5.0 METHODS

5.1 Participants

5.1.1 Sample size

The study had two phases. Phase 1 was the qualitative study which aimed at generating items for the tool and phase 2 was the quantitative study, where we field tested the developed tool. For phase 1 we conducted in-depth unstructured interviews with 7 experts from the field of music. The interviews were conducted until data redundancy was reached. We also conducted a Focus Group Discussion (FGD) with another 7 experts from the field of music. For phase 2, we applied the rule of thumb (Nunnally, 1978) to calculate the sample size. It states that the subject to item ratio for exploratory factor analysis should be at least 10:1. i.e., 10 individuals for each item. We took an excess of 14 individuals per item for the field validation study (n=322). Additionally, we conducted a study as part of phase 2 itself. We tried to validate the developed MRS in a Yoga population and also tried to assess its convergent and divergent validity.

5.1.2 Selection and source of participants

For phase 1 of the study, with the aim of generating items for the tool, we approached music experts from the department of music, University of Kerala and also Sree Swathi Tirunal College of Music, Trivandrum, for in-depth unstructured interviews. Data redundancy was reached by the 7th interview. Further we approached another 7 experts from the field of music for a Focus Group Discussion, from above-mentioned two colleges.

For phase 2, we approached two colleges, one was Marian Engineering College, Trivandrum and the other was Immanuel College, Vazhichal. We conducted the pilot study with 63 individuals from Marian Engineering College and field-testing of the tool with 212 individuals from the same college. Additionally we conducted field-testing with 101 individuals from Immanuel College, Vazhichal. Further, we field-tested the tool with 44 musicians from the Department of Music, University of Kerala.

In order to validate the MRS among the Yoga population, we selected 72 Yoga students (male -28, female – 44) from S-VYASA Yoga University, Bengaluru. Mean age among male students were 26 and that among female students were 25.

5.1.3 Inclusion criteria

Post graduates, Ph.D. holders in music with an expertise of 10 years and above in the field of music education and research, expert performers/exponents of music, willing to participate (Informed consent was taken from each of these experts).

Inclusion criteria for the study involving Yoga population:

Adults in the age group of 20-26 years, healthy participants, practising Yoga every day.

5.1.4 Exclusion criteria

Individuals with hearing impairment.

Exclusion criteria for the study with Yoga population:

Individuals unwilling to participate, those with chronic illness and mental illness.

5.1.5 Ethical consideration

This study was reviewed by the Institutional Ethics Committee of S-VYASA University and approved. IEC certificate no: RES/IEC-SVYASA/87/2016

5.2 Design of the study

The research design was a mixed design, employing both qualitative and quantitative methods. Phase 1 was qualitative study and phase 2 was quantitative study employing survey method.

5.3 Variable studied

The variable under study was music receptivity.

5.4.1 Phase 1- Qualitative study

Towards refining the construct, and generating items for the psychometric instrument, we conducted seven in-depth personal interviews and also a focus group discussion involving seven subject matter experts from Sree Swathi Tirunal College of music, Trivandrum, Kerala, a state in south India. The average duration of these interviews was one hour. The inclusion criteria were: post graduates, Ph.D. holders in music with an expertise of 10 years and above in the field of music education and research, expert performers/exponents of music, willing to participate (Informed consent was taken

from each of these experts). For in-depth interviews, we had musicians with an experience of performing/composing and/or teaching and research experience of over 10 years (n=7; Professor-1, Associate Professor-1, Assistant Professor-1, Music composers-2, Performers-2). For the focus group discussion (FGD), we had seven experts (Assistant Professors-4, Associate Professor-1, Professors-2) from the same department of music. The medium of the interview was Malayalam, the local language of Kerala. Interviews were conducted until data became redundant. The interviewees' comments, views and suggestions were extracted while transcribing the audio recording of the interviews. The interviews were manually transcribed, intelligently translated, freelisted, coded and themes were merged. The interviews were unstructured and questions were asked based on eight probe questions (see appendix for the details). While interviewing, each time the interviewee deviated from the question asked, they were brought back to the respective probe question. Following data analysis, we generated items and consolidated the questionnaire with 23 items (*details on the items are given in appendix*). Following this, two experts of psychometrics were also consulted and their advice was sought towards the overall refinement of the tool.

5.4.2 Phase 2- Quantitative study

For the quantitative study, the research design employed was survey design and the sample size was calculated using the rule of thumb (Nunnally, 1978), which states that the subject to item ratio for exploratory factor analysis should be at least 10:1. i.e., 10 individuals for each item. We took an excess of 14 individuals per item for the field validation study (n=322). Convenience sampling technique was employed.

The study conducted amongst Yoga population was of Survey design. The participants were assessed after the intervention on various assessments such as the d2 test of attention, Mind Wandering Scale (MWS), Interest In Music Scale (IIM), Music Receptivity Scale (MRS), and Positive and Negative Affect Schedule (PANAS-SF).

5.5.1 Content validity

Once the final form of the tool (23 items) was consolidated after the qualitative study, content validation documents were prepared (Three documents were handed over to each of the 12 experts- 1. About the study, 2. Music Receptivity Scale (the actual handout which would be used for the field study), and 3. Content validation sheet) and

we met with each of the 12 experts. Similar inclusion criteria were used as in the case of qualitative study, and the experts were briefed in person about the study. The three documents were handed out to them and they returned the content validation sheets after validating in due time. Lawshe's Content validation ratio was calculated for each item and as per the literature, for a number of 12 experts, the content validity ratio (CVR) should be 0.56 and above (Lawshe, 1975). Three items (4, 16, and 21) had CVR below 0.56. We retained all three items for the field validation study. The rationale why they were retained are as follows: the Item 4: "*I was distracted due to daydreaming while listening to the given music.*" was similar to the item 12: "*While listening to the given music, I was losing focus, going back and forth on daydreaming.*", which had high CVR and hence we retained it to add more items to the domain. Item 16 was: "*I associated disturbing/unpleasant memories or events with this piece of music.*" This item has its importance in a clinical music therapy setting. Individuals may associate disturbing memories or traumatic events that happened in their life to the music that they might have heard during that phase of life. Listening to such unpleasant and disturbing music might trigger memories yielding to negative clinical effects. Therefore item 16 was retained to identify such responses. Item 21 was: "*While listening to the music, I was imaginative/creative.*" This item taps the creative dimension of music listening, which we consider an important aspect of music receptivity. Listening to music with high interest creates unique imagery, which is an integral aspect of music listening. Active music listening is a creative activity; in that the listener constructs a uniquely personal musical experience (Kratus, 2017). All items were agreed upon by the experts to be both culturally relevant and easily comprehensible.

5.5.2 Face validity

Once the content validation process was completed, we consolidated the tool and gave it out to 15 laymen in order to assess its face validity and their responses ensured good face validity of the tool. (*See appendix for details*)

5.6 Field testing of the instrument

5.6.1 Pilot study

A pilot study was conducted (n=63; 28 males, 35 females), all undergraduate engineering students (age range: 18-23 years). The study was conducted in a class

room setup employing floor standing tower stereo speakers. The music we chose for the study is a popular song among the audiences of Kerala, a state in the south of India. The title of the song is '*Samayamithapoorva sayahnam*', its duration was 5 minutes and 12 seconds and this song is from the Malayalam language movie '*Harikrishnans*' (1998), composed by Ouseppachan, written by Kaithapram Damodaran Namboothiri (Fazil, 1998). This piece of music adheres to the Carnatic music/South Indian Classical Music tradition. The same song was used for the pilot study, field-testing and the study with the musicians. The rationale for choosing this song is given below:

1. It is a semi-classical piece of music that has beautiful melodic content and the major percussion instrument – '*mridangam*' is intelligently used to create an uplifting experience for the listeners. The song is a *ragamaalika** comprising of the *ragas** – *Navarasa kanada, Begada and Desh*. All these ragas are known to induce feelings of love, compassion, devotion and tranquility.

2. It has clear, meaningful and poetic lyrics (the song lyrics have been translated and given in the supplementary section).

3. The Song and the lyrics together predominantly evoke the emotions/feelings of -devotion, surrender, love, presence of the divine, pacifying/soothing, happiness, reflections on one's life, etc.

4. Overall, the song is such that, any individual in general (In an Indian context), would be able to appreciate it, and the chances of this piece of music evoking any negative feeling/emotion is very minimal, to the best of our contention.

*Ragamaalika is a term given to a music composition where more than one *ragas* are intelligently knit together.

*Ragas are modal melodies comprising the canon of North Indian Classical Music. Each *raga* is constructed from five or more musical notes, organized into one ascending sequence, and one descending sequence of notes, which together comprise a single melodic framework. Performance of a *raga* is restricted within the note sequences of its ascending and descending halves, but is improvised in all other respects - e.g., timing between notes; sustain, attack of each note (Valla et al., 2017). The same definition of *raga* applies for the South Indian classical music as well.

The participants were asked to be seated comfortably and then briefed about the study, and particularly the importance of this study in fostering field applications of music therapy in clinical settings. Then the hand-outs (Comprising of the participant informed consent form, Checklist of demographic information, checklist to screen for relevant disabilities/disorders, the 23 item Music Receptivity Scale-MRS) were given out to all 63 participants present there. Once they filled out this information, they were instructed to not look into the hand-out further and keep it closed. Then the music was played and once the song ended, they were instructed to open the hand-out and the initial instruction was read out and explained to them. The initial instruction of the music receptivity scale (MRS) is: "There are 35 emotions/feelings listed in these CELLS below. Please go through each of them; You may have EXPERIENCED many numbers of emotions/feelings given below, while you listened to the given music; go on, identify all those and rate them on a scale of 1-5 (Score 1 as lowest level of experience; score 5 as highest level). Give your rating within the brackets. Please do not think much, your immediate response will be the best." These instructions are for the first item of the MRS which is validated separately from the rest of the 22 items. The 23-item tool used for the field validation study is given in the supplementary section. There were three test administers and the participants were told that they could put up their hands and ask any questions if they had related to taking the test. Once they finished taking the test, the hand-outs were collected from them and data was entered into excel sheet and prepared for analysis. The pilot data was subjected to analysis and the psychometric properties of the tool was observed following which we decided to retain all 23 items for the field study.

5.6.2 Field validation

The field validation study was conducted with a sample size of 313 (n=313; 133 males; 179 females; 1 transgender). Data were taken from two colleges, both located in Trivandrum, a district in Kerala. The participants' age range was from 18 to 22. The study was conducted in the amenity centre of Marian engineering college, which is designed to facilitate audio-visual entertainment and conducting college cultural programs. The auditorium had an excellent speaker system and before the actual study was conducted, three test administrators played the music there in the auditorium and checked for the sound quality of the speakers there and ensured that the echo and reverberation was ideal to the piece of music selected. Then the participants were

brought to the auditorium and the same process was repeated similar to the pilot study, with the only difference that the initial instructions were elaborated more and they were briefed in detail about the difference between 'knowing that there is a particular emotion/feeling present in a piece of music' and 'experiencing a particular emotion/feeling within themselves while listening to a piece of music.' The second set of data was taken from Immanuel College, Vazhichal, under similar conditions.

5.6.3 Field validation with musicians

We approached the Department of Music, University of Kerala, to conduct a study which intended to find out whether the Music Receptivity Scale could differentiate between a general population and a population trained in music. The participants (n=44; m=5; f=39) were all third year students pursuing Bachelor of Arts in Music. The participants were all musicians. In the context of our study, a musician may be defined as a person who practices any one or more instruments or vocal, and has musical skills that people around him acknowledge and he need not be a professional. The study was conducted in the college auditorium which had excellent speaker system which was checked OK by the test administrators before the study. Then the participants were brought to the auditorium and asked to be seated comfortably. The hand-outs were distributed and they were briefed about the study and initial instructions were read out clearly. They were briefed about the difference between 'perceiving' an emotion/feeling in the music and 'experiencing' an emotion/feeling in the music. Then the piece of music was played following which they responded on the given hand-outs.

5.6.4 Validation amongst yoga population

All the participants were regular yoga practitioners; it was a one-time assessment survey study with no pre and post assessments. All the participants were assessed after the intervention (listening to a piece of devotional music/*bhajan*) on various tools such as - d2 test of attention (Brickenkamp, 1962), Mind Wandering Questionnaire (MWQ) (Mrazek et al., 2013), Interest In Music scale (Gold et al., 2012), Music Receptivity Scale (MRS), and Positive and Negative Affect Schedule-Short Form (PANAS-SF) (Thompson, 2007).

Before starting the data collection the participants were instructed clearly on how to respond to the various assessment tools mentioned here.

Assessment tools:

1) Mind Wandering Questionnaire (MWQ)

Mind Wandering Questionnaire intends to measure the frequency of mind- wandering and is characteristically described as the interruption of the task – focus by task unrelated thought. This scale can directly measure trait levels of task-unrelated thoughts and also measures the presence or absence of attention and awareness towards what is occurring in the present.

2) Interest in Music Scale (IiM)

It is a self- report scale used to elicit the subjective experience of participants with music in everyday life. In this work, most of the items were designed to measure the positive aspects of the different types of musical engagement, such as making music, listening to music, and other type of music-related experiences and furthermore, many items related to the social aspects of music, which is in recognition of the contextual and relational dimension of interest and engagement in music.

3) Positive And Negative Affect Schedule (PANAS-SF)

Positive and Negative Affect Schedule (PANAS) is based on a model which posits the existence of two independent dimensions- positive affect and negative effect. The positive dimension refers to a state of emotional well- being where the person reports feeling enthusiastic, alert or happy. Whereas negative dimension refers to a state of emotional distress and is accompanied by feelings such as sadness, lethargy or anger. The positive and negative affect dimensions have low or non-significant correlation with one another. Studies also indicate that positive and negative affect operates through different mechanisms to influence health. People with high positive affect are more likely to participate in social activities, report higher life satisfaction. Whereas persons with high negative affect are more likely to be depressed or anxious or report additional health complaints. The five positive affective states are: active, determined, attentive, inspired and alert. The five negative affective states are as follows: afraid, nervous, upset, hostile, and ashamed. Respondents are asked to rate these positive and negative adjectives according to the extent to which each describes the way they have felt during the specific time. It can investigate the cross-sample stability, internal

reliability, convergent and criterion-related validities of the scale and found the scale to be psychometrically acceptable (Karim et al., 2011).

4) d2 test of attention:

d2 test of attention is a well-established neuropsychological assessment for assessing selective and sustained attention and visual scanning speed. This test has been particularly useful in measuring attention and concentration processes (Brickenkamp & Zillmer, 1998). The d2 test, is a pen and paper test where a participant is asked to cross out any letter "d" with two marks around above it or below it in any order, which are interspersed in between non-target letter, which is like' with single dot or 'p' with single or double dots. Hence, this test reduces the competitive advantage of the targets and requires more complex processing because competition for attention is high. In this test, a large number of visually similar objects occur in the visual field and this makes attentional control computationally challenging. This is because the stimuli will compete for attention (Desimone & Duncan, 1995; Luck & Vecera, 2002). In this assessment, due to their physical similarity to the target, distracters would be expected. To make this test more productive, mental template and neural representation of the target must be complex to differentiate d2 targets and non-targets. Also, this should be allowed for detection of varying stimulus configurations of targets i.e. the target letter' with varying spatial configurations of two dashes (Ross, 2005).

Assessing the validity of Music Receptivity Scale

Data was collected on 72 participants of both genders after the intervention.

For divergent validity we used the following pairs of correlation:

1. Music Receptivity Scale (MRS) Attention Vs MWS
2. MRS Attention Vs E (Error total)
3. MRS Emotion Vs PANAS - neg
4. MRS Emotion Vs IIM

For convergent validity the following pairs were used:

1. MRS Interest Vs IIM
2. MRS Hurdle Vs MWS
3. MRS Emotion Vs PANAS – Pos
4. MRS Attention Vs d2 (CP)

5. d2 (FR) Vs MWS

6. MRS Semant Vs d2 (CP)

Schedule including intervention:

S.NO.	Schedule	Time (min.)
1	Starting prayer	3
2	*Bhajan*/devotional music piece (Intervention)	13
3	d2 test of attention	4.33
4	Music receptivity scale	10
5	Interest in music (IIM)	5
6	Positive and negative effect schedule (PANAS-SF)	5
7	Mind wandering scale	3
8	Closing prayer	2
Total duration of intervention: 45.33		