and loneliness (four participants); (4) There was a growing feeling of safety in the group (five participants); (5) During the process, there was an improvement in the ability to mark their boundaries/defend themselves (four participants); (6) It felt good to share positive and traumatic memories but also hard. It could sometimes be challenging to listen to each other's stories (five participants); (7) There was an experience of expansion, relaxation, and new energy (three participants); (8) It enabled increased creativity and playfulness (five participants) (see Figure 6).

Other comments were that painting could be challenging due to feelings of lack of artistic skill. For some, the time for painting was too short and for others too long. Several participants perceived the group treatment as too short.

Overall, the participants felt helped by the intervention, even if they wished the treatment period had been longer. Music has helped them come more in contact with interoceptive sensations. Artmaking was experienced as challenging by some, and so was also to listen to and share traumatic memories.

Figure 6. Themes from the qualitative analysis.

A schematic picture of the complexity and interconnectedness between the themes from the qualitative analysis of participants' experience of the Tf-GrpMI intervention and how they influence each other.



Note: The connecting lines between the themes are based on my reflections as well as the different colours chosen to fit the themes. Warm colours for increased interoception, expression and creativity. Cold colour for resistance. Green for relaxation, safety and feelings of connection with others. Yellow for empowerment and for the challenge of sharing and listening to trauma memories. The two themes: playfulness/creativity and expansion/new energy, were combined into one, and instead, a new theme, initial resistance, was added.

### 6.1.1. CONVERGING QUALITATIVE AND QUANTITATIVE DATA

The qualitative analysis confirmed the statistical findings when comparing the two data sets. The themes from the qualitative data showed that participants felt a growing feeling of safety together with reduced feelings of shame, increased interoception, increased ability to set boundaries, and increased creativity and playfulness. The statistical findings showed significant decreases in PTSD symptoms (primary outcome) and anxiety, depression and dissociation (secondary outcome). Well-being did not reach a significant increase after treatment (however, it improved at follow-up), which might confirm the participants' feeling that the treatment was too short.

The feasibility study results demonstrated that the project was viable and provided the basis for a randomized controlled study.

## 6.2. TRAUMA-FOCUSED GROUP MUSIC AND IMAGERY WITH WOMEN SUFFERING FROM PTSD/COMPLEX PTSD: A RANDOMIZED CONTROLLED STUDY

A total of 78 women were recruited for the randomized controlled trial; after assessment, 45 women qualified and agreed to participate. They were randomized to a treatment group ( $n = 22$ ) and a waiting-list control (WLC) group ( $n = 23$ ). The treatment group received 12 TF-GrpMI sessions. The WLC group received the same group treatment after the waiting period of three months was over. Both groups completed self-rating scales pre and post-intervention, or waiting, and at a three-month follow-up. The treatment group was thus tested three times, while the WLC group was tested four times (see Figure 7).

The participants had a trauma history of physical, sexual, and psychological abuse. 91% of the sample had traumatic experiences before being 18 years old. The mean age was 43.7 years ( $SD = 9.93$ ). Regarding participants' labour status, 51% were on sick leave, 32% were students or employees, and the rest were unemployed or retired. 42% had education at a university level, 40% from secondary school, and 18% from elementary school. 50% were on anti-depressive medication. However, the medication was left unchanged during the study. No significant differences in demographic characteristics were found between the treatment group and the WLC.

The second article focused on the following hypothesis:

1. *Self-rated PTSD symptoms will decrease after treatment compared to a WLC group (the primary hypothesis).*

To measure PTSD symptoms, participants filled in the PTSD checklist for DSM-5 (PCL-5) before and after the intervention and at a three-month follow-up. The result was analysed with a two-way mixed ANOVA for

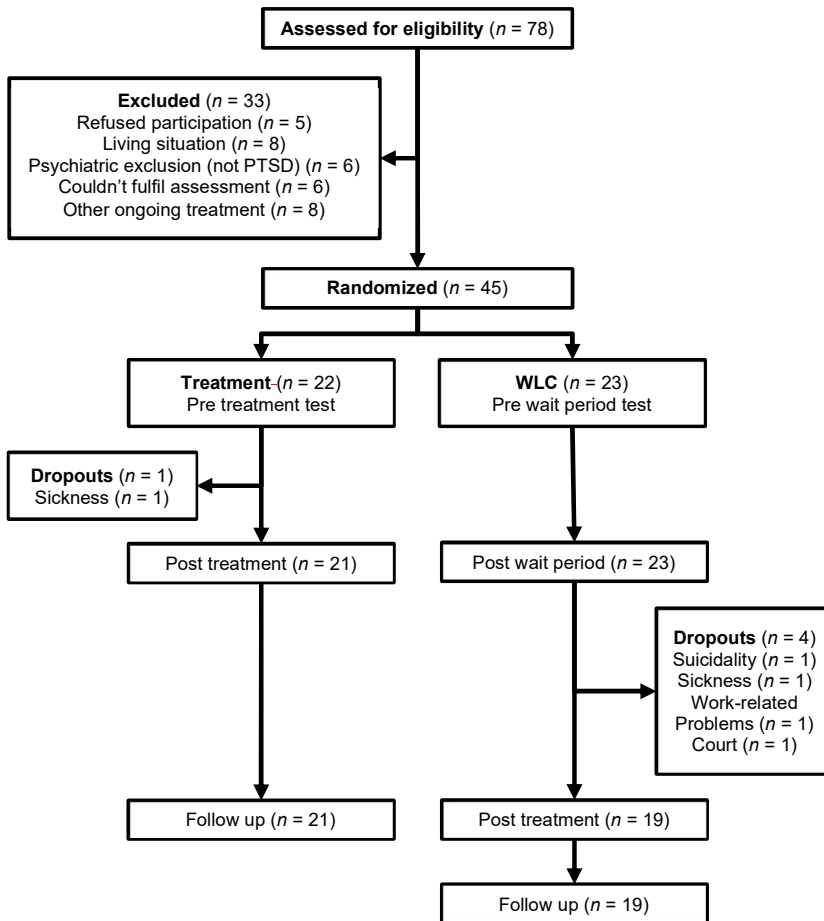


treatment interaction effects and a repeated-measures ANOVA for within-group treatment effects. As measured pre and post-intervention, the interaction effect between treatment and waiting showed a significant change in the treatment group compared with the WLC,  $F(1, 42) = 8.68, p = .005$ , with a large effect size ( $d = 0.94$ ). The within effect in the treatment group was also significant, with a large effect size. Furthermore, we found that the WLC group got a similar reduction in PTSD symptoms after receiving the GrpMI treatment and that the results for both groups were sustained at a three-month follow-up. These results confirm hypothesis one, that self-rated PTSD symptoms decreased after treatment.

2. ***Self-rated anxiety, depression, dissociation, level of function, and symptoms related to DSO (negative self-concept, affect dysregulation, and interpersonal problems) will change in a favourable direction after treatment.***

Secondary outcome measures showed a large interaction effect in anxiety and a medium effect ranging between  $d = 0.67$ – $0.74$  in depression, dissociation, and positive state of mind. SDQ-5 (measuring somatoform dissociation) and DES-T (the short scale for dissociation) found no significant interaction effects. The PCL-5 subscale (the proxy subscale DSO) for measuring CPTSD symptoms showed a significant decrease with a medium interaction effect ( $d = 0.71$ ) after treatment compared to the WLC group.

Figure 7. Recruitment and retention flowchart.



### 6.3. PSYCHOPHYSIOLOGICAL ASSESSMENT OF TRAUMA-FOCUSED GROUP MUSIC AND IMAGERY THERAPY FOR WOMEN WITH PTSD/CPTSD USING SCRIPT-DRIVEN IMAGERY. A RANDOMIZED CONTROLLED STUDY.

This article presents the psychophysiological markers collected during the script-driven imagery (SDI) procedure before and after treatment. The participants' self-rated PTSD symptoms were combined with the physiological arousal and reactivity evoked

by listening to a personalized trauma script. Heart rate (HR), heart rate variability (HRV), and electrodermal activity were sampled during baseline condition (BL) and trauma script (TS). The difference between BL and TS was calculated as a measure of reactivity. The electrodermal measurements included skin conductance levels (SCL) and non-specific skin conductance response (NS-SCR).

The following hypotheses were tested:

- 1 ***TF-GrpMI will result in an altered ANS regulation, manifested as decreased HR and SC activation and reactivity, and increased HF-HRV while listening to the ideographic trauma script (TS) (primary hypothesis).***

The absolute levels of HR activity during TS were reduced in the treatment group with a significant interaction effect and a large within-group effect. HF-HRV increased significantly compared to WLC. Both LF/HF ratio and NS-SCR showed a significant within effect in the treatment group not seen in WLC but no interaction effect. SCL was not significantly reduced but showed a trend.

Regarding reactivity, both groups got a reduction in HR, but the reduction in the WLC group could be explained by an increased HR activation level at BL at post-waiting not seen in the treatment group. HF-HRV and RMSSD showed both an interaction and a within effect compared to WLC. LF/HF ratio, SCL and NS-SCR showed a within effect but no interaction effect. LF-HRV and Total power showed no treatment-related changes in either absolute levels or reactivity.

The results showed that SC and HR reactivity was reduced after treatment and that the decrease in HF-HRV was diminished when listening to the trauma script. The absolute levels (activations) of HR, HF-HRV, LF/HF, and NS-SCR to trauma script also showed treatment-related changes, suggesting that the treatment resulted in decreased trauma-related arousal, reactivity, and increased ventral vagal activity.

- 2 ***Changes in the subjective experiences during trauma script, measured by the RSDI and SUD scales, will parallel changes in self-rated PTSD symptoms.***

The changes in the RSDI scale (re-experiencing, avoidance, and dissociation), the SUD scale, and PCL-5 scores pre and post-intervention decreased with a significant interaction effect. In the RSDI scale, the subscales of re-experiencing and avoidance showed a significant interaction effect but not dissociation, although dissociation showed a significant within effect in the treatment group. Thus the results confirmed that the subjective self-rated changes paralleled each other.

**3 *Changes in psychophysiological reactivity will correlate with changes in self-reported PTSD symptoms.***

The self-assessed changes in PTSD symptoms pre and post-treatment correlated significantly with HR and HF-HRV reactivity changes. No significant correlation was found between self-rated PTSD symptoms and LF, SC, NS-SCR, RMSSD or Total Power changes.

**4 *Initial HR reactivity will predict the PTSD treatment outcome.***

HR reactivity (log-transformed) before treatment predicted changes in PTSD symptoms after treatment. A higher pre-treatment HR reactivity resulted in a larger decrease in self-rated PTSD symptoms after treatment.

All null hypotheses were rejected.

## CHAPTER 7. DISCUSSION

This PhD study has aimed to explore the feasibility and effectiveness of phase-based trauma-focused GrpMI in treating females suffering from predominantly CPTSD from interpersonal trauma (physical, psychological, or sexual abuse in adulthood and/or childhood).

### 7.1. COMPARING THE FINDINGS WITH OTHER TRAUMA-THERAPY STUDIES

The feasibility study ( $n = 10$ ) confirmed that the participants found the treatment feasible and that the physiological measurements were acceptable. The quantitative analyses of self-rated PTSD symptoms showed a significant decrease in the group mean with a large ES (Cohen's  $d = 1.10$ ) after treatment sustained at a three-month follow-up (Cohen's  $d = 1.49$ ). The secondary outcome measures showed a small non-significant increase in well-being at pre-post treatment as measured with PSOMS ( $d = 0.24$ ); however significant at pre-follow up ( $d = 0.59$ ). Depression, anxiety and dissociation decreased significantly after treatment, which was sustained at follow-up ranging between ( $d = 0.74$ – $1.35$ ). None of the participants dropped out of treatment.

The results from the pilot study are well in line with the results from other music therapy pilot and feasibility studies reported by Carr (2012), Beck (2017), and Story and Beck (2017), with ESs in the range of 1.0–1.17.

In the qualitative analysis of post-treatment interviews, it was found that the treatment had helped the participants to move out of isolation and feelings of shame, music and art helped them get in contact with and express bodily sensations and feelings, and they experienced a growing sense of safety and trust in the group. Some women felt new energy and a feeling of expansion during the treatment. They also expressed an increased sense of empowerment and ability to mark boundaries. Others thought painting was challenging because of a lack of artistic skills, but the feeling diminished after some sessions. Painting helped express experiences that were difficult to put into words, and they conveyed that sharing their own traumatic experiences and listening to others' stories could be hard, but it also felt good to be able to share and be listened to, making them not feel alone.

In comparison with previous qualitative studies where traumatized participants' experiences of GIM or MI sessions were analysed, these themes are similar to the three main categories found in Beck et al. (2017): (1) satisfaction with telling their problems and feeling heard, (2) happiness with music and imagery experience, and (3) change of inner states (relief, new energy, focus and calmness). In the study of Story and Beck (2017), participants found that music helped express feelings and

regulate arousal, and they conveyed that they initially felt a resistance to the creative process, which decreased when they felt safer with the process. Both these themes were also found in the present study. However, these two studies explored individual sessions in the MI-GIM continuum, and in the present study, group MI therapy was explored.

In the RCT, the primary outcome measure of self-rated PTSD symptoms measured by the PCL-5 scale showed a significant decrease with a large ES compared to the waiting list control (Cohen's  $d = 0.94$ ). Within-group analyses showed a significant reduction with large ES after treatment in the active treatment group, which was sustained and even improved at follow-up (Cohen's  $d_{av} = 1.14$ ). The dropout rate related to the between-group analysis post-treatment was low—one individual in the active treatment group (4.5%) dropped out. The WLC group was also offered the Tf-GrpMI treatment after serving as a waiting-list control and showed a similar large within-effect after treatment. In the WLC group, four individuals withdrew after the waiting period and were not interested in getting the treatment for various reasons (see Figure 7). The secondary outcome measures of anxiety, depression, dissociation, positive states of mind, and the specific DSO symptoms related to CPTSD: affect regulation, negative self-concept, and interpersonal problems also changed significantly in a favourable direction in comparison with WLC, with medium to large ES ( $d = 0.67$ - $0.87$ ).

The ES in the present RCT study is comparable with the ESs in the recommended evidence-based trauma-focused treatments (i.e., CBT, PE, and EMDR) as reported in previous meta-studies (Bradley et al., 2005; Cusack et al., 2016; Ehring et al., 2014; Watts et al., 2013). Karatzias et al. (2019) investigated the effect of different treatment methods for CPTSD on PTSD symptoms. They found an ES of ( $g = 0.90$ ) for CBT and ( $g = 1.26$ ) for EMDR compared to a waiting list control and concluded that developing effective treatments for CPTSD could build on the established PTSD treatments.

When compared to systematic reviews of group treatment, the present study is in line with Mahoney et al. (2019), who reported a mean ES of ( $g = 0.98$ ) for PTSD symptom reduction in trauma memory processing (TMP) groups compared to no treatment. The study performed slightly better than the reviewed studies by Sloan et al. (2012), who reported ESs in a range of ( $d = 0.31$ – $0.69$ ) in trauma-focused group treatments compared to waiting list controls. Similarly, Schwartz et al. (2019) showed an average ES of ( $g = 0.70$ ) for group therapy compared to no treatment.

The dropout rate in the present study was (as mentioned above) only 4.5%, which is much lower than the reported dropout rate of 34% in trauma-focused CBT groups in previous meta-analyses (Mahoney et al., 2019; Schwartz et al., 2019). However, the low dropout rate aligns with the dropout rate of 5% in the group treated with trauma-

focused MI in an earlier RCT study with refugees suffering from PTSD (Beck et al., 2021).

In this study, around 57% of the active treatment group reached a clinically significant improvement, although only 38% lost their PTSD diagnosis. Bradley et al. (2005) reported that 44% of intention to treat (ITT) and 54% of treatment completers (TC) reached clinically significant improvement after treatment with individual CBT, EMDR, or PE and that 67% of treatment completers lost their PTSD diagnoses. Dorrepaal et al. (2014) found an improvement rate of 35% for completers and a recovery rate of 60% in complex PTSD studies. In comparison, this study has a lower rate of diagnostic change but a higher improvement rate. However, the reported treatments in the meta-analysis included a mix of both individual and group therapy sessions, while this treatment consisted solely of group therapy sessions.

Compared with other studies and reviews, it was found that GrpMI, as a novel treatment modality, is efficacious as a treatment choice for groups of women with CPTSD caused by interpersonal violence and abuse.

Explications for the positive results and the low drop-out rate in the present study might be the interwoven and mutually supporting elements in the treatment, such as the use of a combination of arts-based methods, the phase-based trauma-focus, the social support of the group, the gender-specific treatment, and the experience and training of the therapists. However, the results, showing that only 38% lost their diagnoses and that participants wished the treatment had been longer, support the view that this client group needs a more extended treatment period and could have benefited from a combination of group and individual sessions.

In the next sections of the discussion, I will go into detail with several of these issues., beginning with the use of psychophysiological measures as a way to illuminate the mechanisms of change during the GrpMI treatment.

## **7.2. EVALUATION OF TRAUMA TREATMENTS THROUGH PHYSIOLOGICAL MEASUREMENTS**

The third article, Article 3, of the doctoral thesis, reported the physiological measures from the script-driven imagery task before and after the intervention (Tf-GrpMI versus waiting) in the RCT study. Physiological biomarkers have been used for a long time to distinguish PTSD from non-PTSD. They are recommended to be combined with self-report scales by the Research Domain Criteria (RDoC) project for more robust and objective measurement of treatment effects. (Acheson et al., 2014; Bauer et al., 2013; Pineles et al., 2013). The RDoC project encourages using various variables to investigate the constructs of the different domains in mental health research. The domains are arousal /regulatory, positive valence, negative valence, sensorimotor, cognitive, and social processes. These domains are represented by

different psychological/ biological dimensions constructs that can preferably be measured by various variables, including behavioural, physiological and self-report data.

In this study, heart rate (HR), heart rate variability (HRV), skin-conductance level (SCL), and non-specific skin conductance response (NS-SCR) were used to measure the arousal level and reactivity of the autonomic nervous system before and after treatment/waiting. Finger temperature, forearm electromyography, and respiration rate were also measured. However, as the analysis of these variables was hampered by the presence of artefacts caused by electronic measurement equipment failure and physiological interference, they were not included in the final compilation due to lack of time.

The physiological measures used are markers of the activity in different regulatory ANS pathways. SCL and NS-SCR are known to reflect the arousal mediated by the sympathetic nervous system, while HR and HRV are influenced by both the sympathetic and parasympathetic branches of ANS (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology, 1996). HF-HRV is, according to Porges (2011, 2022), mediated by the ventral vagal branch of the parasympathetic system (see section 2.7.1). Health problems and stress are associated with low HF-HRV (Porges, 2001; Thayer & Lane, 2007). Ge et al. (2020) found low HF-HRV in individuals suffering from PTSD. An increased HF-HRV and decreased SC and HR would therefore be interesting outcomes for evaluating the effects of PTSD treatments, which was one of the central hypotheses in the third article.

In the physiological measurements during the SDI procedure, a reduced reactivity to trauma script in HR, HF-HRV, and RMSSD was found but not in LF-HRV or total power. For the electrodermal measures, SCL, and NS-SCR, a significant within-group effect was found in the treatment group but no interaction effect. No significant effect was found in the WLC group. There were also changes in HR, HF-HRV, and LF/HF ratio levels in the absolute arousal level during TS. The results propose that Tf-GrpMI led to both diminished trauma-related arousal and increased vagal activity, which replicates findings from previous studies that have used physiological measurements for the evaluation of PTSD treatment (Bourassa et al., 2020; Lindauer et al., 2006; Wangelin & Tuerk, 2015). These findings suggest that it might be the changes in parasympathetic activity that are most important for the therapeutic effect, which could be explained by the polyvagal theory (Porges, 2011, 2022), where trauma-healing is linked to a heightened parasympathetic ventral vagal activity, that according to Porges, is leading to a feeling of safety and an increased social engagement. Furthermore, the study showed that the self-rated PTSD symptoms correlated significantly with changes in HR and changes in HF-HRV, which agreeing with Bourassa (2020) and Wangelin & Tuerk (2015), supports the idea that physiological



measures could be used in combination with self-rating scales to evaluate PTSD treatment effects.

Notably, this study replicated the results from Pitman et al. (1996) and Wangelin and Tuerk (2015), showing that higher HR reactivity and arousal levels at pretreatment predicted a better treatment outcome with larger decreases in PTSD symptoms. Neuroimaging studies have shown that there seem to be two different sub-types of PTSD, hyper- and hypoaroused (Lanius et al., 2010, 2018). Persons belonging to the hyperaroused subtype use emotional undermodulation, with *bottom-up* processing of threat, where the subcortical regions (i.e., the Periaqueductal grey (PAG) and amygdala) are chronically activated and the active defence states of the sympathetic nervous system online (Lanius et al., 2018; Terpou et al., 2019). Persons belonging to the hypoaroused subtype use *top-down* processing of threat, with overregulation of the amygdala and PAG by the medial prefrontal cortex (mPFC) leading to emotional detachment and risk of depersonalization (feeling detached from oneself) and derealization (feeling that the world is unreal). Persons from the hypoaroused subtype often have a more complex trauma history and are more easily caught in immobility defences (i.e., freeze, shut down, and feign dead) of the parasympathetic dorsal vagal complex (Lanius et al., 2010, 2018; Porges, 2011), suggesting a need for an extended stabilisation phase for the more severely traumatized and dissociative individuals (Hart et al., 2006; Herman, 2001; van der Kolk, 2015). However, there are different views on this matter. De Jongh et al. (2016) argues that there is no need for stabilisation in the treatment of CPTSD, which only delays trauma processing and increases avoidance. They suggest that trauma-focused CBT treatments should be offered routinely without a stabilisation period, also to the more complex traumatized individuals. Based on my clinical experience, this could harm the more traumatized individuals and lead to re-traumatisation, since they might fall outside of their “WoT” (see section 2.7.2.) and thus unable to process and integrate fragmented traumatic experiences. Further research should continue to explore this subject.

### 7.3. INESCAPABLE THREAT AND CPTSD

When a victim of abuse or violence perceives a threat as inescapable, the active defences of fight, flight, or cry for help are overruled by immobility defences, which in chronically abused individuals can become the default defences and lead to an inability to protect oneself. The result can be that feelings of hopelessness, helplessness, self-loath, and shame develop into negative self-concepts (NS), dysfunctional affect regulation (AD), and interpersonal problems (IP), the core symptoms in CPTSD, the disturbances in self-organization (DSO) (Brewin et al., 2017). Ford and Courtois (2020, p. 64) state that "the core dilemma underlying CPTSD is a chronic entrapment in survival mode and lack of personal agency." So, one aspect of trauma processing might be to help the inhibited actions that needed to happen at the time to be completed with awareness in a safe and relationally held environment, i.e., actions such as escaping, running, crying for help, striking, hitting,

pushing away, kicking, (Janet, 1925; Levine, 2010; Nijenhuis et al., 1998; Ogden et al., 2006; Payne et al., 2015, 2015; van der Kolk, 2015). In hypnosis and psychodrama, these concepts for trauma processing have been used for a long time (Cardeña et al., 2000; Kluft, 2013; Moreno, 1985). In CBT, it was argued that imaginal exposure (IE) might not be enough and even if IE reduced fear and avoidance, other emotions such as guilt, shame and disrupted self-images were left unchanged, and a method called imagery rescripting (Arntz et al., 2007; Holmes et al., 2007) was developed, following the same concept as the therapy forms mentioned above. The patient's needs, emotions and impulses that were inhibited at the time of trauma are stimulated and expressed in fantasy during imaginal relieving. Morina et al. (2017) showed in a meta-analysis of 19 trials (whereof eight with clients suffering from PTSD) that imagery rescripting, in comparison with waitlist control, reduced symptoms with a large ES ( $g = 0.90$ ) and concluded it was a promising psychological intervention for psychological problems due to aversive memories.

In Tf-GrpMI (where imagery and fantasy are essential elements of the process), these actions were facilitated using music, imagery and expressive arts, with the aim of building strength, empowerment and resilience and thus restoring the ability to set healthy boundaries, increase self-compassion and find a more positive self-image (see section 5.3.1), which was reflected in the themes from the qualitative analysis, where participants testified to reduced shame, a growing sense of safety and an improved ability to set boundaries (see Figure 6).

#### **7.4. THE LEARNING BRAIN AND THE SURVIVAL BRAIN**

Ford & Courtois (2020) highlight the importance of the brain being able to shift between the *survival brain* (the system in the brain that focuses on defences) and the *learning brain* (the brain organization that enables the human being to develop freely and to be curious and explorative). Two crucial brain networks have been identified to play key roles in both the survival and the learning brain. The task-positive network (TPN) deals with stressors and achieving life goals, and the default mode network (DMN) is a brain system that involves integrative creative thoughts, self-reflection, memories, daydreaming and mind-wandering. (Akiki et al., 2017; Ford & Courtois, 2020; Teicher & Samson, 2016). The TPN has three critical subsystems; the salience network (SN), which oversees the stress responses; the attention network (AN), which helps with focusing attention; the executive network (EN), a brain network in the prefrontal cortex and associated brain regions, central for affect regulation, and for achieving vital life goals (Courtois & Ford, 2009; Lanius et al., 2018). When the learning mode is online in the brain, DMN and EN work together, usually one at a time. However, when the brain is in survival mode, the DMN and EN can become disconnected, resulting in intrusive internal thoughts and rumination (Ford & Courtois, 2020; Lanius et al., 2018). In PTSD or CPTSD, the ability to switch between survival and learning brain networks has become impaired, and individuals are stuck in the survival brain. (Courtois & Ford, 2009).

These theories can shed light on the study results, where a significant decrease in PTSD symptoms, an increase in HF-HRV, and a decrease in HR and SC reactivity indicates that Tf-GrpMI could be helpful for persons to move from the survival brain to the learning brain. According to Porges (2022) and the polyvagal theory, an explanation could be that the arts-based methods have facilitated the movement out from dorsal vagal shutdown or sympathetic hyperarousal (the passive and active defences) and developed an increase of ventral vagal safety and social engagement.

## 7.5. GROUP THERAPY FOR CPTSD

In a meta-analysis by Ehring and colleagues comparing psychological treatments for PTSD in adult survivors of childhood abuse, group treatments were found to be less effective than individual treatments (Ehring et al., 2014), and in current guidelines (American Psychological Association, 2017; Forbes, 2020; U.S. Department of Veteran Affairs, Department of Defense, 2017), evidence-based treatments for PTSD, individual CBT, PE, and EMDR are recommended and have shown higher efficacy than group therapy. However, for the more complex traumatised individuals, group treatment might give an opportunity to work with the specific hallmarks of CPTSD, the DSO symptoms. Group therapy gives the possibility to work with the social engagement system (Flores & Porges, 2017; Porges & Dana, 2018), especially the feelings of safety and belonging. Reduced shame and loneliness were some of the themes from the qualitative analysis, suggesting that being in a group with others (in this study, women) who have experienced similar abuse resulted in a sense of not being alone and not being guilty or wrong in the eyes of others, which may have reduced feelings of shame (see curative factors; Yalom, 1985).

Sloan et al. (2012) and Mahoney et al. (2019) suggest that carefully conducted group therapy can be helpful with DSO symptoms. However, excluding potential participants who tend to use acting out and aggression as defensive survival strategies, or individuals needing intensive therapeutic care, is essential since they can destabilise the group and make it unsafe for the other participants (Ford & Courtois, 2020).

The proxy DSO scale from the PCL-5 scale used in the present study showed a significant interaction effect with decreased DSO symptoms with medium  $d = 0.71$ . The study could also report a medium within-groups effect as measured with  $d_{av}$  ( $d$  average) in pre to post-treatment and a large pre- to follow-up ES in both groups ( $d_{av} = 1.01$  and  $0.90$ ), suggesting that the effect of treatment sustained and even improved at the three-month follow-up. This result proposes that the GrpMI treatment can be tolerable and helpful for individuals with Complex PTSD.

## 7.6. ARTS-BASED PSYCHOTHERAPY

According to Levine (2010) and Ogden et al. (2006), there is a need to increase awareness of internal experiences (interoceptions) such as sensory perceptions, bodily

sensation, affects, and imagery to facilitate the movement from top-down inhibition and detachment of emotions and sensations, as well as from a bottom-up hyperaroused survival mode. The fragmented, often non-verbal, emotional, and sensory elements of the traumatic experience need to be integrated for the memory to become processed and stored in long-termed memory (F. M. Corrigan & Hull, 2015; Gerge et al., 2019; Hart et al., 2006; Körlin, 2019a). In expressive arts, the movement between different art modalities (intermodal transfer) and the use of non-verbal and verbal languages (Knill et al., 1995, 2005; Meyer DeMott, 2007; Meyer DeMott et al., 2017), together with imagination, can help to bridge the inner and outer world and make it possible to work with and integrate these aspects. In GIM and MI, music is selected to facilitate the creation and movement of inner experiences that are further processed by artmaking (Bonny & Summer, 2002; Grocke, 2019). The traumatic images or sensations, as expressed in non-verbal arts-based modalities, can then be further transformed and synthesized into a verbal narrative with personification (it happened to me) and presentification (it happened then, but not now), essential features for a traumatic memory to become processed (Boon et al., 2011; Hart et al., 2006).

Arts-based methods can also bring beauty, vitality, playfulness, and curiosity to the process (Bonny & Summer, 2002; Grocke, 2019; Johnson, 2009; Knill et al., 2005; Wärja, 2018). Emotions are essential to psychological functioning. One of the earliest building blocks in emotional development is *curiosity*, a prerequisite for reflection and understanding; avoidance, shame, and memory loss through dissociation, on the other hand, counteracts this. *Play* is one of the crucial actions of mammals (Alcaro et al., 2017; Hart et al., 2006). In the play, actions can be modelled and tested in fantasy, making it possible to try out other possible behaviours in future situations that might prevent the risk of traumatising. Activating the affective neuronal circuits involving curiosity and play increases the capacity to deal with the "stuckness" characteristic of PTSD. Several participants expressed that the GrpMI treatment helped them to find increased creativity and playfulness.

## 7.7. THE ROLE OF THE MUSIC

Koelsch and Jäncke (2015) stated that music affects the heart with higher HR for exciting music and lower HR when listening to tranquillizing music. Additionally, music has the potential to evoke and modulate emotions (Koelsch, 2014). Amygdala is sensitive to sounds, pleasant music, and faces and connects with the nucleus accumbens, the reward centre in the brain (Koelsch, 2014). Music can evoke attachment-related emotions and activate the social engagement system (Koelsch, 2014; Porges & Rossetti, 2018). Noting that music is often used to regulate mood and arousal, Chanda and Levitin (2013) suggest that music's ability to regulate stress, arousal, and emotion is due to its ability to modulate brainstem responses such as HR, heart rate, SC, BP, temperature, and muscle tension, which may be explained by the fact that neurons in the brainstem tend to synchronize with the tempo of the music.

Porges and Rosetti (2018) highlight the importance of prosody and that music can sound like hyper-prosodic vocalization, conveying safety signals and exercising the social engagement system. The social engagement system influences:

[...] eyelid opening (e.g., looking), facial muscles ( e.g., emotional expression), middle ear muscles (e.g., extracting humans voice from background noise), muscles of mastication (e.g., ingestion), laryngeal and pharyngeal muscles (e.g, vocalization, and language), and head-turning muscles (e.g., social gesture and orientation). (Porges, 2003, p. 37)

According to Porges, for the social engagement system to be activated, there needs to be a neuroception of safety (Porges, 2004). Neuroception is a neural process evaluating whether situations are safe, dangerous, or life-threatening. The social engagement system can be turned off due to traumatic experiences leading to isolation and mental health problems, and when ANS is in survival mode, the listening focuses on detecting threats (Porges, 2022). Music might be a vehicle to exercise the inner ear structures (Kolacz et al., 2018; Porges, 2011, 2022). These small middle ear muscles contract and relax when the ventral vagal tone is high enough. When the ossicle chain is stiff, the eardrum gets tighter, which facilitates social communication and co-regulation, and when it relaxes, lower sounds pass through to the inner ear. Porges hypothesizes that music can down-regulate the sympathetic nervous system (i.e., fight, flight) and upregulate the ventral vagal and social engagement systems (Porges & Rossetti, 2018).

Ahonen summarizes the neurological features of music that she suggests are essential for using GIM or MI in trauma treatment. She highlights the music's ability to stimulate different senses, evoke emotions and memories and affect neurotransmitters and hormones.

(1) Music is multisensory and may stimulate various sensory areas (auditory, tactile, and visual) (2) Music may retrieve memories and evoke emotions (3) Music may elicit changes in hormones and neurotransmitters, such as endorphins, dopamine, oxytocin, cortisol, prolactin, and melatonin. (Ahonen, 2019, p. 157)

In this study, the therapists used music for calming and stabilisation and, later in the treatment trajectory, for empowering and trauma processing. Maybe the music's ability to exercise the inner ear muscles, as proposed by Porges (2011), modulate arousal levels (Chanda & Levitin, 2013; Juslin, 2019), stimulate various senses, emotions and memories and change hormones and neurotransmitters (Ahonen, 2019; Chanda & Levitin, 2013; Koelsch, 2015) are helpful in trauma-processing with the work of restoring a feeling of safety, empowerment, and integration of fragmented traumatic memories. One of the themes from the qualitative analysis was that music helps to get in touch with emotions and body sensations, which increases interoception, that according to Levine (2010) and Ogden (2006), is necessary for

getting out of hypo or hyperaroused defence modes, and through an embodied renegotiation finally integrate the traumatic experience.

Further explorations of how the music used in sessions influenced the participants' imagery and trauma processing are above the scope of this PhD study but would be interesting to explore in future studies.

## **7.8. LIMITATIONS**

This study has several limitations. They will be presented and discussed in the following section.

When looking at limitations related to the double role of the researcher and the therapist, one of the researchers was also one of the group therapists. However, this was the only possibility because of the needed education in trauma therapy, GIM, and expressive arts. Although, this could have caused a bias making the self-rated scorings more favourable due to the Hawthorne effect. Nevertheless, this bias might have been counteracted by the research design, using the SDI procedure and physiological measurements, which are more objective, to complement the subjective self-rating scales. In future studies, using a therapist not otherwise involved in the research would be preferable.

In terms of limitations related to the assessment procedure, the PTSD assessment was done through self-reported PTSD symptoms using the PTSD Checklist-Civilian Version (PCL-5) and not by a blinded assessor using the standard method of assessing severity, a clinician-rated structured interview, CAPS. However, there is also a possible detection bias with a structured interview as it can be difficult to hide from the assessor to which treatment arm the subjects belong. In addition, physiological measurements, in combination with self-report scales, are common and used in several studies (Bauer et al., 2013; Wangelin & Tuerk, 2015), and the use of multiple units of analysis is encouraged by the Research Domain Criteria (RDoC) project (Acheson et al., 2014; Insel et al., 2010). Furthermore, during the assessment using self-report scales, participants could ask for clarification if the questions were hard to understand.

According to the design, a possible limitation is that the control group was a waiting list control which usually results in higher ES than when a treatment is compared to another active treatment. Nevertheless, since this is one of the first studies with the Tf-GrpMI modification of GIM for PTSD, and the use of physiological measures recorded during the scrip-driven imagery method, it seemed feasible to start comparing with WLC. The next step could be to compare against another active treatment group.

Regarding the sample, a limitation may be that all participants and therapists were women, meaning it cannot be generalised to other trauma populations. As the

participants had been abused by men, this was a way to make the treatment safer. Trauma can also be related to women as perpetrators, with both women or men as victims. Men may have been victimised by other men or subjected to war crimes and torture. Arts-based psychotherapy would probably work as well with men if they want to use artistic methods for trauma treatment. However, putting together groups where participants have been exposed to similar traumatic experiences may be crucial to facilitate a sense of belonging and understanding. In future studies, it could be interesting to explore all-male, mixed-gender or transgender groups.

Relating to the physiological measurements, it may have been better to use ECG instead of PPG in the physiological measurements since ECG is theoretically more precise (Schäfer & Vagedes, 2013). The PPG method was chosen because it is less intrusive and easier to administer. According to Schäfer and Vagedes (2013), the difference in HR between ECG and photoplethysmography is insignificant in medically healthy adults, although there may be an overestimation of HR. As this study uses repeated measurements (cancelling out individual differences) and the SDI procedure, this should have minimised the possible influence on the results. To sum up, there is a need for further comparative studies of HRV recorded with ECG and PPG in healthy adult subjects.

A consideration related to the outcome measures is that since the ICD-11 assessment scale for CPTSD had not yet been published, a subset of items from the PCL-5 scale reflecting the DSO symptoms was used instead, which presumably made the CPTSD categorisation less precise. However, the method used in this study is in line with previous studies that have used different PTSD instruments to estimate CPTSD (Cloitre et al., 2013; Eidhof et al., 2019; Knefel et al., 2015). The procedure in this study was inspired by the method used by Eidhof et al. (2019). First, items corresponding to the three DSO domains affect regulation, negative self-concept, and interpersonal problems were identified. Second, a score of 2 or higher for at least one DSO symptom in each of the three DSO domains, in addition to PTSD symptoms, was required to proxy CPTSD. In future studies, the ICD-11 assessment of CPTSD, The International Trauma Questionnaire (ITQ), should be used (Cloitre et al., 2018).

According to the qualitative part, the semi-structured interviews in the feasibility study were transcribed from the interviewer's notes written during the interview—the transcription was then further checked with the video recordings for accuracy. Transcribing the whole interview directly from the video recordings could have enriched the qualitative analysis, giving more details. The interviewer was also one of the therapists, which might have caused bias, but on the other hand, it also made the interview situation safer for the participants and became a way to integrate the treatment experience. In addition, the themes from the qualitative analyses could have been refined into fewer overarching themes and explored in more depth. On the other hand, the themes capture participants' experiences well and fit the data.

Furthermore, there is a lack of studies using physiological profiling together with self-rated PTSD symptoms for evaluating group trauma treatments, also in music therapy, which made comparing with previous studies complex.

## **7.9. RECOMMENDATIONS FOR FUTURE STUDIES**

In future studies, it would be interesting to analyse more of the qualitative data, i.e. the semi-structured interviews from the RCT, the paintings, and the imagery evoked while listening to the music from a theoretical perspective (Porges neuroception and polyvagal theory), and explore how the music used in sessions influenced the imagery. Another aspect could be dividing participants into a bottom-up hyperaroused subgroup versus a more dissociative top-down hypoaroused subgroup and comparing the results. Furthermore, the treatment group could be compared to another active treatment group, for example, a CBT group, and the study could be replicated with larger samples. Since this study lacked blinding, the results need to be tested in a more blinded study. A statistician blinded to the treatment assignments and a blinded outcome assessor could be used, and the investigator should not be the music therapist. However, this presupposes that the study has enough funding. As for the physiological measurements, it could be interesting to use ECG instead of PPG and to have two respiration bands while measuring respiration, one around the chest and one around the stomach. The electromyography on the forearm could be measured on the orbicularis oculi muscle instead to minimize movement disturbances during the recordings. It could be recommended not to use a SUD value directly after the trauma script in the SDI procedure, as was done in this study, to facilitate the measuring of recovery. As the diagnosis of CPTSD is now accepted in ICD-11, the ICD-11 assessment scale for CPTSD should be used. Additionally, the Tf-GrpMI method could be tested with males or transgender persons.

## **7.10. CONCLUSION**

This doctoral thesis consists of two parts, a feasibility study (Article 1) and an RCT (Articles 2 and 3). The aim was to investigate the effect of 12 sessions of Tf-GrpMI on trauma-related symptoms in women suffering from PTSD or CPTSD, using self-report scales and physiological measurements, and to examine how participants perceived the treatment.

In the studies, PTSD symptoms decreased significantly after treatment with large effect sizes, both within- (Articles 1 and 2) and between groups (Article 2). Also, depression, anxiety, and DSO symptoms decreased with a large to medium effect size. SDQ-5 and DES-T measuring somatoform and psychoform dissociation showed no interaction effects. The dropout rate was low. There was no dropout in the feasibility study and 4.5% in the RCT. However, when the WLC group was offered the same treatment after serving as a control group, four participants deflected giving a dropout rate of 17.4% in the WLC group. As for the physiological measures (Article 3), HR



arousal decreased during TS, and HRV increased compared to WLC. SCL and NS-SCR showed a significant decrease within-group in both arousal level and reactivity but without any interaction effects. Furthermore, the changes in PTSD symptoms correlated with decreased HR reactivity and increased HF-HRV but not with the electrodermal measures or LF-HRV. Interestingly a higher HR arousal to trauma cues at the pretest predicted a better treatment result.

These findings suggest that the treatment effect might be more associated with changes in parasympathetic activity than with sympathetic activity, presumably with a heightened ventral vagal activity which, according to the polyvagal theory, is related to a neuroception of safety and an increased capacity for social engagement (Porges, 2011).

The qualitative analysis of the post-treatment interviews in the feasibility study (Article 1), examining the participants' experience of GrpMI, resulted in the following themes: increased sense of safety, increased awareness of bodily sensations and emotions, reduced shame and sense of isolation, improved ability to set boundaries, increased creativity, playfulness and expansion, sharing traumatic memories felt good but challenging, painting helped express non-verbally, and initial resistance to paint. The themes confirm the statistical findings in Article 1 of significantly reduced PTSD symptoms, depression, anxiety and dissociation and increased quality of life (significant at follow-up). Based on the assumptions that these results are applicable to comparable samples, the physiological measurements in the RCT, with an increased HF-HRV and decreased HR reactivity to trauma cues, which could be related to increased parasympathetic activity, and a heightened feeling of safety and social connection, are in agreement with the discoveries from the qualitative analysis.

However, only 38% of participants lost their diagnosis, and they expressed that the treatment was too short, supporting that individuals with CPTSD need more extended treatment than 12 weeks of group therapy and perhaps a mix of group therapy and individual sessions.

Further studies with larger samples and active controls are needed to confirm the results.



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# APPENDICES

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## Appendix A. Semi-structured interview

[Original language: Swedish]

### FRÅGOR EFTER GRUPPAVSLUT

1. Hur har det varit för dig att delta i den här gruppen? Har det varit till någon hjälp? I så fall hur? Om inte, säg mer om det.
2. Hur har du upplevt musikresorna i gruppen? Har det varit till någon hjälp? I så fall hur? Om inte, säg mer om det.
3. Hur har det varit att måla? Har det varit till någon hjälp? I så fall hur? Om inte, säg mer om det.
4. Vilka övningar som vi gjort tillsammans har varit hjälpsamma? Vilka inte? Varför?
5. Vad har du med dig från den här gruppen? Vad har varit viktigt? Vad har du lärt dig?
6. Har du haft några negativa upplevelser av att delta i den här gruppen? I så fall vad?
7. Vad hade du för förväntningar och motsvarade förväntningarna resultatet?
8. Har det varit någon positiv eller negativ livshändelse, under den här perioden du varit med i forskningen, som du tror påverkat ditt mående?
9. Fanns där någon vändpunkt?
10. Övrigt?

[English translation]

## **QUESTIONS AFTER THE END OF TREATMENT**

1. How has it been for you to participate in this group? Has it been helpful? If so, how? If not, please describe.
2. How have you experienced the musical journeys in the group? Has it been helpful? If so, how? If not, please describe.
3. What has it been like to paint? Has it been helpful? If so, how? If not, say more about it.
4. Which exercises that we have done together have been helpful? Which ones were not? Why?
5. What did you take away from this group? What has been important? What have you learnt?
6. Have you had any negative experiences from participating in this group? If so, what?
7. What were your expectations? Were they met or not? Please elaborate.
8. Have there been any positive or negative life events during the period you have been involved in the research that you think have affected your well-being?
9. Was there a turning point?
10. Anything else?

# Appendix B. Written informed consent

[Original language: Swedish]

## INFORMATION TILL PATIENTER.

### **Studie: Musikterapi och uttryckande konst i traumafokuserad gruppbehandling för patienter med PTSD/CPTSD**

Du har valts ut från KTC s väntelista utifrån att du bedöms lida av posttraumatisk stress och ha en tillräckligt god kunskap i svenska språket för att kunna bearbeta din problematik på svenska. Du har visat intresse och lämplighet för att arbeta med konstnärligt gestaltande metoder och är intresserad av att delta i gruppbehandling.

Du erbjuds att delta i ett forskningsprojekt med syfte att undersöka effekten av en intervention med receptiv musikterapi och bildskapande för att hjälpa till att läka traumatiska upplevelser. Du kommer att delta i en grupp på 6-8 personer som träffas vid 12 tillfällen à 2,5 timmar per gång. Vid gruppstillfällena kommer vi att arbeta med musiklyssning, inre och yttre bildskapande. Du kommer också att i en dagbok få besvara några enkla frågor före och efter varje gruppstillfälle.

Innan gruppstart får du fylla i självskattningsformulär och pröva att göra en KMR (kort musikresa). Du får också göra ett fysiologiskt test för att undersöka din stresstolerans och förmåga till återhämtning. Därefter börjar gruppen. Efter grupp slut får du åter göra det fysiologiska testet och fylla i självskattningsformulären och sedan ännu en gång efter 3 månader. Syftet är att mäta om du blivit bättre och om det håller i sig.

Behandlingens upplägg är varsamt men eftersom det handlar om traumatisering kan du periodvis uppleva att du mår sämre.

Du kan när du vill välja att hoppa av studien och istället få gängse behandling på mottagningen eller remiss till annan instans.

Om du efter avslutad behandling inte nått tillfredställande symptomlindring kommer du efter att ha väntat i 3 månader att erbjudas remiss till annan instans.

Bilderna kommer att fotograferas och sessionerna dokumenteras och sparas som journalhandling. Allt material behandlas konfidentiellt och avidentifieras. Dina svar och dina resultat kommer att behandlas så att inte obehöriga kan ta del av dem. Du har rätt att få ta del av dina resultat och få rättelse av eventuellt felaktiga uppgifter (personuppgiftslagen 1998:204). Alla data som ingår i studien som analyseras statistiskt registreras med ett kodnummer. Kodnyckeln sparas i 5 år. Ansvarig för dina personuppgifter är Kris-och Traumacentrum. Du kommer efter avslutad studie att

kunna ta del av resultaten som kommer att publiceras i vetenskapliga tidskrifter och insändas till lämpliga populärvetenskapliga tidskrifter. Enbart avidentifierade data publiceras.

Forskningshuvudman är Hans Peter Söndergaard / Chefsöverläkare / Docent

Tel: XX-XXXXXXXX. E-post: XXX@XX.se

Deltagare:

Forskningsansvarig:

.....  
Datum Datum

.....  
Signatur Signatur

.....  
Namnförtydligand Namnförtydligand

[English translation]

## **INFORMATION TO PATIENTS.**

### **Study: Music therapy and expressive arts in trauma-focused group treatment for patients with PTSD/CPTSD.**

You have been selected from KTC's waiting list because you are assessed as suffering from post-traumatic stress and have a sufficiently good knowledge of the Swedish language to process your problems in Swedish. You have shown interest and suitability for working with arts-based methods and are interested in participating in group treatment.

You are offered to participate in a research project aimed at investigating the effect of an intervention with receptive music therapy and image creation to help heal traumatic experiences. You will be part of a group of 6–8 people who will meet for 12 sessions of 2.5 hours each. We will work with music listening, inner imagery, and art-making during the group sessions. You will also answer a few simple questions in a diary before and after each group session.

Before the group starts, you will complete a self-assessment form and test to do a KMR (short music journey). You will also do a physiological test to check your stress tolerance and ability to recover. Then the group begins. At the end of the group, you will again take the physiological test, complete the self-assessment forms, and then again after three months. The aim is to measure whether you have improved and whether it is sustained.

The treatment is gentle, but you may sometimes feel worse because it involves working with traumatic experiences.

You can choose to drop out of the study at any time and receive standard treatment at the clinic or referral to another service.

If you have not achieved satisfactory symptom relief after completing treatment, you will be offered a referral to another service after waiting three months.

The images will be photographed, and the sessions will be documented and saved as medical records. All material is treated confidentially and de-identified. Your answers and results will be treated so no unauthorised persons can access them. You have the right to access your results and to have any incorrect information corrected (Personal Data Act 1998:204). All data included in the study that is statistically analysed is registered with a code number. The code key is saved for five years. Responsible for your personal data is the Crisis and Trauma Centre. After the study is completed, you

can access the results, which will be published in scientific journals and submitted to appropriate popular science journals. Only de-identified data will be published.

The authorized representative of the responsible entity for the research is Hans Peter Söndergaard / Chief Consultant / Associate Professor.

Tel: XX-XXXXXXXX. E-mail: XXX@XX.se

Participant:

Principal investigator:

.....  
Date Date

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Signature Signature

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Clarification of signature Clarification of signature

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