Relationships between the Assessment Scale for Group Music Therapy in Substance Use Disorders and an External Measure

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ABSTRACT

This study investigated the convergent validity of the Assessment Scale for Group Music Therapy in Substance Use Disorders (MTSUD) Scale in relation to the University of Rhode Island Change Assessment (URICA), as well as the effects of music therapy on the Stages of Change. To this end, the correlations between the constructs and the influence of music therapy on the Stages of Change and linear models in which the effects of music therapy were placed as predictors of the stages of change were analyzed. The results highlighted the adequacy of the general factor of the MTSUD, but the specific factors did not behave according to the theory. Group music therapy had a significant impact on the processes of change, favoring the stages of Contemplation, Action, and Maintenance. Limitations included disparity in participation between groups, missing data, and participants' difficulties in completing the tests. Future research should explore different populations. In addition, it is essential to investigate specific music therapy interventions and other forms of measurement, given that self-report points to significant limitations in this population. In summary, this study contributes to the understanding of the mechanisms underlying group MT as an effective therapeutic intervention for individuals with substance use disorders, although it points to the need for methodological and investigative improvement to develop more effective research.

Keywords: Music Therapy, Substance Use Disorders, Psychometry, Factor Analysis.

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INTRODUCTION

Modern Music Therapy (MT) was established in the 1940s in the United States of America, initially aimed at the care of "war neurotics," a term used to describe individuals returning from the Second World War with psychopathologies (Puchivailo, 2008). It was also during this period that academic training for music therapists began at the University of Michigan in 1946 (Gaston, 1968).

In Brazil, despite the initial introduction of MT activities in mental health care in 1955 (Costa & Cardeman, 2008) there is limited evidence from studies these contexts (Pedrosa, 2023). In fact, most publications on the role of music therapy in mental health in national scientific journals between 2001 and 2012 were exploratory research, primarily based on case studies and experiential reports (Puchivailo & Holanda, 2014).

Some of the studies that measure music therapy in the context of Brazilian mental health have indicated that: a) people with schizophrenia who received standard treatment along with MT had a higher percentage of medical discharges, lower rates of evasion, and abandonment of treatment compared to patients who received only standard treatment (Costa & Vianna, 1984); b) people with psychotic conditions who participated in 12 music therapy sessions showed improvements in attendance, attention, positive thoughts, immediate memory, short-term memory, and long-term memory (Loureiro & Corrêa, 2001); c) people diagnosed with substance use disorders (SUD) who underwent lyre-table sessions experienced significantly increased relaxation after each session compared to pre-intervention assessments, which resulted in greater resilience in coping with withdrawal symptoms and the desire to use drugs (Teixeira, 2019); and, d) people with SUD who received weekly structured MT sessions in addition to standard treatment for 6 weeks showed a significant increase in levels of readiness for change, unlike those who only listened to songs during the same period of time and received standard treatment (Nascimento & Pedrosa, 2024).

A Cochrane Review suggested that music therapy as an adjunct to standard treatment result in moderate reductions in substance craving and potentially increase motivation for treatment or behavior change among individuals SUD (Ghetti et al., 2022) – consistent with the findings of Nascimento and Pedrosa (2023). This review also indicated that the most significant reductions in substance cravings were observed in individuals who participated in MT sessions lasting longer than a single session.

One strategy for generating evidence on the effects of music therapy treatments in populations with SUD is the use of measurement instruments (Cripps et al., 2016) and the application of inferential statistical analyses in their results. Given the absence of specific measurement tools to assess the effects of MT on people with SUD (Pedrosa et al., 2022), the Assessment Scale for Group Music Therapy in Substance Use Disorders (MTSUD) was developed (Pedrosa et al., 2023a; Pedrosa et al., 2023b).

The MTSUD is based on the Transtheoretical Model of Change (TMC) and has evidence of content validity and its internal structure for two specific factors and one general factor (Pedrosa et al., 2023b), even though the specific factors have demonstrated borderline reliability. The two specific factors are Cognitive Processes[4] (Pcog) and Behavioral Processes (Pcom) and the general factor is the Effects of group music therapy on patients' change processes (EMt).

MTC describes behavioral change as a dynamic process in which individuals go through five distinct motivational stages (Prochaska, 2014). In the Precontemplation stage, individuals lack awareness of the necessity for change. During Contemplation, there is active but ambivalent consideration regarding change. Transitioning to the Preparation stage entails a commitment to change and the development of plans, culminating in Action, where concrete steps are taken. Maintenance involves sustaining achieved gains and adopting strategies to prevent relapse. Notably, relapses can occur at any stage, potentially regressing individuals to earlier points in the process.

The University of Rhode Island Change Assessment Scale (URICA) is an established instrument for measuring stages of change, evaluating levels of Precontemplation, Contemplation, Action, and Maintenance. It has demonstrated validity and reliability in Brazilian Portuguese (Szupszynski & Oliveira, 2008).

Theoretically, Pcog are associated with the stages of Precontemplation and Contemplation, whereas Pcom are more closely linked to the stages of Action and Maintenance (Prochaska, 2014). Empirical research supports these theoretical propositions in some studies (Norcross et al., 2011) but inconsistencies have been noted in others. For instance, studies have reported that both Pcog and Pcom predicted advancements in the Action stage (Mander et al., 2014) or that both Change Processes concurrently increased (Rosen, 2000).

Therefore, the primary aim of this study is to provide evidence of the validity of the MTSUD by examining its associations with the URICA, empirically assessing whether: 1) Pcog correlates more strongly with the initial stages of change; 2) Pcom correlates more prominently with the final stages; and 3) there are variations in instrument application among individuals who received structured MT and those who engaged in musical activities. Furthermore, if hypotheses 1 and 2 are not supported, the study will explore evidence for a single-factor structure of the MTSUD and its impact on constructs evaluated by the URICA. This approach aims to elucidate its functionality through this external measure and to evaluate its internal structure.

This study received support from the Voluntary Scientific Initiation Program of the Federal University of Minas Gerais (PRPq Notice – 01/2023) and a scholarship from the Institutional Program of Scientific Initiation Scholarships CNPq and FAPEMIG (PRPq Notice – 04/2023). Consequently, brief reports detailing experiences with the application of these instruments will be

[4] We will use capital letters to refer to constructs when written in full.

provided. These data are pertinent as they raise qualitative insights into the implications of MTSUD testing.

METHODS

This study adopts a quasi-experimental approach combining exploratory qualitative and quantitative research methodologies. Participants in the study were divided into two groups: 1) Experimental Group: Participants engaged in group sessions following a standardized music therapy approach in addition to receiving standard treatment; and 2) Control Group: Participants listened to pre-recorded songs and engaged in discussions about the songs without specific music therapy direction, alongside receiving standard care. The researchers' activities are also part of the extension project "Music Therapy in Mental Health" (SIEX/UFMG - 402786[5]).

The therapeutic groups were carried out at the Center for Therapies and Social Assistance (CETAS), a day hospital dedicated to the interdisciplinary treatment of men with SUD, over the age of 18, through a system of day stay. Patients follow the premise of total abstinence and stay from Monday to Friday, from 7:30 a.m. to 4:30 p.m., being accompanied by a multidisciplinary team composed of professionals such as psychiatrists, psychologists, art therapists, music therapy volunteers, among others (HEAL, 2023).

At this institution, treatment spans approximately 9 months, during which patients are categorized into three groups based on their duration of sobriety in the program. Initially, patients join the "Awakening" group for the first three months, focusing on achieving total abstinence. Following this phase, upon reaching three months of sobriety, patients progress to the "Hope" group. Upon achieving six months of sobriety, patients move to the "Perseverance" group, where they remain until completing the full nine-month treatment program (HEAL, 2023). Due to the institution's guidelines, randomization of patients was not feasible. Consequently, participants in the Awakening group were designated as the control group, while participants in the Hope and Perseverance groups formed the experimental group.

During sessions with the experimental group, the standardized SUD treatment approach developed by Pedrosa (2023) was implemented. This model structures sessions into three distinct phases: warm-up, music therapy techniques, and session closure. During the warm-up phase, the emphasis is on engaging participants, either through performing songs requested by them or selected by the therapist. The music therapy techniques phase involves activities such as musical listening, lyrical analysis, and musical composition, with flexibility in the sequence to accommodate therapeutic needs. At the session's end, time is allocated for closure, allowing participants to

[5] Access to the extension project through the link: https://sistemas.ufmg.br/siex/VerIdentificacao.do?id=93785&tipo=Projeto&modo=abrir.

complete rating scales while listening to selected music. Initially, for two months, this group was led by an intern who subsequently departed from the project due to personal reasons. Subsequently, sessions were led by the second author. The control group experienced sessions where participants selected their own music, fostering verbal interaction between them and the therapist facilitating the sessions.

This research is a component of the Assessment Scale for Group Music Therapy in Substance Use Disorders (MTSUD) project. It was submitted to Plataforma Brasil, reviewed, and approved by the Research Ethics Committee of UFMG (CAAE 30939720.1.0000.5149) and the Municipal Health Department of Belo Horizonte (CAAE 30939720.1.3001.5140)..

SAMPLE

A convenience sample comprised adult male participants over 18 years old from the Center for Therapy and Social Assistance (CETAS) at the Hospital Espírita André Luiz. All participants provided informed consent, agreeing to participate in both the therapeutic groups and the research. The study involved minimal risks to participants, including potential discomfort during MT sessions, listening to music, or answering sensitive questions on measurement instruments. Participants had the option to withdraw from the research at any time they felt the need to discontinue their involvement.

INCLUSION AND EXCLUSION CRITERIA

Participants included in the study were men aged 18 and older diagnosed with Substance Use Disorders (QD) who were receiving care at CETAS. Exclusion criteria encompassed patients who declined to participate in the groups and individuals whose scale responses contained significant missing data or were completed without acquiescence (e.g. filling in all items with a single category).

INSTRUMENTS

The Assessment Scale for Group Music Therapy in Substance Use Disorders (MTSUD) is a self-report instrument comprising 20 items designed to evaluate perceived effects among adult patients with SUD participating in group MT sessions, specifically focusing on their change processes. The MTSUD demonstrates strong evidence of content validity, internal structure, and reliability, encompassing a general factor (Effects of Music Therapy on Change Processes - EMt) and two specific factors (Pcog and Pcom) (Pedrosa et al., 2023).

The University of Rhode Island Change Assessment (URICA) is a self-report scale known for its robust internal and external validity indices. This instrument consists of 24 items measured on ordinal categories ranging from 1 to 5. It assesses motivational stage factors including

Precontemplation (PCont), Contemplation (Cont), Action (Ação), and Maintenance (Manut) (Szupszynski, 2006). Scores for each stage range from 6 to 30.

DATA ANALYSIS

The statistical analyses in this study were conducted using RStudio v. 4.3.1 software (R Core Team, 2023), alongside specific packages: psych v. 2.2.5 (Revelle, 2023) and ggplot2 v. 3.6.6 (Wickham, 2016). A significance level of $p < 0.05$ was applied to all statistical tests.

To assess the normality of the data, the Shapiro-Wilk test was utilized. Parametric tests were employed for normally distributed data to examine group differences, while non-parametric tests were chosen for non-normally distributed data. Additionally, the psych package v. 2.2.5 (Revelle, 2023) facilitated correlation analyses and the olsrr package v. 0.5.3 (Hebbali, 2020) was utilized to validate linear models.

Given the presence of numerous missing values in the study investigating the internal structure of the EGMTCD (Pedrosa et al., 2023), an assessment will be conducted to determine whether these missing values occurred completely randomly using Little's (1988) test, implemented through the naniar package v. 1 (Tierney & Cook, 2023). A p-value greater than 0.05 from Little's test would indicate that the missing values were randomly distributed, thereby justifying multiple imputation using the mice package v. 3.16.0 (van Buuren & Groothuis-Oudshoorn, 2011).

To examine the multivariate normality of the MTSUD items, the Mardia test (Mardia, 1970) was applied with the MVN package v. 5.9 (Korkmaz et al., 2021). Should the data fail to meet normality assumptions, the WLSMV estimator (Li, 2016) would be employed for confirmatory factor analysis using the lavaan package v. 0.6.12 (Rosseel et al., 2023). The reliability of the derived factors was assessed using the semTools package v. 0.5.6 (Jorgensen et al., 2022).

RESULTS

For this research, data from the MTSUD and URICA assessments on the days specified in Table 1 were analyzed. It was noted that the size of the population in the control group was smaller compared to the experimental group, with a statistically significant difference ($t(9.57) = 3.64$, $p < 0.01$).

Table 1: Session participants.

Date	Participations	Experimental Group	Control Group
07/26/2023	21	10	11
08/09/2023	25	13	12
08/23/2023	25	13	12
09/13/2023	26	16	10
09/27/2023	25	13	12
10/11/2023	26	16	10
10/25/2023	28	18	10
02/27/2024	26	17	9
Sum	202	116	86
Mean (SD)	25.25 (1.98)	14.5 (2.67)	10.75 (1.16)

Note: SD = standard deviation. Source: created by the authors.

In the next section, the authors discuss their experiences with the sessions and the implementation of measurement instruments through MT sessions.

EXPERIMENTAL GROUP

The music therapy groups conducted in the experimental group recurrently utilized the technique of musical songwriting and subsequent lyrical analysis. The choice of these techniques was based on their verified effectiveness in previous studies (Jones, 2005; O'Callaghan & Grocke, 2009; Silverman, 2015a, 2015b). During the sessions, it was observed that the audience served was heterogeneous, covering different occupations and cultural, social, academic, ethnic, gender and age levels. Similarly, the reported substances of abuse varied widely during the sessions, with the most frequent being alcohol, cocaine, crack, marijuana and medications or the concomitant use of several of these substances.

For songwriting, some of the strategies were used, which employed, including the creation of parodies and/or reinterpretations that modified parts of the original song, as well as the development of new versions. More intricate processes involved composing entirely original song. The aim of this process was to obtain lyrical material as starting points for song structuring (Nascimento et al., 2024).

To illustrate this process, we report a songwriting during one of the sessions at CETAS, which was divided into three stages:

1. Proposal to the group of a musical composition activity using a word cloud (each member contributes a word).
2. Proposal to the group of a musical composition activity using a word cloud (each member contributes a word).

3. Structuring of verses, harmonic and melodic arrangement of the song.

This process was carried out collaboratively with the group, with the music therapist actin as co-author and mediator. The inclusion of group members in decision-making was essential, as it promoted a consensus within the group, fostering ongoing dialogue. Below is the chorded lyrics of the final composition[6]. The words suggested by the members of the group were: freedom, truth, happiness, life, hope, prosperity, trust, tomorrow, gnome, thereafter, reborn, rainbow, animals, build.

Title - Gnomes (Freedom)
Lyrics: CETAS participants on 04/24/2024
Music by Thiago Félix / Genre: Reggae / Tempo: 92 BPM

C
Life and freedom to be reborn
F C G
At the end of the rainbow, there are gnomes
C F
In the future there can be prosperity and happiness
C G
There can be happiness
F C
Hope for a new dawn
F G
Observing the animals and nature and,
F C
Building the truth thereafter
Bb C
The truth thereafter, thereafter

The completion of the MTSUD and URICA instruments biweekly with pen and paper caused discomfort among many patients at CETAS. Common behaviors observed during completion included avoidance and sloppiness. To minimize this discomfort, it was essential to clarify the purpose of these instruments, the reasons for the research, their relevance and the need for careful completion. Another measure taken was printing the scales in two formats, including one with large letters to facilitate reading and comprehension. The time allotted for this activity varied between fifteen and twenty minutes.

Some participants had questions when filling out the instruments, even outside the day of application. These questions addressed topics such as music theory, msuical harmony construction, melodies and songs, as well as reflections on the scale items. In several narratives, the participants reported understanding the reason for completing the scales and reflected more deeply on the content of the questions and their relationship with the treatment.

Finally, we found that the MT process, along with discussions held during sessions, elucidated the reasons for using MTSUD and created a new understanding among the participants,

[6] To listen to the music, access the link https://drive.google.com/file/d/1boQMZS1O6XrMN5x6WRO71aZTxVoIg93X/view?usp=sharing.

resulting in a noticeable change in attitude in relation to the completion and participation in the process.

CONTROL GROUP

In the control group, one notable characteristic was the frequent turnover of participants, including both new arrivals and individuals returning after experiencing relapses. Weekly sessions often saw the addition of new members and the return of those who had previously left due to relapses. The dropout rate was considerable, as patients had the opportunity to advance to the Hope group upon achieving certain milestones.

At the beginning of each session, a moment was set aside to welcome the new arrivals for the week. Participants were invited to introduce themselves, sharing their names, musical styles or favorite songs, and provide information about their musical development with instruments and/or singing. The intention of these actions was to facilitate bonding among participants and create a welcoming environment.

Following introductions, a playback queue was formed in a music *streaming* application , following the order of participant requests. Some songs chosen such as: "Eu quero é botar meu bloco na rua" by Sérgio Sampaio, "Zona de perigo" by Léo Santana, "Toxicity" by System of a Down.

During the music playback, patients engaged in discussions related to their life experiences. They shared moments when they typically listened to specific songs, the origins of their interest in certain types of music, memories associated with particular pieces, or reasons for disliking specific songs or musical genres. Conversations often delved into reflections on changes in music consumption over time, opinions on artists, their songwriting and production techniques, concert experiences, and other related topics. While some discussions spanned the entire session, topics generally arose intermittently.

Before administering the MTSUD and URICA instruments, the research context and relevance were introduced to participants, emphasizing that participation was voluntary. The relevance of sincere and attentive completion was also highlighted, as these data would guide future studies highlighted. In addition, the participants marked the informed consent form.

The scales were completed after the proposed session activities, usually in the last 20 minutes. The filling environment varied from an outdoor space, called a "kiosk" by the institution itself, to a more spacious room with less influence of external noise, which helped to maintain the concentration of the patients. Each participant received an individual sheet for each scale on completion days (including a version with larger letters for those with visual difficulties) and the informed consent form. Ambient music selected either by patients or the session facilitator played during this period to enhance patient comfort.

During the scale completion process, a variety of reactions were noticed, some showed enthusiasm for contributing to the research, while others expressed disinterest or even some impatience. Interestingly, completing the scales occasionally sparked group discussions that led to individuals sharing emotional reports. Regarding the scales, several challenges were identified, including incorrect markings or uncertainties during scale completion. One significant issue that arose was the use of the term "drug" in the tests, which caused discomfort for some participants. Specifically, individuals whose primary psychoactive substance use was alcohol expressed that they did not find this terminology suitable to describe their situation.

ANALYSIS OF THE RELATIONSHIPS BETWEEN THE MEASURES

The convenience sample comprised exclusively of males with a mean age of 36 years (SD = 9.51). Initially, we tabulated the data in a spreadsheet and identified a considerable amount of missing data. Among the 202 participants who completed scales across both groups (116 in the experimental group and 86 in the control group), only 32 complete responses were obtained in the experimental group and 27 in the control group. These numbers indicate that only 29.21% of the responses from the study sample were fully completed and subsequently used for correlation analyses.

Some variables exhibited significant deviations from normality, such as PCog in the experimental group and Action in the control group, as indicated by $p < 0.05$ in the Shapiro-Wilk test. Therefore, Spearman's correlation was employed to examine the association between the MTSUD and URICA variables in both groups. The results of these correlations are presented in table 2.

Table 2: Spearman's correlation matrices between the MTSUD and URICA constructs in the experimental group (n = 32) and control group (n = 27).

Experimental Group

	EMt	Pcog	Pcom	PCont	Cont	Ação
Pcog	**0.93**					
Pcom	**0.96**	**0.82**				
PCont	-0.19	-0.34	-0.15			
Cont	0.36	0.35	0.32	-0.17		
Ação	0.30	0.24	0.29	-0.28	**0.64**	
Manut	**0.44**	**0.47**	0.40	-0.15	0.32	0.29

Control Group

	EMt	Pcog	Pcom	PCont	Cont	Ação
Pcog	**0.89**					
Pcom	**0.91**	**0.68**				
PCont	-0.02	-0.08	0.02			
Cont	0.19	0.27	0.04	**0.33**		
Ação	0.09	0.23	-0.10	-0.24	**0.58**	
Manut	-0.17	0.17	-0.15	0.10	0.33	0.26

Note. Values in **bold** indicate correlations with $p > 0.05$. Pcog = Cognitive Processes, Pcom = Behavioral Processes, PCont = Precontemplation, Cont = Contemplation, Ação = Action, Manut = Maintenance.

As shown in Table 2, there were significant correlations only between EMt and Maintenance ($r = 0.44$), Pcog and Maintenance ($r = 0.47$) in the experimental group. No significant correlations

were observed between the constructs of the two measures in the control group. It's important to note that some substantial correlation values ($r > 0.30$) did not reach significance.

Given the close relationship between significance and sample power (Miola & Miot, 2021), we examined whether the missing values in the scale completions were completely random, as this would allow for imputation of missing data. Little's test (1988) indicated that missing data in the experimental group were completely random for both the MTSUD ($\chi^2(271) = 261$, $p = 0.66$) and URICA ($\chi^2(403) = 445$, $p = 0.07$). However, in the control group, missing data were not completely random for MTSUD ($\chi^2(188) = 259$, $p < 0.01$), although they were for URICA. Consequently, we proceeded with multiple imputation of missing values for MTSUD and URICA in the experimental group. Then, we estimated a new Spearman correlation matrix using the imputed data (Table 3).

Table 3: Spearman's correlation matrices between the MTSUD and URICA constructs in the experimental group (n = 83) with missing data imputed.

	EMt	Pcog	Pcom	PCont	Cont	Ação
Pcog	**0.88**					
Pcom	**0.96**	**0.79**				
PCont	-0.14	-0.19	-0.14			
Cont	**0.46**	**0.39**	**0.45**	-0.21		
Ação	**0.34**	**0.35**	**0.30**	**-0.25**	**0.53**	
Manut	**0.29**	**0.39**	0.23	-0.10	**0.34**	0.18

Note. Values in bold indicate correlations with $p > 0.05$. Pcog = Cognitive Processes, Pcom = Behavioral Processes, PCont = Precontemplation, Cont = Contemplation, Ação = Action, Manut = Maintenance.

Table 3 shows that the significant correlations between the constructs are mostly moderate and positive, as follows: EMt with Contemplation ($r = 0.46$); EMt and Action ($r = 0.34$); EMt and Maintenance ($r = 0.29$); Pcog with Contemplation ($r = 0.39$); Pcog with Action ($r = 0.35$); Pcog with maintenance ($r = 0.39$); Pcom with Contemplation ($r = 0.43$) and Pcom with Action ($r = 0.30$). Theoretically, Pcog would be more associated with the constructs of Precontemplation and Contemplation, whereas Pcom would be more linked to the stages of Action and Maintenance (Prochaska, 2014). However, it's important to note that these theoretical assumptions have not been empirically validated in this study.

Considering that MTSUD includes a general factor (EMt) alongside specific factors, and following the definition of validity provided by the Standards for Educational and Psychological Testing, which pertains to the degree to which evidence and theory support the interpretations of test results for the proposed uses (AERA et al., 2014), a multiple regression analysis investigated the effects of the three factors of MTSUD on the stages of Contemplation, Action, and Maintenance. The backward method was employed for variable selection in regression models, eliminating unnecessary variables that do not significantly contribute to explaining the dependent variable—in this case, the Stages of Change.

Effects of MTSUD factors on Stages of Change

Based on linear model analyses, the effects of EMt, Pcog and Pcom on the levels of Contemplation, Action and Maintenance were examined. Assumptions of normality of residuals and homoscedasticity were met in all models ($p > 0.05$ for all tests). Importantly, these predictive analyses utilized actual data without imputation..

For the Contemplation variable, the linear regression model remained significant with only the EMt variable ($F(1, 30) = 8.98$, $p < 0.01$; $\beta = 0.13$), indicating a mean increase of 0.13 in Contemplation levels for each unit increase in EMt, which explained 20.5% of Contemplation.

Similarly, for the Action variable, the linear regression model was also significant with only the EMt variable ($F(1, 30) = 6.08$, $p = 0.02$, $\beta = 0.07$), indicating a mean increase of 0.07 in Action levels for each additional unit in EMt, which predicted 14.1% of Action.

Finally, for the Maintenance variable, the linear regression model was significant when it remained only with the MEt variable ($F(1, 30) = 8.18$, $p < 0.01$; $\beta = 0.11$), suggesting a mean increase of 0.11 in Maintenance levels for each unit increase in EMt, which predicted 18.8% of Maintenance.

These findings suggest that the specific factors have limited explanatory power compared to the general factor, which is more successful in explaining the variation of the Stages of Change. Research on the internal structure of the EGMTCD revealed adequate adjustment indices also for the one-factor model (Pedrosa et al., 2023). However, given the inadequate performance of the specific factors in both correlation and prediction analyses reported here, the factorial structure of the MTSUD using a single-factor model will be explored below.

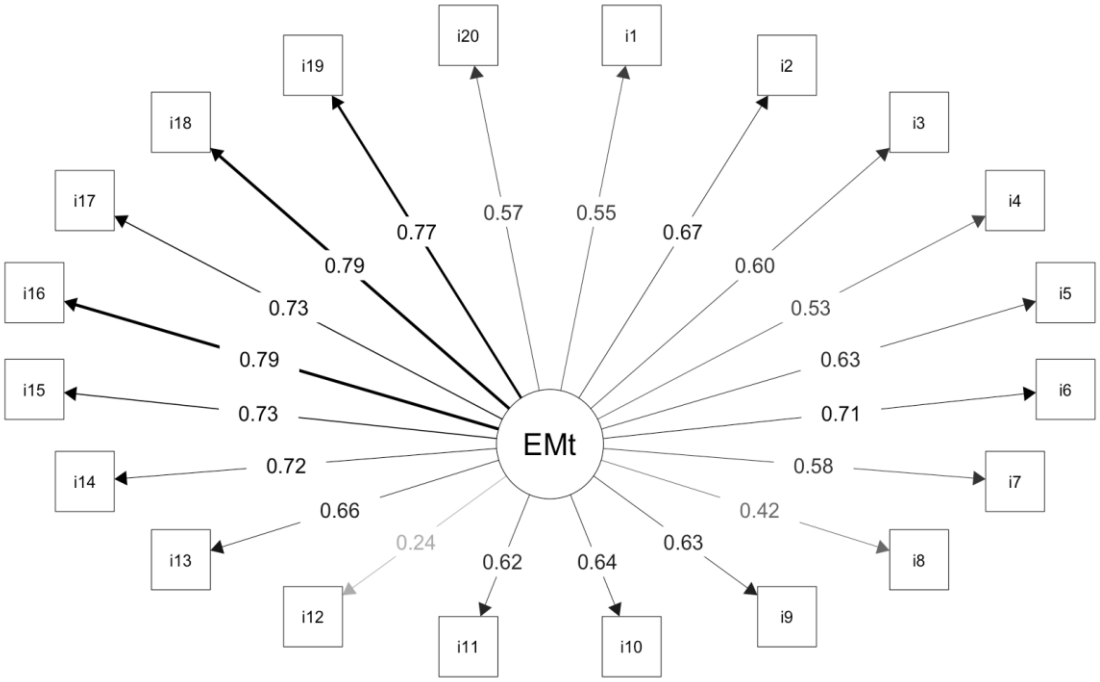
FACTOR ANALYSIS FOR THE ONE-DIMENSIONAL MODEL OF THE MTSUD

To determine the factorial structure of the model, we utilized data from the experimental group, supplemented by MTSUD completions conducted post-MT care at a public facility for individuals with SUD as part of the Music Therapy in Mental Health extension project. The combined dataset included 220 completions. The convenience sample consisted predominantly of males (81%) with a mean age of 44.1 (SD = 12.6).

The Mardia test results (kurtosis = 26.97; $p < 0.01$ and asymmetry = 3358.78; $p < 0.01$) indicated that the items did not present evidence of multivariate normality. Therefore, confirmatory factor analysis of items was performed with the WLSMV estimator. The model's fit indices ($\chi2$ = 282,823(170); CFI = 0.989; RMSEA [95% CI] = 0.055 [0.044; 0.066]) indicated satisfactory adequacy.

The factor loadings of each item are presented in figure 1.

Figure 1: Factor loadings of the items in the one-factor model.



Note. EMt - Effects of group music therapy on change processes. Source: created by the authors.

Item 12 had a factor loading below the expected cut-off line of 0.30 (Costello & Osborne, 2004). However, the reliability analysis results revealed good internal consistency. Cronbach's alpha coefficient of 0.91 indicated high reliability of the items when measuring the same underlying construct, while the ordinal alpha, adapted for ordinal scales, registered an even higher value, reaching 0.93. Additionally, MacDonald's omega presented a similar value of 0.91 and the composite reliability, which combines the common and specific variance of the items, was evaluated at 0.82, indicating an acceptable reliability.

To evaluate the impact of item 12 on the results, we conducted a correlation analysis between the scores obtained by the sum of the items and the actual (factor) scores, both considering and excluding item 12 in the sum. The sum scores of all items correlated in 92.9% with the latent scores ($r = 0.963$, $p < 0.01$), while the scores summing all items, excluding item 12, correlated in 92.1% with the latent scores ($r = 0.959$, $p < 0.01$). Given the minimal difference between these correlations and considering the sample size limitations of this study, it was decided to retain item 12 in the analysis.

DISCUSSION

The findings of this study provide valuable insights into the impacts of group music therapy on the change processes among individuals with SUD. A significant observation is the pronounced difference in participant numbers between the experimental and control groups, indicating a notable imbalance. This disparity underscores the importance of exercising caution in interpreting the

outcomes, given the potential for selection bias to influence the results. Furthermore, despite efforts to address missing data, it is essential to acknowledge this limitation, as it could potentially affect the generalizability of findings due to reduced sample power.

MTSUD has demonstrated its efficacy as a reliable instrument for assessing the effects of Music Therapy (MT), affirming its utility in both clinical and research settings related to MT, as evidenced by previous studies (Nascimento et al., 2024; Nascimento & Pedrosa, 2024; Pedrosa et al., 2023). However, its applicability beyond the domain of music therapy appears to be limited, emphasizing the necessity of acknowledging the scale's specificity when evaluating treatments incorporating music therapy techniques. This specificity underscores the importance of considering the context in which the scale is employed to ensure its relevance and validity in assessing therapeutic outcomes comprehensively.

The convergent validity of the Pcog and Pcom constructs of the MTSUD was not empirically verified, as theoretically expected. This discrepancy, also reported in other studies (Mander et al., 2014; Rosen, 2000), suggests the need for further investigations to better understand the specific factors of MTSUD. Conversely, the significant correlations and predictions between the effects of group music therapy (EMt) and the Stages of Change measured by URICA are in line with the previous literature, indicating that music therapy can positively influence the processes of change related to SUD (Jones, 2005; Silverman, 2011).

Furthermore, the results of linear regression analyses revealed that EMt is a significant predictor of the Contemplation, Action, and Maintenance stages of change, with a relevant effect size. These findings suggest that group MT may play an important role in promoting reflection, action, and maintenance of healthy behaviors in individuals with substance use disroders.

Despite item 12 in the MTSUD showing a factor loading below the expected cut-off line, its exclusion does not significantly compromise the scale's reliability and validity. The scale demonstrates robust reliability and predictive power regarding Stages of Change, underlining its utility in interpreting data from this study. Regarding item 12, which assesses discomfort with songs about substance use, its low covariance with other MTSUD behaviors is notable. This finding is particularly relevant given conflicting literature on whether music can trigger substance use (Short & Dingle, 2016; Silverman, 2021).

The experience reports underscored the participant’s resistance in relation to complete the scales, particularly due to discomfort arising from the inclusion of the term "drugs" in some items, which also triggered emotional discussions. This highlights the critical need to build a trusting relationship and provide clear explanations about the scale's purpose, ensuring participants' comfort and motivation for active engagement. Additionally, challenges were noted in comprehending and completing the scales, particularly among individuals with visual or literacy issues, emphasizing the

necessity for adaptability to ensure accessibility and understanding for all participants. These insights have informed enhancements in data collection procedures, aiming to enhance participant experience and guide future research and intervention strategies.

Finally, the occurrence of discussions and emotions during the completion of the scales is noteworthy, indicating that moments of reflection, debate, and even emotional confrontation may emerge. These dynamics underscore the importance of fostering a supportive and welcoming environment for participants during both data collection and music therapy sessions.

CONCLUSION

This study investigated both the convergent validity of MTSUD and the effects of MT in people with chemical dependence, using MTSUD and URICA as assessment instruments. The results revealed findings that enhance our understanding of the efficacy of MT in this specific clinical context.

Although MTSUD has demonstrated adequate reliability and factorial structure of its general factor, the specific factors showed discrepant empirical bechaviors that diverged from theoretical expectations. It is recommended to use only the EMt factor, given by the sum of all items. Future research should consider interpretability indications for their scores.

The findings indicate that group MT, in addition to the standard treatment, can have a positive influence on the Stages of Change, favoring the stages of Contemplation, Action and Maintenance in individuals with SUD. The analysis of the correlations and predictions between the effects of group music therapy and the Stages of Change suggested associations and moderate positive impacts between these variables, in line with the previous literature. This highlights the relevance of MT as a therapeutic intervention in this context.

However, it is important to recognize the limitations of this study, which include the disparity in participation between the experimental and control groups, the presence of missing data, and the participants' difficulties in completing the scales. These limitations underscore the need for further investigation to better understand the mechanisms for measuring the influence of MT on Stages of Change and to develop more adaptable and accessible approaches to data collection in clinical settings. In addition, the results indicate that self-report instruments, such as MTSUD and URICA, may face adherence challenges among the participants with problems with psychoactive substances.

Future studies may explore different populations, especially females, and clinical contexts, using mixed approaches that combine quantitative and qualitative methods for a more comprehensive understanding of outcomes. It is also critical to investigate specific MT interventions, such as songwriting, and examine their effects on different Stages of Change. It is relevant to analyze the

items of the MTSUD, given that the participants of this research pointed out difficulties with the expression "drugs" that compose them.

This study may contribute to the growing evidence base supporting the efficacy of group MT as a valuable therapeutic intervention for people with SUD, in addition to standard care. There is pressing need for more research to deepen our understanding of the underlying mechanisms and develop more effective clinical practices.

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APPENDIX I

Assessment Scale for Group Music Therapy in Substance Use Disorders (MTSUD)

INSTRUCTIONS

Please read each statement below and mark an X in the right-hand column that indicates how often you have encountered these situations. Remember that these descriptions refer to attitudes or thoughts that you may have experienced DURING THE LAST WEEK.

1) Do I reward myself with music when I resist using drugs?	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
2) Does the music therapy group help me share my drug problems?	Never	Rarely	Sometimes	Often	Always
3) Does the music therapy group get me thinking about the illnesses that can come from using drugs?	Never	Rarely	Sometimes	Often	Always
4) Does the music therapy group help me see that the people around me would be better off if I didn't have a drug problem?	Never	Rarely	Sometimes	Often	Always
5) Have I heard that music can help me give up drugs?	Never	Rarely	Sometimes	Often	Always
6) Does music help distract me when I start thinking about doing drugs?	Never	Rarely	Sometimes	Often	Always
7) Does society provide therapeutic options, such as music therapy, that I believe can help me overcome my drug problem?	Never	Rarely	Sometimes	Often	Always
8) Does being in the music therapy group help me see how disappointed I feel in myself when I rely on drugs?	Never	Rarely	Sometimes	Often	Always
9) Do I look for information about my drug problem in the music therapy group?	Never	Rarely	Sometimes	Often	Always
10) Do some songs help me remember not to do drugs?	Never	Rarely	Sometimes	Often	Always
11) Are there folks in the music therapy group I can rely on when I'm dealing with drug problems?	Never	Rarely	Sometimes	Often	Always
12) Do songs about drugs and their effects bother me?	Never	Rarely	Sometimes	Often	Always
13) Does my musical compositions indicate that I can quit using drugs if I really try??	Never	Rarely	Sometimes	Often	Always
14) Does music therapy help me see how my drug use affects people around me?	Never	Rarely	Sometimes	Often	Always
15) Does being in the music therapy group make me feel more ready and able to decide to quit drugs?	Never	Rarely	Sometimes	Often	Always
16) Does being in the music therapy group help me avoid places that are usually associated with my drug use?	Never	Rarely	Sometimes	Often	Always
17) Do I think listening to or making music is a good substitute for drug use?	Never	Rarely	Sometimes	Often	Always
18) Do I join the music therapy group and feel like I'm being rewarded for not using drugs?	Never	Rarely	Sometimes	Often	Always
19) Do I join the music therapy group and feel like I'm being rewarded for not using drugs?	Never	Rarely	Sometimes	Often	Always
20) Did we chat in music therapy about how society helps folks stay away from drugs?	Never	Rarely	Sometimes	Often	Always