RELEVANCE OF THE ITEMS OF THE ASSESSMENT SCALE FOR CEREBRAL PALSY ASSESSMENT SCALE (ASCP) FOR THE OBSERVATION OF A GROUP OF PEOPLE NOT HOMOGENEOUSLY AFFECTED BY SEVERE CEREBRAL PALSY IN A MUSIC THERAPY TREATMENT

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Master Thesis at the Master Programme in Music Therapy
Department of Communication and Psychology
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June 2013

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INSTITUTO MAP
música, arte y proceso

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Abstract

The purpose of this study is to find the relevance of the items within a self-made assessment scale, called Assessment Scale for Cerebral Palsy (ASCP), built to observe the interactive response of a small group of people with severe Cerebral Palsy Therapy in a Music Therapy treatment.

In order to achieve that goal, different assessment scales in Music Therapy with Cerebral Palsy (CP) and other pathologies with similar limitations have been reviewed, and their items have been compared with those of ASCP scale.

The qualitative data analysis used provided some common and significant items (17/32) to observe changes in the interactive response in CP. There is also a reflection on the relevance or not of others, initially considered in ASCP scale, and potential perspectives to expand its relevance.

Keywords:

Music Therapy Cerebral Palsy Assessment Scale for Cerebral Palsy, Interaction, Intentional Response, Comparison Scales.

Resumen

Este estudio se propone reflexionar sobre qué ítems pueden ser relevantes dentro de una escala de valoración propia, denominada Assessment Scale for Cerebral Palsy (ASCP), construida para observar la respuesta interactiva de un pequeño grupo de personas con Parálisis Cerebral severa durante un tratamiento de Musicoterapia.

Para ello, se han revisado distintas escalas de valoración usadas en Musicoterapia con Parálisis Cerebral y otras patologías con limitaciones similares y, posteriormente, se han comparado los ítems de éstas y los de la escala ASCP.

El análisis cualitativo de los datos ha proporcionado unos ítems comunes (17/32) y significativos para observar los cambios en la respuesta de interacción en PC. También se ofrece una reflexión sobre la relevancia o no de otros, considerados inicialmente en la escala ASCP, y posibles perspectivas que amplíen su relevancia.

Palabras claves:

Musicoterapia, Parálisis Cerebral, Escala de Valoración para Parálisis Cerebral, interacción, respuesta intencional, comparación entre escalas.

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Chapter 1: INTRODUCTION

1.1 Personal Motivation

To develop this paper, I will start from a clinical experience of music therapy (MT) that took place in 2009 in the Ramon y Cajal Centre - ASPACE (*Asociación de Paralíticos Cerebrales* – Cerebral Palsy Association), Cizur (Navarra), Spain, specialized in the treatment of people affected by Cerebral Palsy (CP). The music therapy treatment was conducted with a group of four people not homogeneously affected by severe CP during thirty sessions. The group was comprised by two men and two women, of ages in the range of 14 to 37 years old, spastic quadriplegics without verbal language, two of them blind and confined to bed, all of them hospitalized in the Ramon y Cajal Centre. The treatment has followed the provided ethical requirements and all the sessions were recorded in video.

The MT treatment was conducted with multiple musical activities based in active creative techniques, inspired in the Nordoff-Robbins model (1977), using small percussive instruments. A MT treatment according to this model envisages three proceeding phases that may be described as follows: meeting the emotional state of the client by means of music, evoking their musical responses and free expression and interaction in the response. Active MT offers a framework so that the patients and the music therapist meet and relate by producing sounds, rhythms and melodies, with the aim of engaging in a relationship and enjoying.

Depending on individual differences, the spectrum of the responses to MT treatment (either sound or corporal or gestural) varied differently from one case to the other. This variety made me reflect on the complexity of observing and analyzing the changes in their communicative interaction responses, differentiating between intentionality and automatism of their gestures and behaviours. Cavalier and Brown (1998) highlighted that it is possible to consider the potential for communication in every type of deficiency, included CP, as an element favouring transit from passivity to participation. Lewis (1990) suggests five levels of intentionality according to the criterion that describes intention as the property of all the systems “objective oriented”: first level – *innate necessity*

related to survival; second level – *interactive necessity* subordinated to the presence or absence of external stimuli; third level – *action intent* related to the ability of representation that provokes the anticipation of desire; fourth level – *divergent intent* according to differentiated objectives; fifth level – *conscious intent* supported by emotions. Finally, Bunce and Breakey (2007) point out that the world perceived by one individual is in relation with the intentionality given that the possibility of response is limited or enabled by the physical properties of their body. They also highlight that the two concepts cannot be separated from the personal world and "other", existing as a single phenomenon that may explain the direction of intentionality (Bunce and Breakey, 2007).

Throughout the development of this treatment, an assessment scale was progressively created based on the observation and the objectives that had been set forth for these sessions and with the aim of describing the changes in the response of the members of the group during the MT treatment process. To support the items of this scale, some references, mentioned in different assessment scales such as the AQR (Assessment of the Quality of Relationship) of Schumacher & Calvet (2007), Nordoff-Robbins Rating Scales (1977), Music Interaction Rating scale (MIR) of Pavlicevic & Trevarthen (1989) and Music Therapy Diagnostic Assessments (MTDA) of Oldfield (2006), were examined.

The interest of this paper is to go deeper in the study and revision of the most frequent assessment scales, frequently used for MT observation of people with severe CP or similar limitations in the motor, communicative, cognitive and social areas, so as to help in the consideration of the usefulness and validity of the items established in this clinical case to carry out clinical observations of the interaction responses of patients with severe CP, either interacting with the instrument(s), with the therapist or with their mates.

1.2 Research Question and Problem Formulation

Which items in a particular assessment scale developed for a Music Therapy work with a group of four adults, not homogeneously affected by severe Cerebral Palsy, may be considered relevant for the valuation of their acts of interaction?

1.3 Previous Theoretical Foundations

Cerebral Palsy

Cerebral Palsy (CP) is understood as a group of permanent non-progressive disturbances produced in developing fetal or infant brain (Rosenbaum et al., 2006). Disorders of the development of movement and posture which cause limitation of activity, are *always present* and are often accompanied by disturbances in communication, cognition, sensation, perception, behaviour, epilepsy (Ferrari and Cioni, 2005; Rosenbaum et al., 2006) and secondary musculoskeletal problems (Rosenbaum et al., 2006), that may affect the intelligibility of speech and gestures, understanding of language and communication signals expressed by movement of the body and expression (Pennington, 2008). According to Stanley et al. (2000), the severity of limitations associated in the definition increases with the seriousness of the motor deficiency and are strictly connected with the relational aspects of social behaviour (Rosenbaum et al., 2006), social isolation and loneliness (Krakowsky et al., 2007), and significant losses of ability (Krakowsky et al., 2007). According to Morris and Bartlett (2004), the level of limitation in superior and inferior limbs implies one of the following definitions: *mild, moderate* and *severe,* depending on the degree of the handicap, difficulty with speed, coordination and balance; quadriplegic means having the same level of incapacity in inferior and superior limbs (Morris and Bartlett, 2004).

Morris (2007) states that the definition of CP has progressively broadened in recent history to the point of including all these aspects: motor aspect (Bax, 1964); an heterogeneous spectrum of non-progressive motor disturbances of central origin (Mutch et al., 1992); terms of neurological nature such as

hypotonia, hypertonia, spasticity, rigidity, dyskinesia and ataxia (Evans et al., 1987); disturbances in communication, cognition, sensation, perception, behaviour and epilepsy, (Ferrari & Cioni, 2005); permanent aspect and non-progressive aspect (Rosenbaum et al., 2006). According to Lamont et al. (2003), CP may be briefly defined as the interference of messages between the brain and the body.

To describe the disturbances caused by CP in communication, cognition, sensation, perception, expression, behaviour, relational and social aspects, and the decrease in the activity, Rosenbaum et al. (2006) refer to the following functional limitations:

- "Abnormal motor functioning and organisation (that reflect an abnormal motor control) are the main features of CP. These motor problems may cause difficulties to walk, eat and swallow, in coordinated eye movements, speaking articulation, and secondary problems of behaviour, musculoskeletal functions, and social participation.
- Sensory: Sight, hearing and other sensory modalities may be affected.
- Perceptive: The ability of incorporating and interpreting sensory and/or cognitive information.
- Cognitive: Both global and specific cognitive processes may be affected, including attention.
- Communicative: Expressive and/or receptive communication abilities and/or social interaction may be affected.
- Behavioural: These include psychiatric or behaviour problems such as autistic spectrum disorders (ASD), sleeping disorders, ADHD, humour disorders and anxiety problems.
- Epilepsy: many types of epileptic syndromes may be seen in people with CP.
- Musculoskeletal secondary problems: People with CP may develop a variety of musculoskeletal problems such as muscle or tendon contracture, bone torsion, hip displacement and spinal malformation. Many of these problems develop throughout life and have to do with physical growth, muscle spasticity, aging and other factors."

Music therapy applied on Cerebral Palsy

According to the Humanistic approach, despite their severe limitations in almost all psycho-physic fields, each individual with CP is an entire world with a latent potential from the point of view of the expression of their internal emotional richness, particularly inaccessible for common people. It may be reflected more easily in the interpretation of the observations in treatments of active MT models. In these MT models, the improvisation assumes a very important role. Bruscia (1998) suggests that creative musical improvisation improves, strengthens, and develops in a group of clients with severe CP, the cognitive processes, emotional expression, communication skills and relation social abilities. According to Grocke and Wigram (2007), MT may be a treatment in which spastic quadriplegic people may express themselves through musical improvisation directly and without verbal expression of their body, explore and express their emotional world freely, despite of the limitations of their condition. In accordance with what was previously expounded and to what Nordoff & Robbins (1997) express in their Creative MT model, I believe that this approach of MT may help people with CP to express by means of the music created during the session, putting their effort in driving movements in a communicative direction of their internal world towards the outside, and to decrease the tensions in favour of a growing emotional wellbeing.

1.4 Context of the clinical case

Context of the Centre

The objective of the Ramon y Cajal Centre - ASPACE Navarra is that people with CP and/or similar alterations reach the maximum development of their possibilities and for that, a team work suited to the needs, possibilities and interests of each individual is carried out, with a permanent contact with their families. The professionals that work with these people in different kinds of therapeutic interventions in the centre usually are: physical therapist, speech therapist, occupational therapist, teachers, physician, nurse, psychologist, social worker, assistants, workshop assistants, hydro-therapy monitor, leisure

and free time monitor and sports monitor. This was the first time that a Music Therapy treatment was conducted there.

Participants

A group of four patients hospitalized in the centre participated in the MT treatment; two males 16 and 37 years old, and two females 14 and 22 years old, diagnosed as spastic quadriplegics with a severe degree of CP, without verbal language. The selection of these patients for the MT activity was done by the physician of the centre, giving the following clinical diagnosis of each one of them (Table 1):

Table 1: Clinic diagnostic of the clients

Patient	Age	Gender	Diagnosis	Characteristics	Other illnesses
L.	14	Female	Spastic quadriplegic	Severe level, without verbal language, confined to bed	Blindness Deep mental retardation Hip malformation
A.	16	Male	Spastic quadriplegic	Severe level, without verbal language, in wheelchair	Epilepsy, Degenerative Lennox-Gastaut syndrome
H.	22	Female	Spastic quadriplegic	Severe level, without verbal language, in wheelchair	
R.	37	Male	Spastic quadriplegic	Severe level, without verbal language, confined to bed	Blindness Severe dorsal lumbar scoliosis

Setting

The room where the sessions were conducted was adapted in the room used for stimulation in other occasions. An occupational therapist was always present in the sessions.

A set of instruments comprised by small percussion instruments Orff-Schulwerk- type (Velázquez, 1990) (rattles, maracas, tambourines and one darbuka) was placed in this room.

These musical instruments are easy to handle and more adaptable to the musical needs of the group members, since they favour: hitting, moving, shaking, scratching the membrane, and over all, the possibility of fastening them by tying them up to the limbs and producing sounds, rhythms and accompaniments. The instruments of the music therapist were a guitar and a djembe drum, in addition to the voice.

The adjustments made so that the participants could use some of the instruments were fastening the rattles to their joints, wrists or ankles with Velcro tape (in L. and R. clients).

Timing and structure

Thirty sessions of MT were conducted in a weekly basis and with duration of forty minutes each.

Active music therapy activities of improvisation and creation of sound environments, rhythms and songs were carried out in a general structure of sessions that included a welcome and a farewell song. Neither the quality of sound nor the timbre or the way of producing sounds mattered. The approach consisted in allowing a conscious action of interaction in which a person with different degrees of severity could produce sound in addition to exercising their arms and hands, so as to relax their muscles and expanding the spectrum of their movements.

All the activities were significant and led to the increase in changes observed in the records of instrumental participation.

Procedure followed in the construction of the assessment scale for this study

To build the assessment scale used to describe the changes in the response of the members of the experimental work group in the clinical case under consideration, during the MT process, the following process was followed:

1. Estimating the intervention areas according to the limitations of the clients due to the severity of their CP.
2. Collecting the clients' needs.
3. Establishing the treatment objectives.
4. Choosing the items as a result of the points 1, 2 and 3 (for a detailed presentation, see the corresponding Table 3 in Chapter 3, section 3.2).

The areas of intervention according to the clients' limitations were: motor area, perceptive-sensorial area, communication area, emotional development area and relational area.

Their needs and the objectives that were worked on the MT and centred in the instrumental activity may be summarized in the following Table 2:

Table 2: Areas of intervention according to clients needs and goals developed in MT

Areas	Needs	Objectives
MOTOR	Control corporal movement. Produce voluntary motor acts. Decrease uncontrolled movements.	Stimulate the development of aim-oriented voluntary movements by means of the use of small percussion instruments.
PERCEPTIVE-SENSORIAL	Increase the attention capacity and remaining in the task.	Stimulate the state of alert, orientation and attention to external stimuli provoked by the instruments and the own interaction.
COMMUNICATION	Increase the expression ability. Increase the understanding of messages.	Increase oral, body-language and instrumental expression and communication with the music therapist and the group by means of musical improvisation games with small percussion instruments.
EMOTIONAL DEVELOPMENT	Reduce anxiety and tension. Increase pleasant sensations and manifestations.	Reduce the level of anxiety and tension by means of a structured framework of activities included in a structured session. Facilitate the contact with, and expression of diverse emotions.
RELATIONAL	Relate to the "other". Relate to the instruments. Relate to the music therapist.	Increase motivation and pleasure of participating in the activity of playing instruments.

1.5 Method

To answer the core question of this study about which items of the assessment scale developed specifically for Music Therapy with a group of four adults, not homogeneously affected by severe CP, may be considered relevant for the valuation of their interaction acts, the following steps will be followed:

1) First, the items chosen in the assessment scale, created for the observation and follow-up of the clinical group previously mentioned, will be described.

2) Then, will be expounded items used in assessment scales with this clinical population and with other populations with similar characteristics in the type of intentional response (such as, for example, coma or deep mental disability) in MT. For this, a revision of the existing literature in this matter will be done.
3) Afterwards, a comparison between the items described in the literature and those observed in the assessment scale of this study will be done, to conclude by determining which of the latter may be considered valid and relevant (or not).

1.6 Methodology of the study

To solve the problem posed in this study, the latter is based on a literature review and a subsequent comparison, following a qualitative methodology which, according to Holloway & Wheeler (2009), is useful for the exploration of the changes and with is based on an interpretative approach and the description of the experience of human beings.

The study tried to do a systematic review to evaluate and interpret all the relevant research available in relation to assessment scales susceptible of being used and adapted for use with population with CP and in MT.

This review arises from the need to summarise existing information on the subject, with the objective of reinforcing and validating the scale created by me for this particular clinical case.

The development of this search and its results are shown in the core of this work.

Besides, a comparison was made with the items previously selected in the clinical case and which, from a qualitative review, were considered useful to orient the clinical work with MT and its subsequent assessment.

To try to respond to the main question of this paper, the study will intend to find the relevance of the items proposed in the assessment scale created for it.

Relevance is understood as finding equal or similar items that justify a possible inclusion of the items proposed or others found pertinent for a future enhancement of the scale. Messick (1989) states that the systematic attempts to assess the ‘content-relevance’ are not common in the literature and Dunn et al. (1999), speaking of relevance of the “item-content-relevance”, quote Cronbach (1971) to emphasise that the research processes have to be described with as many details as possible so that other researchers may replicate the key aspects of the process in a proper manner. The relevance of the content of an individual item or of a group of items will also be assessed in this study.

Chapter 2: LITERATURE REVIEW

2.1 Introduction

The objective of this literature review is to provide foundation and context for the study in question, justifying the definitions, outlining and conceptualising topics so as to impartially compare the own results with others, according to Dileo (in Wheeler, 2005) and, Hemingway and Brereton (2009). Rocco and Plakhotnick (2009) suggest that the empirical, qualitative, quantitative and mixed studies have to be related to literature or to concepts that support the focus and the problem of the study, and which have a correlation between the literature review, the theoretical framework and the conceptual framework.

In this sense, two points will be developed in this chapter:

1) MT applied on people with CP;

2) Assessment scales most frequently used in MT and in CP, with the aim of deepening in the question of this study regarding assessment scales and their applicability to describe the communicative interaction acts of people with severe CP in MT.

2.2 MT applied on people with CP

For the description of the material considered in this section, one of the two aims of the literature revision has been deepening in the theoretical framework and the other, core of this study, mentioning studies that expound, are centred on or talk about evaluation and assessment of MT treatment with this population, to categorise or be a source of inspiration for a response to the problem proposed in this study (Rocco y Plakhotnick, 2009).

As regards to the first aim, it is most important to confirm the importance of music as an element that facilitates communication and relationships for people that do not have verbal language and are physically limited for the expression of their emotions, as are people with CP. Although many authors have deepened on this argument in studies previous to this, giving us the possibility to confirm

its utility, I have chosen to go deeper into those that refer to active music. Music is one of the fundamental aspects of MT and, as a means to do a connection, different from speaking, it may involve verbal communication and playing instruments at the same time (Oldfield, 1995); it may as well provide benefits in the treatment of speaking and language disorders (Hurkmans et al., 2012). Darrow et al. (2001), in his study on the effect of diverse musical conditions (vocalization and playing percussion instruments) on the state of behaviour of students with deep disabilities, found that none of the musical treatments were better than the base conditions in which the therapist simply spoke to the students and kept them in a state of alert de base; however, other studies do highlight its utility. Thus, a quantitative study on music and art-therapy with children with CP shows improvement in the attention and concentration abilities, in the cognitive and motor areas (Nasuruddin, 2010). A musical intervention with percussion and familiar music has demonstrated to be an approach that contributes to decrease anxiety in groups of elder patients with dementia (Sung et al., 2012). Finally, a quantitative study on the impact of percussion in children has revealed that participation in percussion groups results in significant improvement in multiple areas of socio-emotional behaviour (Ho et al., 2011).

To validate the MT interventions in human organism, Unkefer and Thaut (2005) state that music is a unique perceptive stimulus that may be used as a main therapeutic mechanism. Hillecke, Nickel and Bolay (2005) mention five aspects in which MT can contribute, i.e.: 1) improvement of attention, since music is an auditory stimulus that can drive attention much better than other stimuli; 2) increase of emotional expression because music may serve to modulate emotions, either because a melody directly activates certain emotions or because it recalls associated emotions; 3) cognitive development, since the understanding of music implies thinking and creating a subjective experience, which may help to change specific subjective cognition and meanings that were previously established; 4) behavioural changes, because music is a tool that can activate movement; and 5) development of communication, since music is a way of non-verbal communication of great help in the treatment of problems related to interaction between people, especially effective as a vehicle to express emotions in people who are not able to communicate verbally (Juslin

and Sloboda, 2001). A subsequent study on the efficacy of MT in a group of adults with mental disease, reports the reduction of psychiatric symptoms related to anxiety, although with little negative effects on somatisation, depression and psychotic symptoms (De l'Etoile, 2002).

One of the first ones to mention the specific work with MT with people with CP was Alvin (1961), who wrote that children with CP can be aided by means of music.

Almost all the articles considered in the literature revision (see Appendix I) have highlights researches or studies conducted basically with children populations. Three quantitative studies focus on the combination of MT and acupuncture, in CP with a population of children (Wu et al., 2008; Yu et al., 2009a, 2009b). Another quantitative study focuses on MT, acupuncture and movement with a population of children with CP (Peng et al., 2011), showing the benefits in the motor area. The effectiveness of MT in specific behavioural changes in clients with CP has been proven by Krakouer et al. (2001). Ma et al. (2009) point out positive results in the motor area and also in relaxation, in a quantitative study with children with CP, by applying a treatment that combines MT with the Chinese therapeutic massage or “Tuina” (Ma et al., 2009). References to uses and interventions of MT as a complementary stimulus to develop, for example, gait trough pulse and rhythm, in children and adults with spastic CP, applying the method called Rhythmic Auditory Stimulation (RAS) (Kwak, 2007; Correa et al. , 2009; Kim et al. 2011).

A recent quantitative study with a group of six young people with CP and severe multiple disabilities (SMDC), describe how MT may suppress the nervous parasympathetic activities, using, for the observation, a monitored system (Orita et al., 2012). Perry (2003) states, in his study with a sample of children with a series of cognitive and communicative disturbances, and multiple disabilities, including CP, that MT may support the development of abilities such as sustained attention and joint attention, in an interactive context of musical improvisation. In addition, the same author, focusing on musical interaction, states that a MT intervention has to begin as soon as possible to improve their communicative abilities, increasing motivation. In their qualitative study, Gilboa

and Roginsky (2010) prove, in their qualitative study, the efficacy of a dyadic MT treatment with children with CP, especially finding an improvement in the relation and in the communication of the children with their mothers. In addition, Kho (2011) describes a research conducted as an experimental case of clinical practice, using mainly qualitative data and a sample of two children with CP with different levels of severity, which suggests that MT may promote communication and socialisation in people with CP. The evaluation and assessment of social and communicative skills of the two children was done using the Assessment, Evaluation, and Programming System for Infants and Children (AEPS) before and after the intervention. Kho (2011) expounds that regardless of the existence of empirical studies on how MT may help in promoting communication and socialisation, these focus mainly in children with Autistic Spectrum Disorders (ASD) (Gold, Wigram & Elefant, 2006). Another article, although old, deserves to be mentioned because it describes the use of percussion in MT, stating that a percussion instrument such as the Balinese gamelan may be used in musical improvisation as the basis for creativity in MT and be of advantage for people with severe spastic CP (Sanger and Kippen, 1987).

Some studies reviewed have been source of inspiration or facilitators of new points of view on this matter, because of the resemblance with the response of people with different pathologies, describing areas of interest with contributions such as the assessment of the level of response of the patients in coma, according to the “Glasgow Coma Scale” (GCS) (Teasdale and Jennett, 1974; Jones, 1979), whose description may be found in the section 2.4. A recent study that refers exclusively to the state of coma, takes into consideration the quality of the response of patients in this state, observing that, in the spectrum of possibilities from the state of coma up to the state of extreme alert, the response is an act of will or intentionality (Hill, 2011). On this subject, several studies suggest that awareness and intentionality as a response are related (Gillett and McMillan, 2001), as are the ‘voluntary action’ or intentionality (Laureys, 2005) and the implication of an active model of conscious experience (Picton and Stuss, 1994); however, given that the response is difficult to observe, wrong interpretations may take place (Inzaghi and Sozzi, 2011). The

incidence of active MT in the state of consciousness of people in 'coma vigile', in patients in neurological rehabilitation, and also in other pathologies such as dementia, traumatic cerebral damages and multiple sclerosis, among other neuro-generative illnesses, has been studied by Aldridge (2005), whose conclusions highlight the effectiveness of the MT intervention in the restoration of identity.

2.3 Assessment scales used in MT and their relation with CP

A definition of evaluation and assessment scales is given by Wigram (1999), suggesting that they are those instruments that enable to have proof and information that are the foundation of a diagnostic hypothesis, to clarify on general needs or which demonstrate the value of MT as an intervention (Wigram, Pedersen and Bonde, 2002). According to these authors, the theory of MT has developed from the empirical practice and the individual differences in personality and abilities of the music therapist. This has made difficult to arrive to a uniform approach of the practice of MT and thus the importance of assessment has been limited. The evaluation criteria could be more uniform (Wigram, 1999; Wigram, Pedersen and Bonde, 2002) and McFerran and Wigram (2005) argue that there is a need to create relevant and suitable tools to research the musical phenomena in a therapeutic setting.

Phan Quoc (2007) and Sabatella (2004) collect different MT scales described in the literature, based on Aldridge (1996) and Tischler (2000). According to them, there is an urge for evaluation in MT, and a lack of evaluation instruments specific for MT, especially for patients that cannot be evaluated through verbal tests. Many of the scales of qualification of MT in the literature are neither specific for MT nor validated. Goodman (2007) made a review of assessment methods in MT with children and, quoting Wilson and Smith (2000), he shows that two thirds of the methods refer to mental disability and emotional deficits, among which many were in the psychiatric field, clinical practices and educational settings. Wigram, Pedersen and Bonde (2002) write that the scales developed in MT focus on a great variety of aspects of the process of music therapy, such as musical interaction (Pavlicevic, 1995), response, communication and relations established with music (Nordoff-Robbins, 1977),

diagnosis (Raijmaekers, 1993), cognitive, perceptive and motor skills (Grant, 1995), sound-musical profiles (Di Franco, 1999) and analysis of improvised music (Bruscia, 1987), among others.

In addition, Jacobsen and Wigram (2007) highlight evaluation models that are centred in the way of interaction between the therapist and the client within an improvisation model in MT, such as the Music Interaction Rating scale (MIR) of Pavlicevic and Trevarthen (1989), designed to describe the interpersonal and inter-musical relational state between the clients and the therapists or the clients and others, or the instrument of Assessment of the Quality of Relationship (AQR), developed by Schumacher and Calvet-Kruppa (1999) supported on the work with children with autism, which is based on Stern's theories on children's interpersonal development.

Wigram, Pedersen and Bonde (2002) mention *qualitative* assessment and evaluation tools (developed according to an experimental and phenomenological model) to evaluate the changes that occur in the sessions throughout time, such as: Lee's (2000) method of analysis for improvisations in MT with patients with HIV , which envisages a process of nine phases that go from listening to the improvisation to the detailed transcription of the music produced; the Improvisation Assessment Profiles (IAP) of Bruscia (1987), in which musical improvisation fragments in therapy are analyzed according to autonomy profiles (patient-therapist interaction) or variability (level of rigidity or freedom in the music produced by the patient); the psychotherapeutic evaluation method of Loewy (2000), in whose model of musical evaluation the interpretation of the words used to describe the musical experience is predominant; Hintz's (2000) evaluation model of musical abilities and related conducts in elders; the evaluation model of Wigram and Oldfield developed with children in which they define the appearance of a process of activities during the session (Wigram, Pedersen y Bonde, 2002); the evaluation model of Nordoff-Robbins (1977), which includes scales of musical response, patient-therapist bond, musical communication, etc.; the qualitative criteria of Alvin (1961) to describe the listening responses, both vocal and instrumental, considering the psychological and musical processes (Bruscia, 1987); the

method to describe levels of contact of Steen-Møller (1996). Furthermore, Wosch and Wigram (2007) describe in their book Microanalysis the scale of Music Therapy Diagnostic Assessments (MTDA) of Oldfield (2006) to help the psychiatric team in the elaboration of a diagnosis of children with autism. Finally, an adaptation of the AQR scale carried out by Lawes (2012) to prove the level of expressive and communicative interaction in the music created in sessions with *autistic children*. Lawes gathers the four scales that comprise the AQR in one, associating the four different aspects of analysis in the same sequence of the development levels.

Neither of these scales has been conceived for CP, nor references found about the use of these scales in a population with CP with any type of severity, but the scale of observation of Dyadic Treatment in Music Therapy (DUET) of Gilboa and Roginsky (2010). This scale is comprised by two sub-scales, one for the type of communication and the other for the type of relationship between the mother and her child with CP. It is likely that all these scales, except for the latter, need to be adapted specifically to be used somehow as an assessment and evaluation tool in a proper manner with this population, and this is the object of this study.

According to Steenbeek et al. (2010) an individual instrument, more and more used to assess the progress of rehabilitation in an interdisciplinary practice with children with CP is the assessment Goal Attainment Scale (GAS), which is an objective-oriented scale designed by Kiresuk and Sherman (1968), and subsequently refined (Endicott et al., 1976) for the assessment of adults in mental health programmes, and tested with a good level of reliability (Steenbeek et al., 2010; Palisano et al., 1997; Palisano, 1993).

2.4 Assessment scales used in MT and populations similar to those with CP

In different studies devoted to pathologies with similar characteristics in the type of response to those found in patients with severe CP, other assessment scales have been found, although none of them has been thought or developed for CP.

A review of Nicoll (2008) on MT and children with special needs, mentions a study of Goodman (2007) refers to the existence of the Music Therapy Assessment Profile for Severely/Profoundly Handicapped (MTAP) scale, created for the observation of people with deep disabilities (Michel y Rohrbacher, 1982), and to the scale created by the same author, Assessment for Emotionally Disturbed Children (MTA-ED) (Goodman, 1989) in which the representational thinking and the verbal associations are observed in children (Goodman, 2007). Davids and Wagner (2012) discusses the existence of the Developmental Disabilities – Children's Global Assessment Scale (DD-CGAS) of Wagner et al. (2007), clinical rating scale for global assessment of *children with developmental disorders*.

The following scales have been considered relevant to answer the question of this study: the Developmental Disabilities – Children's Global Assessment Scale (DD-CGAS) of Wagner et al. (2007); the Glasgow Coma Scale (GCS) of Teasdale & Jennett (1974); the Music Therapy Rating Scale (MAKS) of von Moreau et al. (2010); the Music Therapy Assessment Tool for Awareness in Disorders of Consciousness (MATADOC) scale of Magee et al. (2012); the Music Therapy Assessment Tool for Low Awareness States (MATLAS) scale of Magee (2007); and the Sensory Modality Assessment and Rehabilitation Technique (SMART) scale of Gill-Thwaites & Munday (2004).

Although not conceived as a scale, Lewis's (1990) assessment tool that attempts to explore the origins of intentionality was also considered relevant. In this study, the author points out five levels of intentionality which may be applied to evaluate the level of intentional response in people who do not have verbal language among their abilities.

2.5 Description of the assessment scale and their categories

Next, there is a description of some of the assessment scales previously mentioned and their categories, such as, in alphabetic order: AQR (Schumacher and Calvet-Kruppa, 1999), IAP (Bruscia, 1988), MIR (Pavlicevic &

Trevarthen, 1989), Model of levels of contact of Steen-Møller (1996), MTDA (Oldfield, 2006), Nordoff-Robbins Rating Scales (1977). A more detailed description of the items will be found in the next chapter.

Scales used in MT

Assessment of the Quality of Relationship (AQR)

Schumacher and Calvet-Kruppa (1999) write in the Chapter VII of Wosch & Wigram (2007) that this instrument of AQR is a System of Analysis for the assessment of the Quality of a Therapeutic Relationship, created by a development psychologist specialized in the early mother-child relationship with *disabled children*, and a music therapist. The objective of this instrument is to evaluate and classify the quality of interpersonal relationships. The AQR enables the assessment of the quality of a relationship (diagnosis), as well as the presentation of a therapy (evaluation), and also of the method, since the ability of the therapist to offer a suitable intervention for the state of the patient can be appreciated. This analysis should also help in the prognosis of the therapy and its objectives. Finally, it can also be used in the research setting.

The AQR has four scales with different focuses; the first three on the patient and the fourth on the therapist: 1) on the relation of the patient with the instruments and their relational function (IQR scale); 2) on vocalizations (VQR scale); 3) on the physical-emotional qualities (PEQR scale); and 4) on the therapist and their therapeutic intervention (TQR scale).

The procedure suggested by Schumacher and Calvet-Kruppa is choosing one of the first three scales, depending on what expression -vocal, instrumental or physical-emotional- is the most outstanding throughout the time in the sessions that are being punctuated. If the client does not play or sing but shows important emotional characteristics, the physical-emotional scale is preferable, with its focus on the affective state of the client expressed by means of gestures, posture and movement, and the quantity and quality of their eye-contact (Schumacher and Calvet-Kruppa). The fourth scale for the therapist is used for subsequent clarifications.

Improvisation Assessment Profiles (IAP)

The Improvisation Assessment Profiles scale (IAP) was designed by Bruscia (1988) with the objective of providing a model for the assessment of musical improvisation, with respect to aspects of personality, in *children* and *adults with several levels of development and different pathologies*. In this scale, three main steps of the procedure may be identified: 1) Observing the client during the musical improvisation (alone, with the therapist or other significant person, with/without images and with/without musical direction); 2) Analysis of the musical improvisation according to the profiles and the sub-scales indicated by the author; 3) Interpretation of the results based on the most indicated among the psychological development theories, psychoanalytic and existential. These scales foresee six profiles per each musical element, focusing on the following aspects:

- *Integration,* which means organization of simultaneous aspects of each element
- *Variability,* which means organization of sequential aspects of each element
- *Tension* or how each element accumulates, supports, modulates or releases tension
- *Congruence,* which means consistency of emotional and relational states between each element
- *Prominence* and *control* of each element
- *Autonomy* of the elements with respect to the one who improvises

Music Interaction Rating Scale (MIR)

The Music Interaction Rating scale (MIR) is a tool designed by Pavlicevic & Trevarthen (1989) with the objective of diagnosing, evaluating and assessing the level of contact during the musical improvisation in MT with *schizophrenic patients* (Wigram, Pedersen and Bonde, 2002). The nine levels of the MIR scale go from level 1, in which there is no communication between the client and the therapist, to, progressively, considering a level 9, in which the two share a musical reciprocity increasing the dynamic and the change towards intimacy. These are: 1) No Communication; 2) One part connects but there is no

response from the person; 3) One part connects but there is no musical response from the person; 4) The person does not respond directly to the therapist but in their own direction; 5) Weak musical response coming from the person; 6) Sustained musical response coming from the person; 7) Establishment of mutual contact; 8) Extension of the mutual contact; and 9) Musical association.

Model of levels of contact of Steen-Møller

In 1996, Steen-Møller developed a model of levels of contact between patient and therapist, as a result of his work with a population of *multiple disabled children*, defining five levels of contact (Wigram, Pedersen and Bonde, 2002): In the level 1, the therapist feels the contact with their patient; in the level 2, the therapist hears and sees the contact; in the level 3, the patient controls the contact; in the level 4, the contact takes the shape of dialogue; and in the level 5, the therapist and the patient make contact by means of free, improvised music. These authors state that the objective of this evaluation tool is providing a perspective of the work in MT, document it and clarify the state of a patient (Wigram, Pedersen and Bonde, 2002).

Music Therapy Diagnostic Assessments (MTDA)

The scales that comprise the Music Therapy Diagnostic Assessments (MTDA) were designed by Oldfield (2006) and are used to help the psychiatric team in preparing a diagnosis with *children with autism*. Oldfield (2006) has proven this tool as valid to establish the diagnosis, showing 72% of agreement between the two scales compared in his investigation: MTDA (comprised by several sub-scales of diagnosis evaluation) and the Autistic Diagnostic Observation Schedules (ADOS), which is the most used scale in the diagnosis of autism, using 30 subjects as sample. The four blocks of categories that comprise the scales are: 1) *Categories of the autistic spectrum* (12 items); 2) *Categories of attention deficit* (12 items); 3) *Categories of emotional deficit* (5 items); 4) *Categories of disability in learning/language* (4 items).

Nordoff-Robbins Rating Scales

According to Bruscia (1988) and Goodman (2007), the assessment scales designed by Nordoff-Robbins (1977) for the model of Creative Music Therapy have the objective of collecting information on the use of improvisation as therapeutic tool, both in individual therapy and in group therapy, without limits regarding the age range or any level of development, and with individuals whose pathologies include *mental disability, autism, psychosis, neurological, sensory-motor, learning, emotional and physical problems*. These scales intend to collect the results of objectives addressed to the individual potential of the patient, focusing on some of the items in the expression, human relationships and capacity of response. The scales measure both quantitatively and qualitatively and are:

Thirteen categories of response for the analysis of the relations between the music created by the client and their reaction to other stimuli (The categories 1st – 8th refer to the specific levels of rhythmic ability, the 10th to vocal responses and the others to extra-musical aspects).

Evaluation scale I to describe the relation between the patient and the therapist, both regarding the level of participation and the resistance offered.

Evaluation scale II it addresses the levels of musical communication of the patient in instrumental, vocal and movement activities.

Musical response III whose aim is to facilitate the analysis of rhythmic and instrumental activities and singing. What matters is not only what the patient is able to do musically, but also knowing how he/she does it.

Tempo-dynamic scheme for an assessment of the musical interpretation, that may be considered: pathological, if what the patient expounded lacks meaning; normal if it falls within the limits of musical practice. This assessment associates the combination of emotions with the variations of time and dynamic, which frequently come together, sometimes inseparable (strong-quick, strong-slow, soft-quick, soft-slow).

Scales used in MT and CP or populations close to CP

Now a brief description of some of the assessment scale and their categories used in MT and populations close to CP, such as: DD-CGAS (Wagner et al., 2007); DUET (Gilboa and Roginsky, 2010); GCS (Teasdale & Jennett, 1974); MAKS (von Moreau et al., 2010); MATADOC (Magee et al., 2012); MATLAS (Magee, 2007); Levels of Intentionality according to Lewis (1990); SMART (Gill-Thwaites & Munday (2004).

Developmental Disabilities – Children's Global Assessment Scale (DD-CGAS)

The Developmental Disabilities – Children's Global Assessment Scale (DD-CGAS) was designed by Wagner et al. (2007) with the aim of measuring the global functioning in the study of the treatment of *children* with PDD (Pervasive Developmental Disorders). The DD-CGAS is a modification of the previous CGAS (Children's Global Assessment Scale) of Schaffer et al. (1983), which was the improvement of the GAS (Global Assessment Scale) of Kiresuk and Sherman (1968), adapting the points of analysis and the procedures of administration to the characteristics of children with PDD.

The categories observed are:

- *Care for oneself*
- *Communication*
- *Social behaviour*
- *School/ academic performance*

Dyadic Treatment in MT (DUET)

The observation of the types of communication and relationship between a mother and her child with CP in the Dyadic Treatment in MT (DUET), uses two qualitative scales and one quantitative scale created by Gilboa and Roginsky (2010). The two categorization scales foresee the following categories for communication and relation respectively:

1) The Communication Scale, which is comprised by three categories (10 items):

1a) *Non-verbal communication*

1b) *Musical communication*

1c) *Verbal communication*

2) The Relation Scale, which is comprised by two categories (22 items):

2a) *Coordinated relations*

2b) *Uncoordinated relations*

The third quantitative scale is the same than the first of communication, with the same categories and items, in which the communicative occurrences are listed.

Glasgow Coma Scale (GCS)

The Glasgow Coma Scale GCS is an assessment instrument designed by Teasdale & Jennett (1974) to assess the level of consciousness of patients in coma. According to Teasdale & Jennett (1974), *the actions have an intentional and propositional content*, since different acts that include the consciousness of the direction towards an object may be interpreted as intentional. If action, intentionality and consciousness are considered to be related, it may be said that there is also relation between the willingness of a person and the operations that he/ she may do in the world; this leads to the conclusion that the relation with the social environment of the person can also be observed through their action (Teasdale & Jennett, 1974). According to Teasdale & Jennett (1974), a mental or conscious act has a subject and an object: the subject is the individual to whom the mental act belongs and the object is what the subject focuses on; thus, intentionality is typically relational by the property of the subject-object; by virtue of this object, each moment of consciousness may be considered full of content.

According to Teasdale & Jennett (1974) the punctuation of the level of consciousness depends on the level of response of the patient to what occurs around him/her, and provide the following three categories for their scale: a) *Eye-opening* (4 items); b) *Verbal Response* (5 items); and c) *Motor Response* (5 items).

Music Therapy Rating Scale (MAKS)

The development of the Music Therapy Rating Scale (MAKS) started to be used in psychiatry, in 1994, with the aim of objectively measuring the musical behaviour of a client (von Moreau et al., 2010). The scale has been modified in the clinical practice and for the final version two sub-scales are collected:

1) The Expression Scale, for the assessment of the client's musical improvisation, which is comprised by four categories (14 items):

Treating the instrument (2 items)
Musical shape/ figure (3 items)
Vitality/ Dynamics of expression (4 items)
Quality of the expression (4 items)

2) The Communication Scale, for the assessment of musical improvisation in the duet client-therapist, which is comprised by four categories (13 items):

Commitment (2 items)
Formal aspects (3 items)
In relation to others (5 items)
Quality of the expression (3 items)

Music Therapy Assessment Tool for Awareness in Disorders of Consciousness (MATADOC)

The MT assessment tool of Assessment Tool for Awareness in Disorders of Consciousness (MATADOC) has been designed by Magee et al. (2012) with the aim of providing an interdisciplinary instrument structured for the assessment of consciousness and clinical responses, especially hearing, using a defined protocol that, during the musical setting of MT sessions with *adults*, relates the musical stimulus with the resulting behaviours (Magee et al., 2012). The objective of the MATADOC assessment instrument is to help in the identification of the level of response of the patient, the formulation of an interdisciplinary diagnosis and the creation of a base of responses of the patient in the rehabilitation level in which they are, to identify strong and weak areas and thus design suitable objectives. Magee et al. (2012) advise its use to

determine the level of perception in DOC – Disorders of Consciousness, i.e. VS – Vegetative States and MCS – Minimally Conscious State, and in undetermined levels of consciousness. The format of this scale is designed to show changes in the patient's response across time and in a measurable way.

The MATADOC scale is comprised of three parts with 14 Behavioural Response Categories:

1) Essential Categories Main Sub-scale - Items 1-5 (utilities for diagnosis):

    - Item BRC 1: *response to visual stimuli*
    - Item BRC 2: *response to hearing stimuli*
    - Item BRC 3: *consciousness of musical stimuli*
    - Item BRC 4: *response to verbal directions*
    - Item BRC 5: *excitement*

2) Musical parameters and Behavioural responses - Items 6-7 (information for the design of the musical treatment):

    - Item BRC 6: *behavioural response to music*
    - Item BRC 7: *musical response*

3) Clinical information - Items 8-14 (establishment of objectives and assessment of the responses to design the treatment):

    - Item BRC 8: *vocalization*
    - Item BRC 9: *non-verbal communication*
    - Item BRC 10: *making choices*
    - Item BRC 11: *motor abilities*
    - Item BRC 12: *attention to task*
    - Item BRC 13: *intentional behaviour*
    - Item BRC 14: *emotional response*

All behaviours seen in the observations previous and subsequent to the session must be discarded in the assessment of the responses occurred during the session.

Music Therapy Assessment Tool for Low Awareness States (MATLAS)

MATLAS is an assessment tool designed by Magee (2007) specifically to measure the responses in *patients* diagnosed with *MCS* (Minimally Consciousness State) or in *VS* (Vegetative State). It has been developed for more than fourteen years, as part of an interdisciplinary evaluation and treatment, in particular in the hearing and communication areas (Magee, 2007).
Five behaviour areas cover the 14 items of the MATLAS scale:

- Motor responses
- Communication
- Excitement
- Hearing response capacity
- Visual response capacity

Levels of Intentionality according to Lewis

In his article "The Development of Intentionality and the Role of Consciousness", out of the three models of thought of the Development Theories (Mechanistic model, which considers intentionality as irrelevant since all human acts are subordinated to the surrounding or to internal biological predisposition; model for which intentionality is an emergent property in some organisms; model that defines intention as a property of all the object-oriented-systems) Lewis (1990) is in the third one, doing a metaphorical comparison between intention itself and the movements of a plant that moves and grows towards the sun. To explore the relation between thought and action, Lewis associates cognition (representations) to emotion (actions or motives). Lewis suggests three types of intentional processes:

1) Intentional Process 1: *Adaptive intention*. The emotional property of the objectives are an action pattern (Darwin, 1872; Searle, 1984)

2) Intentional Process 2: *Knowledge of the Intention (subjective self-awareness)*. In each system there is a hierarchy of knowledge of the objectives that motivates their achievement (Newell, 1982)
3) Intentional Process 3: *Conscious intention (objective self-awareness)*. Difference between the objective self-awareness and the subjective self-awareness (Duval & Wicklund, 1972)

Applying these concepts, Lewis considers that development is not transformational; that emotional properties underlie all intentionality; and that awareness is the maximum level of intentionality.

Finally, Lewis defines the five levels of intentionality as:

1) Level I: Need coincides with the Intention and the Emotion
2) Level II: Surrounding activates Desire in all organisms
3) Level III: Objectives are activated Regardless of the environmental context
4) Level IV: Intention includes Multiple Possibilities that are valid to reach and objective
5) Level V: Manipulation of Intentions is a property of objective awareness: being aware of the desire becomes a new desire.

Sensory Modality Assessment and Rehabilitation Technique (SMART)

According to Gill-Thwaites & Munday (2004), SMART is an assessment instrument designed both as an evaluation tool for the treatment of *patients in Vegetative State* or *Minimally Conscious State* (VS o MCS). It has been developed based on the Glasgow Coma Scale and has been perfected continuously since its creation in 1988. SMART is one of the two standardized sensory stimulation protocols that are capable of measuring small changes in the response of patients of slow recovery in minimally conscious state (Magee, 2007). SMART is a tool for the assessment of sensory, motor and communicative responses of a patient, by means of stimulation of the five senses. Magee (2007) says that the consistency of response of the patient is

linked to significant responses, which suggests that the tool has a diagnosis power. The assessment includes the following categories:

1) Five sensory modalities (visual, hearing, tactile, smell and taste)
2) Three other modalities: motor function, functional communication and insomnia/ excitement

2.6 Summary

Many authors highlight the importance of active music as a fundamental factor in MT, and a facilitator of communication and expression for people who do not have verbal language (Oldfield, 1995; Hurkmans et al., 2012), and many others point out the contribution of MT interventions in human body (Unkefer and Thaut, 2005; Hillecke, Nickel and Bolay, 2005; De l'Etoile, 2002).

Working with MT with people with severe CP may be of help, promoting the expression by means of musical improvisation (Alvin, 1961; Bruscia, 1998; Grocke and Wigram, 2007). The study of the effectiveness of MT with people with CP reveals benefits in the motor area, changes of behaviour in the social sphere, improvements in the perceptive-sensory and communicative abilities (Krakouer, 2001; Perry, 2003; Kwak, 2007; Wu et al., 2008; Yu et al., 2009a, 2009b; Ma et al., 2009; Peng et al., 2011; Gilboa and Roginski, 2010; Kho, 2011).

All these articles have been important to give foundation to this work (Nordoff-Robbins, 1977; Bruscia, 1987; Pavlicevic and Trevarthen, 1989; Schumacher and Calvet-Kruppa, 1999; Steen-Møller, 1996; Oldfield, 2006), and some others have been relevant as an inspiration that has produced new points of view about assessment scales of the work with music therapy, opening the field of possibilities to deepen in areas of interest such as observation of the active intentional response of interaction in MT with clients with pathologies close to CP (Teasdale and Jennett, 1974; Lewis 2002; Goodman, 1989, 2007; Gill-

Thwaites & Munday, 2004; Magee, 2007; Wagner et al., 2007; Gilboa and Roginsky, 2010; von Moreau et al., 2010; Magee et al., 2012).

In the next chapter there will be a detailed description and presentation of items and ways of punctuating of the assessment scale created for the clinical case in this study, and some of the assessment scales introduced in this chapter.

Chapter 3: DATA ANALYSIS

3.1. Introduction

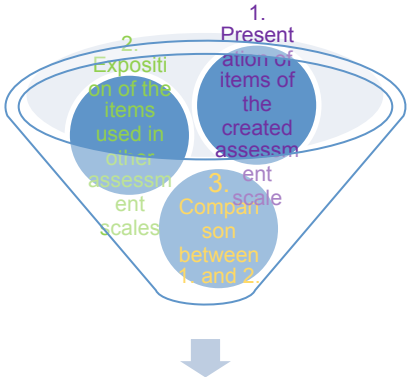
To respond to the initial question: “Which items in a particular assessment scale developed for a Music Therapy work with a group of four adults, not homogeneously affected by severe Brain Paralysis, may be considered relevant for the valuation of their acts of interaction?”, a process comprising the following steps will be followed:

1) Presentation of the items considered in the assessment scale created for the clinical case.

2) Exposition of the review of other assessment scales in MT used with this clinical population and with other populations with similar characteristics in the type of intentional response: categories and items.

3) Comparison between the two items described in the literature and those in the scale of this study.

Picture 1: Diagram of the method of this study



3.2. Presentation of the items considered in the assessment scale created for the clinical case

The scale created for this clinical case, from now on called "Assessment Scale for Cerebral Palsy" (ASCP), is comprised by five response categories of active music intervention in MT: motor, perceptive-sensory, communication, emotional and relational development. The 32 items considered in the scale are: 6 for the motor area, 9 for the perceptive-sensorial area, 8 for the communication area, 4 for the area of emotional development, and 5 for the relational area, as shown in the Table 3:

Table 3: "Assessment Scale for Cerebral Palsy" (ASCP), created for the clinical case presented in this study

	Categories	ITEMS
Categories of responses to musical intervention	1. Motor	1.1. Changes in voluntary movements: frequency 1.2. Changes in voluntary movements: direction (oriented towards an aim) 1.3. Changes in involuntary movements 1.4. Changes in voluntary movements: corporal segments – superior limbs 1.5. Changes in voluntary movements: corporal segments – inferior limbs **1.6.** Changes in voluntary movements: corporal segments – facial
	2. Perceptive-sensorial	2.1. Remains awake 2.2. Remains attentive in the task 2.3. Keeps eye-contact 2.4. Changes gesture or movements with an activity 2.5. Moves towards the voice or sound 2.6. Recognizes the voice of the Therapist 2.7. Recognizes the voice or sound of peers 2.8. Seems to listen to a noise (shakes, moves) 2.9. Discriminates different sounds
	3. Communication	3.1. Does not respond to a sound (we do not know if he/she can hear) 3.2. Continues a sound (so not only hears but also responds) 3.3. Initiates a sound or a sound movement 3.4. Continues a musical cell 3.5. Refuses a verbal command 3.6. Responds or follows a verbal command 3.7. Moves the instrument: plays it, offers it 3.8. Produces vocal or guttural sounds

	4.Emotional development	4.1. Laughs 4.2. Cries 4.3. Shows displeasure 4.4. Moves instrument aside
	5. Relational	5.1. Recognizes the Therapist 5.2. Recognizes peers 5.3. Interaction with the Therapist 5.4. Interaction with peers 5.5. Recognizes or asks for instruments

This division of categories was chosen according to the objective of the observation: assess the communicative intentionality of the expression observable in all the spheres as a reaction to a musical intervention in a MT session.

The punctuation method was, for some items, counting the occurrences (items 1.1. and 2.3.) and for the others (2.3. included) considering the following classification:

0 = this conduct was not observed, 1 = this conduct was rarely observed, 2 = this conduct was observed frequently.

3.3. Description of the literature review

For the literature review of this paper the following steps were followed:

1. Identification of the research studies and published articles.
   For this, the main key words were used: *music therapy, cerebral palsy, assessment scales;* and their combinations: *music therapy – cerebral palsy*, *music therapy - assessment scales*, *cerebral palsy - assessment scales*, *music therapy - cerebral palsy - assessment scales*.
   To enable a wider view on the subject under study, related categories of secondary key words were considered and reviewed, such as:

   - multiple disabilities and music therapy;
   - adults; groups;
   - severe intellectual disability; special educational needs; disorders of consciousness;

- assessment; assessment scales;
- music; improvisation; creative techniques; percussion;
- intentionality; communication; non-verbal communication; active response; socio-emotional behaviour; interaction;

Initially, the following Databases were visited: Cochrane Library, ERIC, PsycINFO, PUBMED and SCOPUS. All the search fields were considered, including publications in magazines, conferences and articles.

2. Selection of the studies or articles to be included in the paper.
   Only those written in English, Italian and Spanish, mainly within the last 10 years were chosen.
3. Evaluation of the quality of each study or report.
   Those that were relevant to respond the research problem were selected.

The summary of the articles found appears in the Table 4:

Table 4: Summary of the articles found

DATABASES	Articles considered	MT- CP	MT- Assessment scales	CP- Assessment scales	CP-MT- Assessment scales (or scale)
COCHRANE LIBRARY	6	4	2	0	1
ERIC	1	1	0	0	0
PsycoINFO	10	9	1	0	0
PUBMED	14	9	2	2	1
SCOPUS	20	12	3	3	2

Based on the articles found (see Appendix I), in a first filtering, the following authors were selected according to the topic of this research. This is the summary of their contributions (Table 5):

Table 5: Description of the summary of the articles selected according to main key words

Author	Year	Source	Search key	Summary
Perry	2003	ERIC PsycINFO PUBMED SCOPUS	MT and CP	CP and MT in a qualitative study with children
Magee	2007	SCOPUS	MT and assessment scales	MT and Minimum consciousness and Vegetative states in a quantitative studies with several populations, MATLAS, reference SMART
Nicoll	2008	PsycINFO	MT and CP	Review of a Goodman (2007) study on assessment methods of MT for CP with children
Gilboa and Roginsky	2010	PsycINFO SCOPUS	MT and CP	Dyadic MT (DUET) and CP in a qualitative study with DUET scale
Steenbeek et al.	2010	PUBMED SCOPUS	CP and assessment scales	Scale adapted from GAS for rehabilitation with children with CP
von Moreau	2010	PsycINFO	MT and assessment scales	Musical behaviour with children and MAKS in Psychiatry
Wagner and Davids	2012	SCOPUS	MT and assessment scales	Assessment instruments and classification systems for children and CP, DD-CGAS

Based on these articles and on the quotes mentioned in them, in a second filtering the following articles were selected. The table 6 is the summary of these contributions:

Table 6: Description of the summary of the articles selected according to secondary key words and quotes

Author	Year	Summary
Bruscia	1987	Nordoff-Robbins Scales
Goodman	2007	Study on assessment instruments for MT, MTAP scale, MTA-ED scale, Nordoff-Robbins's scales
Jones	1979	Describes the GCS
Kho	2011	Communication and socialisation in MT with children with CP
Lawes	2012	Adaptation of the AQR scale
Lewis	1990	Describes levels of intentionality
Magee et al.	2012	Describes the MATADOC scale
Oldfield	2006	Describes the MTDA scale
Pavlicevic and Trevarthen	1989	Describe the MIR scale
Schumacher and Calvet-Kruppa	1999	Describe the AQR scale
Teasdale and Jennett	1974	Describe the GCS
Wigram, Pedersen and Bonde	2002	MT with patients with physical disability or retardation in development, model of levels of contact of Steen-Møller (1996)
Wosch and Wigram	2007	Chap. 7: Schumacher and Calvet-Kruppa – AQR scale

3.4 Presentation of the review of other assessment scales for MT used with this clinical population and with other populations with similar characteristics in the type of intentional response: categories and items

Scales

Of all the scales described in the previous chapter, the Bruscia's IAP was excluded, since only those with categories and items comparable to those in the ASCP scale were selected.

After reviewing the scales selected, it was found that the only assessment scale designed for CP is the DUET scale (in red in the following summary Table), which will be presented first, although the following assessment scales designed for other populations with similar characteristics in the type of intentional response were also be considered, and whose items have similar points (see complete and detailed presentation in the Appendix II):

- DUET scale (Table 12, Table 13)
- AQR scale (Table 14)
- DD-CGAS (Table 15)
- GCS (Table 16)
- MAKS (Table 17)
- MATADOC scale (Table 18)
- MATLAS (Table 19)
- MIR scale (Table 20)
- MTDA scale (Table 21
- Nordoff-Robbins's scales (Table 22, Table 23, Table 24, Table 25)
- SMART (Table 26)
- Steen-Møller's scale (Table 27)
- Lewis's intentionality levels (Table 28)

Categories

From these assessment scales, only the categories suitable for the comparison with the categories of the scale in this study were considered, summarised in Table 7:

Table 7: Assessment scales and categories suitable for comparison with the categories of the ASCP

Scale	Author	Used in MT-CP	Used in MT-other populations	Sub-scales - Categories
DUET	Gilboa and Roginsky (2010)	yes	*Child with CP*	**Communication** 1: Non-verbal communication 2: Musical communication 3: Verbal communication **Relation** 1: Coordinated relations 2: Uncoordinated relations
AQR	Schumacher and Calvet-Kruppa (1999)	no	*Disabled children*	**Instrumental dimension (IQR)** 1 Election of an instrument 2 Relation with the instrument 3 Musical parameters 4 Space for playing **Vocal-pre-language (VQR)** 1 Voice 2 Relation: intra-interpersonal 3 Type of vocalisation and pre-vocal expressions **Physical-emotional (PEQR)** 1 Sense of body / physical contact 2 Affection 3 Eye-contact **Development of a relation (TQR)** 2 State of affection of the therapist 3 Intervention and their approach
DD-CGAS	Wagner et al. (2007)	no	*children with Development Disorders (PDD)*	2. Communication 3. Social behaviour
GCS	Teasdale & Jennett (1974)	no	*Patients in coma*	1: Eye opening 2: Verbal response 3: Motor response
MAKS	von Moreau et al. (2010)	no	*psychiatry*	**Musical expression** 1: Treating the instrument 2: Musical shape/figure 3: Vitality/Expression dynamics 4: Quality of the expression **Musical communication** 5: Commitment 6: Formal aspects 7: In relation to the others 8: Quality of the expression

MATADOC	Magee et al. (2012)	no	*Adults with Disorders of Consciousness (DOC), vegetative states (VS) and minimal consciousness states (MCS)*	**Main sub-scale of essential categories** **Item BRC 1**: Response to visual stimuli **Item BRC 2**: Response to hearing stimuli **Item BRC 3**: Awareness of musical stimuli **Item BRC 4**: Response to verbal directions **Item BRC 5**: Excitement **Sub-scale of musical parameters and behaviour responses** **Item BRC 6**: Behavioural response to music **Item BRC 7**: Musical response **Sub-scale of clinical information** **Item BRC 8**: Vocalisation **Item BRC 9**: Non-verbal communication **Item BRC 10**: Making choices **Item BRC 11**: Motor skills **Item BRC 12**: Attention to task **Item BRC 13**: Intentional behaviour **Item BRC 14**: Emotional response
MATLAS	Magee (2007)	no	*patients diagnosed with MCS or in vegetative state VS*	1. Motor responses 2. Communication 3. Excitement 4. Ability of hearing response 5. Ability of visual response
MIR	Pavlicevic & Trevarthen (1989)	no	*Schizophrenic patients*	1. Level of contact in musical interaction
MTDA	Oldfield (2006)	no	*children with autism*	1. Autistic spectrum 2. Attention deficit 3. Emotional deficit 4. Disability in learning/ language
Nordoff-Robbins's scales	Nordoff-Robbins (1977)	?	*Mental retardation, autism, psychosis, neurological sensory-motor, learning, emotional and physical problems*	**Thirteen categories of response Evaluation of Scales I and II** 1. Child-Therapist Relationship 2. Musical Communication **Musical response Scale III (instrumental rhythmic responses)** 3. Levels of ability-experience 4. Levels of Response Capacity **Musical response Scale III (sung responses)** 1. Levels of melodic form 2. Capacity of vocal response 3. Vocal participation

SMART	Gill-Thwaites & Munday (2004)	no	*Patients in states of minimal consciousness states (VS or MCS)*	1. Five sensorial modalities (visual, hearing, tactile, smell, and taste) 2. Three other modalities: motor function, functional communication and insomnia/ excitement
Steen-Møller	(1996)	no	*Multiple disabled children*	Levels of contact between patient and therapist
Levels of intentionality	Lewis (1990)	no	*unspecified*	Origins of intentionality

Subsequently, a parallel between similar categories was done (Table 8), and with that several differences and similarities were noted when a conceptual line was established among them. As can be observed in the selected categories, they did not coincide completely in their way of naming the global aspects they work on. Placing a category in an inter-scale correspondence row sometimes is a difficult task given the conceptual ambiguity at the moment of classification. For example, the category "Excitement" in a MT intervention may either refer to the consequences of a musical stimulus, a motor response or an emotional response to an alert (or awake) state. It also happens that certain categories considered in some scale are named as items in other, as will be discussed later.

The MIR scales or tools, Lewis and Steen-Møller's levels of intentionality were not included in Table 8 since they can be considered as mono-categories, included respectively in musical interaction, intentionality and level of contact (may be musical and relational).

Table 8: Comparative description related categories

AQR	DD-CGAS	DUET	GCS	MAKS	MATADOC	MATLAS	MTDA	Nordoff-Robbins	SMART
Instrumental		Musical communication		Musical expression Musical communica-tion	Musical parameters response	Hearing response		Musical response Musical communication	
Vocal-pre-language	Communication	Verbal communication	Verbal response		Vocalzation Response to verbal directions	Communication		Vocal response	**Functional communication**
Physical-emotional		Non-verbal communication	Eye opening		Non-verbal communication Emotional response to stimuli Excitement	Visual response Excitement	Emotional		**Sensorial modalities excitement**
Relational	Socail behaviour	Rlationship (with the mother)						Relationship Child-Therapist in musical activity	
							Learning		
					International behaviour Making choices				
			Motor response		Motor skills International behaviour	Motor Responses		Movement in musical communication	**Motor function**
					Attention	Excitement (= alert)	Atrention		**Excitement (=alert)**

Despite the differences, the following can be observed:

- Communication:

This area refers to the entire range of communication: verbal (DUET, GCS); vocal (AQR, MATADOC, Nordoff-Robbins); non-verbal communication (DUET, MATADOC); communication in general (DD-CGAS, MATLAS) or functional communication (SMART); musical or instrumental communication (AQR, DUET, MAKS, MATADOC, MATLAS, Nordoff-Robbins).

- Motor aspects or corporal movement:

This category may refer to intentional changes (MATADOC), or response to musical stimuli (MATADOC, MATLAS, Nordoff-Robbins), or non-musical response (GCS, SMART).

- Emotional aspects:

This category may refer to emotional response to stimuli (MATADOC) or emotional in general (MTDA); or to excitement in general (MATLAS, SMART).

- Area of relationships:

This category may refer to social behaviours (DD-CGAS) or relational interaction responses (AQR, DUET, Nordoff-Robbins).

- Perceptive-sensorial area:

This category may refer to physical-emotional aspects (AQR); or eye opening (GCS); or visual response (MATLAS); or sensorial modalities (SMART).

Items

For a detailed description of the assessment scales selected and their categories and items, the summary tables have been prepared following the indications in the bibliography (see Appendix II).

3.5. Comparison between the items described in the literature and those in the scale of this study (ASCP)

To compare the items, at first a two-column table was built (Picture 2 below), which is explained next:

Picture 2: Header of the items comparison table

ASCP scale		Other Assessment scales	
		A	**B**
Category	**ITEM observed in ASCP**	Equal or expanded (E) items in Category = or similar to the category of the study	Equal or similar or expanded (E) items in Category ≠ to the category of the study

The left column was conceived to present the ASCP scale (subdivided into category and items observed); the right column was thought for the other assessment scales. By doing this organisation exercise, it was identified that some scales have items that describe more in detail some of the observation categories and these items have been called Expanded (E), followed by the number of them in found in the scale in brackets. In other words, when something like E(4) appears, this means that in the scale analysed there are 4 items in more detail for the same phenomenon.

It was also found that there are two possibilities of classification for the items of other scales, which I have called A and B:

Case A: Items that are in a category that is equal or similar to that of the ASCP scale, and which are equal or similar to those that they are being compared with; the number of expansions –if any- is also specified. For example, the category of Communication, item 3.6: *Responds to or follows a verbal command,* from the ASCP scale is taken and when compared with the MATLAS, in its category of Communication, it has the item 2.4: *Response to verbal commands;* there is a coincidence for the case A. Using the same item of

the ASCP scale, it is also found that in the MATLAS in the category of Non-verbal Communication, the items 9.1*: No interaction with others, spontaneous or under verbal commands or +/- help*, and 9.2: *Requires verbal commands or +/- help for verbal and social communication,* to my criterion provide a description of the same phenomenon, so I consider them as case A, with an expansion of two: E(2).

Case B: Items that are in a different category in the ASCP but which are equal or similar in the content of the item that they are being compared to; expansions are also specified in these. To continue with the analysis of the item 3.6 *Responds to or follows a verbal command*, from the category communication of the ASCP, it was found that the GCS in its category of motor response there is the item 3.5: *Obeys orders (the patient obeys an order of the type "raise your hands").*

The colours shown below were used to make evident the category to which the items belong (Picture 3):

Picture 3: Colours of the categories of the items comparison table

Categories of the ASCP scale	**Categories of** Other Assessment scales
1. MOTOR **2. PERCEPTIVE-SENSORIAL** **3. COMMUNICATION** **4.EMOTIONAL DEVELOPMENT** **5. RELATIONAL**	If one category is presented with the same colour than the one of the category in this study, it means that such category is the same. If the colour is the same but lighter, it means that it coincides with the item observed. If the **cinnamon** colour appears, this means that the category of the mentioned scale is different from that of the study.

In the table 9 from left to right, the category of the assessment scale of this study ASCP will appear in an intense colour, followed by the corresponding item observed (number of categorisation and name), and for the three columns A, B, C, the occurrences corresponding to the different items found (or not) in their own scale. The description of the item found in one occurrence is organized as follows: the scale (in brackets, sometimes including the possible sub-scale);

category in which the item is classified; individual item or expanded in a group with more details.

At the end of the description there is a cell (one for each column A, B, C) with numeric and alpha-numeric characters that represent the number of times that an item was found. When a number is followed by an E, it means that an expansion of an item into a group of items was found; the number in brackets refers to how many items comprise this group. For example: 3 E (14) means that an item was found three times in 3 categories, with 14 expansions into more detailed and deeper items.

Table 9: Description of the Results of the Comparison of Items. The Sign – means that no items were found

ASCP scale		Other Assessment scales	
Category	**ITEM observed**	**Case A**	**Case B**
1. MOTOR	1.1. Changes in voluntary movements: frequency	(MATADOC) **Motor skills** 11.1. no active movement 11.2. active movement but unknown attempt 11.3. voluntary movement but which requires verbal aid and/ or physical aid 11.4. spontaneous voluntary movement but which requires aid 11.5. spontaneous independent voluntary movement 11.6. unable to move	(MATADOC) **Behavioural response to music** 6.3. change in physical movement **Making choices** 10.3. change in physical movement (Nordoff-Robbins-Scales I and II) **Musical Communication** 2.3.d. Movement influenced by the musical style or mood 2.4.d. Movements related to their music 2.5.a. Maintained and oriented instrumental, vocal or motor responses 2.7.a. Mobility and sensibility in musical responses
		1 E(6)	2 1 E(4)
	1.2. Changes in voluntary movements: orientation (oriented to an aim)	(MATADOC) **Motor skills** 11.1. no active movement 11.2. active movement but unknown attempt 11.3. voluntary movement but which requires verbal aid and/ or physical aid 11.4. spontaneous voluntary movement but which requires aid 11.5. spontaneous independent voluntary movement 11.6. unable to move	(MATADOC) **Behavioural response to music** 6.3. change in physical movement **Making choices** 10.3. change in physical movement (Nordoff-Robbins-Scales I and II) **Musical Communication** 2.3.d. Movement influenced by the musical style or mood 2.4.d. Movements related to their music 2.5.a. Maintained and oriented instrumental, vocal or motor responses 2.7.a. Mobility and sensibility in musical responses
		1 E(6)	2 1 E(4)
	1.3. Changes in involuntary movements	–	–
		0	0

	1.4. Changes in voluntary movements of corporal segments: superior limbs	(SMART) **Motor function** 3. response of withdrawal to stimuli (like turning the head, eyes or limbs) 4. localized response to stimuli (like turning the head or moving superior limbs)	–
		1 E(2)	0
	1.5. Changes in voluntary movements of corporal segments: inferior limbs	(SMART) **Motor function** 3. response of withdrawal to stimuli (like turning the head, eyes or limbs)	–
		1	0
	1.6. Changes in voluntary movements of corporal segments: facial	–	(MATADOC) **Behavioural response to music** 6.1. change in facial gesture 6.2. change in eye-contact/ direction of eyes
		0	1 E(2)

ASCP scale		Other Assessment scales	
Category	**ITEM observed**	**Case A**	**Case B**
2. PERCEPTIVE-SENSORIAL	**2.1. Remains awake**	–	–
		0	0
	2.2. Remains with attention on task	(MATADOC) **Attention to task** 12.1: did not pay attention to any task 12.2: paid attention by moments to musical tasks 12.3: paid attention to the complete musical task 12.4: paid attention to the complete session (MTDA) **Attention deficit** 2.m. permanence in activity 2.n. distraction 2.o. restlessness with drumsticks or percussion 2.p. permanence in place 2.q. excitement 2.r. impulsiveness 2.s. playing at ease 2.t. listening 2.u. interrupting 2.v. waiting to play 2.w. finishing an activity 2.x. remembering phrases	(MAKS-COMMUNICATION) **Commitment** 5.2. Interior participation (MTDA) **Autistic spectrum** 1.b. commitment 1.e. abstraction (Nordoff-Robbins - Scales I and II) **Relationship Child-Therapist** 1.4.c. Intermittent implication **Musical communication** 2.6.b focuses on preferred activities
		1 E(4) 1 E(12)	3 1 E(2)
	2.3. Maintains eye-contact	(AQR – PEQR - Physical-emotional) **Eye-contact** 3.1. Quality 3.2. Quantity	(DUET-COMMUNICATION) **Non-verbal communication** 1.2. Eye-contact (MATADOC) **Behavioural response to music** 6.2. change in eye-contact/ orientation of eyes
		1 E(2)	2
	2.4. Changes their gesture or movements to an activity	–	(MATADOC) **Behavioural response to music** 6.3. change in physical movement **Non-verbal communication** 9.3. unaided inconsistent spontaneous use of social communication gestures

			9.4. consistent spontaneous and appropriate use of social communication gestures Making choices 10.3. change in physical movement **Motor skills** 11.1. no active movement 11.2. active movement but unknown attempt 11.3. voluntary movement but which requires verbal aid and/ or physical aid 11.4. voluntary spontaneous movement but which requires aid 11.5. independent voluntary spontaneous movement 11.6. unable to move (Nordoff-Robbins – Thirteen Response Categories) **Musical communication** 2.3.b. Impulsive and compulsive hitting more flexible to interaction 2.3.d. Movement influenced by musical style or mood 2.4.d. Movements related to their music 2.7.a. Mobility and sensibility in musical responses
		0	2 1 E(2) 1 E(4) 1 E(6)
	2.5. Orients towards voice or sound	(MATADOC) **Response to hearing stimuli** 2.1. no location of hearing stimuli 2.2. inconsistent movement/ turn of eyes/ head towards hearing stimuli 2.3. consistent location of hearing stimuli 2.4. can focus alternatively > 1 hearing stimulus (SMART) **Five sensorial modalities (visual, hearing, touch, smell and taste)** 4. localized response to stimuli (like turning head or moving superior limbs)	(GCS) **Verbal response** 2.4. confusing response (The patient is not oriented in relation to people, places and time but remains standing) 2.5. oriented response (The patient is not oriented in relation to people, places and time) (Nordoff-Robbins - Scale III, sung responses) **Vocal response skill** 2.4. Oriented response skill

		1 1 E(4)	1 1 E(2)
	2.6. Recognizes the therapist's voice	–	–
		0	0
	2.7. Recognizes the voice or sound of peers	–	–
		0	0
	2.8. Seems to hear a sound (shakes, moves)	(MATADOC) **Response to hearing stimuli** 2.1. no location of hearing stimuli 2.2. inconsistent movement/ turn of eyes/ head towards hearing stimuli 2.3. consistent location of hearing stimuli (MATLAS) **Hearing response skill** 4.1. response to hearing stimulation (SMART) **Five sensorial modalities (visual, hearing, touch, smell and taste)** 3. response of withdrawal to stimuli (like turning the head, eyes or limbs)	(GCS) **Eye opening** 1.3. response to speech (The patient opens their eyes in response to speech)
		2 1 E(3)	1
	2.9. Discriminates different sounds	(MATADOC) **Response to hearing stimuli** 2.4. can focus alternatively > 1 hearing stimulus	–
		1	0

ASCP scale		Other Assessment scales	
Category	**ITEM observed**	**Case A**	**Case B**
3. COMMUNICATION	**3.1. Does not respond to a sound (we do not know if can hear)**	(MIR) **Level of contact in musical interaction** Nivel1. no communication (Nordoff-Robbins - Scales I and II) **Musical communication** 2.1. Not communicative/ active (SMART) **Functional communication** 1. no response to stimuli	(MATADOC) **Awareness of musical stimuli** 3.1. no observed response **Vocalisation** 8.9. unable to vocalise (MTDA) **Autistic spectrum** 1.I. no response
		3	3
	3.2. Continues a sound (so not only hears but responds)	(DUET-COMMUNICATION) **Non-verbal communication** 1.1. Relation of playing together (MATLAS) **Communication** 2.5. turn games (Nordoff-Robbins - Scales I and II) **Musical communication** 2.10 Musical-social intercommunication and musical contribution in the group	(AQR- VQR-Vocal-pre-language) **Intra-interpersonal relationship** 2. 5. Turn games (MATADOC) **Awareness of musical stimuli** 3.5. inconsistent interactive responses within musical exchanges 3.6. consistent interactive responses within musical exchanges **Vocalisation** 8.3. unsuccessful vocalisation / increase in oral movement 8.4. inconsistent vocal sounds to musical stimulus 8.5. consistent vocal sounds to musical stimulus (MIR) **Level of contact in the musical interaction** Level 5. Slight musical response oriented from the person Level 6. Sustained musical response oriented from the person Steen-Møller) **Level of contact** Level 4. Contact takes the form of a dialogue

		3	2 2 E(2) 1 E(3)
	3.3. Starts a sound or movement with sound	–	(MATADOC) **Vocalisation** 8.3. unsuccessful vocalisation attempt/ increase of oral movement
		0	1
	3.4. Continues a musical cell	(Nordoff-Robbins - Scales I and II) **Musical communication** 2.4.b. Synchronises short phrases, tempo and dynamic	–
		1	0
	3.5. Refuses a verbal command	(MATADOC) **Non-verbal communication** 9.1. no interaction with others, spontaneous or under verbal commands or +/- aid (MATADOC) **Response to verbal commands** 4.1. no activity under verbal commands	–
		2	0
	3.6. Responds or follows a verbal command	(MATLAS) **Communication** 2.4. response to verbal commands (MATADOC) **Non-verbal communication** 9.1. no interaction with others, spontaneous or under verbal commands or +/- aid 9.2. requires verbal commands or +/- aid or verbal and social communication (MATADOC) **Responses to verbal commands** 4.1. no activity under verbal commands 4.2. activity unrelated to verbal commands 4.3. responded inconsistently to verbal commands 4.4. followed verbal commands consistently	(GCS) **Motor response** 3.5. obeys commands (The patient obeys a command of the type “raise your hands”)
		1 1 E(2) 1 E(2)	1
	3.7. Moves	(DUET-COMMUNICATION)	(AQR- IQR- Instrumental

	the instrument: plays it, offers it	**Non-verbal communication** 1.6 Use of objects (AQR- IQR- Instrumental dimension) **Relation with the instrument** 2.1. Way of handling it 2.2. Way of playing it as regards to the quality of a relation and the instrumental expression	dimension) **Election of an instrument** 1.1. Duration and way of handling it 1.2. Way of playing it as regards to the quality of a relation (MTDA) **Autistic spectrum** 1.d. structuring with the instruments **Attention deficit** 2.o. restlessness with drumsticks or percussion
		1 1 E(2)	2 1 E(2)
	3.8. Produces vocal or guttural sounds	(DUET-COMMUNICATION) **Musical communication** 2.2 Vocal (GCS) **Verbal response** 2. incomprehensible sounds (The patient responds with incomprehensible sounds) (MATLAS) **Communication** 2.1. vocal response (Nordoff-Robbins - Scales I and II) **Musical communication** 2.3.c. More controlled vocalisations and rhythmically related to the therapist 2.4.c. Wide range of vocal tones (AQR- VQR-Vocal-pre-language) **Voice** 1.1. Duration and shape of the vocal-pre-language expression 1.2. Way in which the patient discovers their voice 1.3. Way in which the patient uses their voice 1.4. The voice enables an interpersonal relationship (MATADOC) **Vocalisation** 8.1. no vocalisation to a musical stimulus 8.2. vocal sounds unrelated to the musical stimulus 8.3. unsuccessful vocalisation	(AQR- VQR-Vocal-pre-language) **Relation: intra-interpersonal** 2.2. Interpersonal: vocal expression in an interpersonal context

		attempt / increase of oral movement 8.4. inconsistent vocal sounds to musical stimulus 8.5. consistent vocal sounds to musical stimulus 8.9. unable to vocalise	
		3 1 E(3) 1 E(4) 1 E(6)	1

ASCP scale		Other Assessment scales	
Category	**ITEM observed**	**Case A**	**Case B**
4.EMOTIONAL DEVELOPMENT	**4.1. Laughs**	–	(DUET-COMMUNICATION) **Non-verbal communication** 1.4. Humour (DUET-RELATION) **Coordinated relations** 1.4 Relation of happiness
		0	2
	4.2. Cries	–	–
		0	0
	4.3. Shows displeasure	–	(MTDA) **Autistic spectrum** 1.k. rejection
		0	1
	4.4. Puts the instrument away	–	(DUET-COMMUNICATION) **Non-verbal communication** 1.6 Use of objects
		0	1

ASCP scale		Other Assessment scales	
Category	**ITEM observed**	**Case A**	**Case B**
5. RELATIONAL	5.1. Recognises the therapist	(Nordoff-Robbins - Scales I and II) **Child-Therapist Relationship** 1.6.b. Recognises the role of the therapist	–
		1	0
	5.2. Recognizes their peers	–	–
		0	0
	5.3. Interaction with the Therapist	(Nordoff-Robbins - Scales I and II) **Child-Therapist Relationship** 1.1 Forget/ Extreme reactions 1.2 Short-term knowledge / Abandonment/ Diffuse anxiety 1.3 Knowledge without acceptance / Negativism/ Avoidance 1.4 Ambivalence/ Passive acceptance/ Intermittent implication / Tends to reject 1.5 Limited response strategies/ Willing to attend therapy/ Evasive defence 1.6 Activity relationship developed from the pleasure towards music/ Recognizes the role of the therapist/ Less defensive subsistence manifested in perseverance and manipulation 1.7 Assertive co-activity in musical interactions with the therapist/ Establishes work relations with the therapist to achieve musical objectives/ Resistance as acerbity, inflexibility, rebellion or defiance 1.8 Intense commitment in musical activity as means of self-expression/ Has an exclusive mutual relationship with the therapist/ Crisis that leads to resolution or lack of negative resistance 1.9 Self-confidence /Believes in the therapist/ Working to achieve a personal musical objective/ Needs to go beyond in the relation patient-therapist but uneasy with the group/	–

		Identification with the therapist to avoid regression 1.10 Functional independence in the musical group/ Cooperative with the initiative of the therapist and other members of the group/ Comfortable in the group (MIR) **Level of contact in musical interaction** Level 1. No Communication Level 2. One part connects but there is no response from the person Level 3. One part connects but there is no musical response from the person Level 4. The person does not respond directly to the therapist, but in their own direction Level 5. Slight musical response directed from the person Level 6. Sustained musical response directed from the person Level 7. Establishment of mutual contact Level 8. Extension of mutual contact Level 9. Musical association (Steen-Møller) **Level of contact** Level 1. The therapist feels the contact with their patient Level 2. The therapist hears and sees the contact Level 3. The patient now controls the contact Level 4. The contact takes the shape of a dialogue Level 5. Therapist and patient make contact through free improvised music	
		1 E(5) 1 E(9) 1 E(10)	0
	5.4. Interaction with peers	–	–
		0	0
	5.5. Recognizes or asks for the instrument/s	–	–
		0	0

As it can be observed in the **¡Error! No se encuentra el origen de la referencia.**, the process of comparing is complex but gives interesting results. The way of summarising these results will be the analysis of each one of the categories proposed in this clinical study. In this point it is important to remember that the categories proposed were conceived as ranges of "Responses to musical intervention in MT" with CP population for which the ASCP was created, while the scales with which it was compared are not specifically built for CP.

3.5.1 Motor Category

In the category envisaged as **1. Motor** in the ASCP, the items were considered significant to collect the motor response during the MT activity.
After comparing with the most common scales in MT, this was the analysis:

The observation items in the category of motor skills that appear in the MATADOC scale (11.1 to 11.6) and also in the observations that report this physical change in the categories Behavioural response to music (6.3) and Making choices (10.3); and in the category Musical communication (2.3.d, 2.4.d, 2.5.a, 2.7.a), that Nordoff-Robbins provide in their Scales I and II, show an apparent relation with the items *Changes in voluntary movements in frequency (1.1) and in orientation (1.2)* of the scale.

In addition, the items 11.1 and 11.6 of the MATADOC scale include the possibility of absence of movement.

None of the scales reviewed collect and set out in detail the *Changes in involuntary movements* (item 1.3) provided in the ASCP, i.e. inhibition or increase of these movements during the musical activity.

The items 1.4 and 1.5 *Differentiated changes in superior and/or inferior limbs*, of the ASCP are reflected in the SMART (items 3 and 4), in the category Motor function, similar to the Motor, although only the item 4 speaks, among other parts of the body, of superior limbs, while the item 3 does not differentiate between superior and inferior.

The observation of facial changes (item 1.6) of the ASCP is only considered in the MATADOC scale, in the category of Behavioural response to music, items 6.1 and 6.2.

3.5.2 Perceptive Sensorial Category

The category called **2. Perceptive-Sensorial** of the ASCP, intends to account for observations of both attention and response and interaction to visual and hearing stimuli.

As for the item 2.1 *Remains awake*, no similar items were found in other scales.

In relation to the item 2.2 *Remains attentive to the task*, we found the following:

In the category Commitment of the MAKS (5.2) and in the category Autistic spectrum of the MTDA scale (1.b and 1.e) reference is made to attention although not explicitly, while in the categories Child-Therapist Relationship (1.4.c) and Musical communication (2.6.b) of the Nordoff-Robbins Scales I and II there are more explicit aspects of participation that show clearer reference to attention. There are expanded items in categories similar to the 2.2, such as the following: in the category Attention to task of the MATADOC scale (12.1 a 12.4); in the category Attention deficit of the MTDA scale (2.m. a 2.x). These expanded items clarify very detailed actions or attitudes of attention.

As regards to the item 2.3 *Maintains eye-contact*, in the comparison with other scales we can observe that this item is considered in other categories, such as Non-verbal communication (1.2) of the DUET scale and in Behavioural response to music (6.2) of the MATADOC scale; moreover, the AQR-PEQR-Physical-emotional scale, category Eye-contact, accounts both for the quality (item 3.1) and the quantity (item 3.2), which are two important aspects to be reflected in an observation.

In relation to the item 2.4 *Changes their gesture or movements to an activity*, no equal categories were found in other scales referring to this item but we did find similar items in other categories, such as: Behavioural response to music (6.3),

Non-verbal communication (9.3 and 9.4), Making choices (10.3) and Motor skills (11.1 a 11.6), which appear in the MATADOC scale; Musical communication (2.3.b, 2.3.d, 2.4.d, 2.7.a) of Nordoff-Robbins- Thirteen Categories of Response. Although the categories are different, the items have similar features but also aspects that were not considered such as: spontaneous nature, consistency, impulsiveness, compulsiveness, as well as the possibility of absence of changes, which we should also consider for a better definition of the item.

With respect to the item 2.5 *Orients towards voice or sound*, items were found in equal or similar categories, like Response to hearing stimuli (2.1 to 2.4) in the MATADOC scale and Five sensorial modalities (visual, hearing, touch, smell and del taste) in the SMART (item 4). While the item collected can be seen, also the lack of negative punctuation is evident in the case of absence or inconsistency of stimuli that these scales do consider, together with the possibility not only of turning towards a sound but also of responding with movement of the superior limbs and focusing on more than one hearing stimulus in an alternative manner.
In different categories, this item is collected in the categories of Verbal response (2.4 and 2.5) of the GCS and in Vocal response skill (2.4) of the Scale III of Nordoff-Robbins. These items have been considered because although they do not specify the type of stimulus, they account for an oriented type of response.

None of the scales reviewed collect the items 2.6, *Recognises the voice of the Therapist,* or *2.7, Recognises the voice or sound of peers,* provided in the ASCP.

With respect to the item 2.8 *Seems to hear a sound (shakes, moves)* items have been found in similar categories, referring not only to the localization of stimuli but also to the movement in response to them in the categories Response to hearing stimuli (2.1 to 2.3) of the MATADOC scale; Hearing response skill (4.1) of the MATLAS and Five sensorial modalities (visual, hearing, touch, smell and del taste) in the SMART (item 3). Besides, we found an item (1.3), in a different category: Eye-opening of the GCS, which considers

a facial gesture response. All the items found show the importance of gestural or facial movements as a response to a sound stimulus, since in the definition of the item observed only wider body movements are considered, i.e. “shakes or moves”.

The item 2.9 *Discriminates different sounds*, is barely considered in other scales, except for the category Response to hearing stimuli (item 2.4) of the MATADOC scale, which accounts for the possibility of an alternative focus on more than one stimulus.

3.5.3 Communication Category

We could see that, differently from the two categories of the ASCP introduced now under the synopsis of the category **3. Communication**, may be found in the scales most used in MT, sub-scales and/or categories that embody aspects related to: Non-verbal communication (DUET and MATADOC scales); Musical communication (DUET scale and Nordoff-Robbins-Scales I and II); Functional communication (SMART); Level of contact in musical interaction (MIR scale), in which it is understood that if there is interaction there is communication. The scale that does consider the category 3. Communication with identical naming is the MATLAS.

As regards to the item 3.1 *Does not respond to a sound (we do not know if hears)*, the items of the other scales include this item in an obvious manner in the categories: Level of contact in the musical interaction (Level 1) of the MIR scale; Musical communication (2.1) of Nordoff-Robbins-Scales I and II; and in Functional communication (1) of the SMART. On the other hand, in different categories, the item 3.1 of the ASCP is also considered: Awareness of musical stimuli (3.1) of the MATADOC scale; Vocalisation (8.9) of the MATADOC scale and Autistic spectrum (1.l) of the MTDA scale.

From this comparison, the importance of including an item or items that account for the absence of response and/ or communication is evident.

As for the item 3.2 *Continues a sound (so not only hears but responds)* we see that the items of equal or similar categories refer especially to interaction: turn games (2.5 in Communication, MATLAS) , mutual play (1.1 in Non-verbal

communication, DUET-COMMUNICATION), contribution to the group (2.10 in Musical communication, Nordoff-Robbins-Scales I and II). Likewise, although in different categories, there is also reference to this interaction: turn games (2.5 in Intra-interpersonal relationship, AQR-VQR-Vocal-pre-language); contact in the form of dialogue (Level 4, Level of Contact, Steen-Møller); from less to more level of interaction, the MATADOC scale in the category Vocalisation (8.3 to 8.5) refers to an attempt of vocal emission, and its category of Awareness of musical stimuli, it differentiates between inconsistent and consistent responses (3.5 and 3.6). The MIR scale, in the category Level of Contact in musical interaction (Levels 5 and 6), mentions different levels of musical response oriented to another person.

In relation to the item 3.3 *Starts a sound or a movement with sound*, only the MATADOC scale, in the category Vocalisation, considers unsuccessful vocalisation attempts or increase of oral movement (item 8.3).

As for the item 3.4 *Continues a musical cell*, the only item comprised in another scale, the Nordoff-Robbins-Scales I and II, refers in the same category Musical communication to the synchronisation of short phrases, tempo and dynamic (item 2.4.b).

As regards to the items 3.5 *Refuses a verbal command* and 3.6 *Responds or follows a verbal command*, the items found in the category Non-verbal communication (9.1 and 9.2) and in the category Response to verbal commands (4.1 to 4.4), of the MATADOC scale may be considered as part of the same reference to the scope of possibilities that go from the absence of response to the complete response to verbal commands; besides the GCS, in the category Motor response, defines an item of explicit response to orders of the type “raise your hands”.

The item 3.7 *Moves the instrument: plays it, offers it*, which in the ASCP is intended to observe the relation with the instrument from the communicative point of view, may be considered an item of non-verbal communication according to the category Non-verbal response of the DUET-COMMUNICATION scale (item 1.6), or possibly it is better enclosed in other categories such as the Relation with an instrument (items 2.1 and 2.2) or

Election of an instrument (items 1.1 and 1.2) of the AQR-IQR-Instrumental dimension scale or one that was not included in the ASCP scale, which is the musical response. Another scale, the MTDA, in different categories, accounts for the structuring with instruments in the category Autistic spectrum (item 1.d) and the restlessness with drumsticks or percussion, an item that was very well-specific (2.o), in the second category of Attention deficit.

As regards to starting a sound or movement with sound, the item 3.8: *Produces vocal or guttural sounds*, is reflected in the vocal expression in an interpersonal setting within the categories Intra-interpersonal Relationship (item 2.2) or Voice (1.1 to 1.4) in the AQR-VQR-Vocal-pre-language scale or in Vocalisation (8.1 to 8.9) of the MATADOC scale, in which the negative possibility of recording the production of vocal or guttural sounds. Similar or equal categories were found in other scales, including vocal response items, from incomprehensible sounds (item 2 within the category Verbal response, in the case that there is a communication attempt, in the GCS), up to vocal responses (Musical communication, item 2.2, of the DUET-COMMUNICATION scale and Communication, item 2.1, of the MATLAS). More controlled vocalisations, rhythmically related to the Therapist, and wide range of vocal tones are reflected in the items of the category Musical communication (2.3.c and 2.4.c) of the Nordoff-Robbins-Scales I and II.

3.5.4 Category Emotional Development

Another category considered in the ASCP under the name **4. Emotional development** intended to include aspects related to the emotional change manifested during the musical activity.

The item provided in the ASCP as 4.1 *Laughs*, has some relation with humour in the scales most used in MT (item 1.4 of the category Non-verbal communication of the DUET-COMMUNICATION scale) and with happiness relation (item 1.4 of the category Coordinated relationships of the DUET-RELATION scale); while the item 4.2 *Cries*, is not provided in any scale from those reviewed.

As for the item 4.3 *Shows displeasure*, only in the category called Autistic spectrum of the MTDA scale rejection (item 1.k) is mentioned.

In relation to the item 4.4 *Puts the instrument away*, it may be considered not very well defined in this category or be included in the previous item *Shows displeasure* (4.3), and it is barely included in other scales, except in the category Non-verbal communication of the DUET-COMMUNICATION scale (item 1.6), that refers generically to the use of objects.

3.5.5 Relational Category

In the ASCP created especially for this study, the category **5. Relational** was included to account for the observation of changes in the relation and interaction of the clients with the Music Therapist and with peers.

In the different scales used in MT and observed in this study, this category could be found in the following: MIR scale, in the category of Level of contact in musical interaction; Nordoff-Robbins-Scales I and II in the category of Child-Therapist Relationship; and Steen-Møller in the category of Level of contact.

As regards to the item 5.1 *Recognises the Therapist*, it is only provided in another scale, Nordoff-Robbins-Scales I and II, in the category Child-Therapist Relationship (item 1.6.b).

In relation to the item 5.2 *Recognises their peers*, no similar item was found in the other scales reviewed in this category.

As for the item 5.3 *Interaction with the Therapist*, the categories found in other scales have relation with the same item, since they focus in the level of contact in musical interaction or in the relation of the client (Child) with the Therapist. The MIR scale includes the first possibility with a series of items (Level 1 to 9) and also the Steen-Møller scale does (items Level 1 to 5), while the Nordoff-Robbins-Scales I and II (items 1.1 to 1.10) include the second one. Thus, the variety of possibilities that the authors of these scales have foreseen to describe the relation client-therapist in the musical interaction can be considered.

No similar items to the item 5.4 *Interaction with peers*, was found in the other scales reviewed.

Since the item that in the ASCP appears as 5.5 *Recognises or asks for the instrument/s*, was not found in any of the scales reviewed, it is worth considering including it in a new category in the ASCP to account for musical aspects.

In the next chapter, these data will be discussed and a possible answer to the core question of this study will be proposed. In addition, a new proposal for the analysis of the results of the comparison of items will be made, using a different methodology that may be the origin of a new study subsequent to this one.

Chapter 4: DISCUSSION AND CONCLUSIONS

In this paper efforts were done to progress in the search of answers to the core question of this study: *Which items in a particular valuation scale developed for a Music Therapy work with a group of four adults, not homogeneously affected by severe Brain Paralysis, may be considered relevant for the valuation of their acts of interaction?* Next, there is a discussion based on the analysis done in the previous chapter.

In the development of this search, different levels of analysis and deepening were done and here there are some reflections and conclusions in this regard. First, a bibliographic review on MT and CP and Assessment Scales was done. The results show little references found to match these three aspects and the most related refers to a qualitative study, refers to DUET scale.

The search was extended to other assessment scales commonly used in MT but not especially focused on CP. From the scales reviewed, the MATADOC scale was selected. This scale, which is a valuable tool to assess subjects seriously affected in all the areas of behaviour –as may be people with CP- has a sub-scale: Musical parameters and Behavioural responses, that is closely related to the way of organising my observation in the clinical case of this paper and the observation scale created for this purpose. The scale evaluated in this study (ASCP) was created to collect the observations of changes in the subjects during a musical activity that took place during the MT sessions. The objective of observing and assessing changes in the interaction during the musical activity is the core of such scale, and thus it is quite related to the MATADOC scale. Nevertheless, this study has also made the comparison with other scales.

On the other hand, this study was based on the premise that all the aspects to be observed tried to implement and give sense to those voluntary acts intended to give a communication and/ or interaction response to musical activity. In this sense, the MT activity and its observation tend to consider the Level IV of Lewis (1990) in which the intention includes multiple valid possibilities to achieve an objective.

This analysis by means of the comparison of items was efficient to give response to the core question of this study, in the extent that relevant items were found, although some need modification. Nonetheless, some items proposed in the assessment scale of this study (ASCP) were not found in other scales.

The items of the assessment scale created for this clinical case - ASCP that were considered relevant were 20 (on a total of 32):

4. In the category Motor: 1.1. *Changes in voluntary movements*.
5. In the category Perceptive-sensory: 2.2. *Remains attentive to task*; 2.3. *Maintains eye-contact*; 2.4. *Changes their gesture or movements with activity;* 2.5. *Orients towards voice or sound*; 2.8. *Seems to hear a sound (shakes, moves)* and 2.9. *Discriminates different sounds*.
6. In the category Communication: 3.1. *Does not respond to a sound (we do not know if hears)*; 3.2 *Continues a sound (so not only hears but responds)*; 3.3 *Starts a sound or a movement with sound*; 3.4 *Continues a musical cell*,; 3.5. *Refuses to a verbal command*; 3.6 *Responds or follows a verbal command;* 3.7 *Moves the instrument: plays it, offers it* 3.8. *Produces vocal or guttural sounds*.
7. In the category Emotional development: 4.1. *Laughs*; 4.3. *Shows displeasure* and 4.4. *Puts the instrument away*, and
8. In the category Relational: 5.1. *Recognises the Therapist* and 5.3. Interaction with the Therapist.

Likewise, some items (12) were considered irrelevant, since they are not included in other scales; these are:

- From the category Motor: 1.2. Changes in voluntary movements: orientation (oriented towards and aim); 1.3. Changes in involuntary movements; 1.4. Changes in voluntary movements: corporal segments – superior limbs; 1.5. Changes in voluntary movements: corporal segments– inferior limbs; 1.6. Changes in voluntary movements: corporal segments – facial.

- From the category Perceptive - sensorial: 2.1. Remains awake; 2.6. Recognises the voice of the Therapist and 2.7. Recognises the voice or sound of their peers.
- From the category Emotional development: 4.2. Cries
- From the category Relational: 5.2. Recognises peers; 5.4. Interaction with peers and 5.5. Recognises or asks for the instrument/s

The following table 10 sets out the relevant items (in black) for each category of the ASCP scale. In gray, relevant items appear, (3) which may relocate to a new category.

Table 10: Relevant items of the ASCP scale

Categories of responses to musical intervention	Categories	ITEMS
	1. MOTOR	1.1. Changes in voluntary movements
	2. PERCEPTIVE-SENSORIAL	2.2. Remains attentive to the task 2.3. Maintains eye-contact 2.4. Changes their gesture or movements with activity 2.5. Orients in relation to voice or sound 2.8. Seems to hear a sound (shakes, moves) 2.9. Discriminates different sounds
	3. COMMUNICATION	3.1. Does nor respond to a sound (we do not know if hears) 3.2 Continues a sound (so not only hears but responds) 3.3 Starts a sound or a movement with sound 3.4. Continues a musical cell 3.5. Refuses to a verbal command 3.6. Responds or follows a verbal command 3.7. Moves the instrument: plays it, offers it 3.8. Produces vocal or guttural sounds
	4.EMOTIONAL DEVELOPMENT	4.1. Laughs 4.3. Shows displeasure 4.4. Puts instrument away
	5. RELATIONAL	5.1. Recognises the Therapist 5.3. Interaction with the Therapist

On the grounds of all previously expounded, it is considered that it could have been useful to take into account in the ASCP a new observation category called **Musical,** which included the item 3.4: *Starts a sound or sound movement*; the

item 3.4: *Continues a musical cell;* as well as the item 3.7: *Moves the instrument: plays it, offers it.* (Table 11)

Table 11: New observation category for the ASCP scale

Categories of responses to musical interaction	Categories	ITEMS
	MUSICAL	3.4 Starts a sound or a movement with sound 3.4. Continues a musical cell 3.7. Moves the instrument: plays it, offers it

Throughout this paper, diverse difficulties have been identified in the following steps of the proposed method:

One of them has been building a comparative table of related *categories*, as shown in the Table 8 in the previous chapter. As could be observed, it is impossible to conclude that there is a total coincidence in the way of naming the categories. The different scales use different terminology to name categories; in some cases Communication can be found as vocal-pre-language, non-verbal communication, verbal response, vocalisation, functional communication; in other cases the same characteristic is observed but it can either be called an item, a category or a sub-scale. This difficulty may lead to different visions that result in different classifications and this study shows one of these possible interpretations.

Similarly, it was hard to prepare a descriptive table for the *comparison of items,* since these items were sometimes in a different category from the one searched or they were expanded, due to which, if defined more in detail they could match with one of the categories in the scales of the comparison. This extensive reading and compared analysis of the items may also be subject to different views. This study shows one of these possible interpretations.

Hence, estimating the relevance of the items proposed with the qualitative methodology used has been extremely complex and probably not conclusive. To improve the ASCP or for other consecutive studies that intend to create an assessment scale specifically for CP, a proposal for the analysis of the results of the comparison of items will be proposed, with a different quantitative methodology that may probably helps to clarify the relevance of the items proposed in an alternative manner. Quantitatively an index of relevance (RI) could be defined and built on an alpha-numeric cell of items found per each column A and B, shown in the Table 9. This work is beyond the purpose of this study.

Finally, I consider that making an attempt to systematise the observation items in an intervention is a necessary and valuable task for students and professionals in MT. This study, although it is a humble and probably incomplete sample of a method for the creation of a specific assessment scale for an intervention of MT with CP. In order to make this study more significant and valuable of the MT community, it must be expanded and incorporate some quantifiable measures, as well as really validating the relevance of the items.

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Appendix I

This is the summary of the literature review done according to the key words and the searching engines chosen described in the introduction of Chapter 2. Out of the number of *articles found* in the databases, in one first filtering only those that appear in the following lists were *considered,* according to the following criterion:

- Articles that contained in their argument two of the key words proposed.
- Articles that contained only one of the key words in the "argument" and one of correlated interest for my study in "another associated field", according to the list described in 2.1.

In a more detailed reading, the articles that have contributed with some type of information in response to the research question of this study were considered *relevant*.

Articles found according to (*music therapy, cerebral palsy*)

a) COCHRANE LIBRARY

COCHRANE LIBRARY	Argument	Other associated field	Method	Population	Year
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Yu et al.	PC-MT	Acupuncture	Quanti	children	2009 a
Yu et al.	PC-MT receptive	Acupuncture	Quanti	children	2009 b
Peng et al.	PC-MT	Acupuncture and Movement	Quanti	children	2011

b) ERIC

ERIC	Argument	Other associated field	Method	Population	Year
Perry	PC- MT	Improvisation	Quali	children	2003

c) PsycINFO

PsycINFO	Argument	Other associated field	Method	Population	Year
Perry	PC- MT	Improvisation	Quali	children	2003
Kwak	PC-MT (RAS)	Computer	Quanti	children	2007
Nicoll	PC- MT	Review	_	children	2008
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2011
Gilboa and Roginsky	PC-MT (DUET)	Dyadic Therapy	Quali	children	2010
Yu et al.	PC-MT receptive	Acupuncture	Quanti	children	2009

d) PUBMED

PUBMED	Argument	Other associated field	Method	Population	Year
Perry	PC- MT	Improvisation	Quali	children	2003
Kwak	PC-MT (RAS)	Computer	Quanti	children	2007
Yu et al.	PC-MT receptive	Acupuncture	Quanti	children	2009a
Yu et al.	PC-MT	Acupuncture	Quanti	children	2009b
Nasuruddin	PC-MT	Movement	Quanti	children	2010
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2011
Peng et al.	PC-MT	Movement	Quanti	children	2011
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2012
Orita et al.	PC-MT	Monitoring	Quanti	Young adults	2012

e) SCOPUS

SCOPUS	Argument	Other associated field	Method	Population	Year
Perry	PC- MT	Improvisation	Quali	children	2003
Kwak	PC-MT (RAS)	Computer	Quanti	children	2007
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Correa et al.	PC-MT (assisted)	Computer	Quanti	children	2009
Ma et al.	PC-MT	Tuina	Quanti	children	2009
Yu et al.	PC-MT receptive	Acupuncture	Quanti	children	2009
Gilboa and Roginsky	PC-MT (DUET)	Dyadic Therapy	Quali	children	2010
Nasuruddin	PC-MT	Movement	Quanti	children	2010
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2011
Peng et al.	PC-MT	Movement	Quanti	children	2011
Hurkmans et al.	PC-MT	Systematic Review	Quanti	–	2012
Orita et al.	PC-MT	Monitoring	Quanti	Young adults	2012

Articles found according to (*music therapy, assessment scales*)

a) COCHRANE LIBRARY

COCHRANE LIBRARY	Argument	Other associated field	Method	Population	Year
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Sung et al.	Dementia	Music – Groups- Percussion- Anxiety	Quanti	elders	2012

b) ERIC (Articles considered: 0)

c) PsycINFO

PsycINFO	Argument	Other associated field	Method	Population	Year
von Moreau	Psychiatry	Musical behaviour – MAKS	Quanti	children	2010

d) PUBMED

PUBMED	Argument	Other associated field	Method	Population	Year
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2012
Sung et al.	Dementia	Music – Groups- Percussion- Anxiety	Quanti	elders	2012

e) SCOPUS

SCOPUS	Argument	Other associated field	Method	Population	Year
Magee	MT	Minimal Consciousness and Vegetative states - MATLAS	Quanti	various	2007
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Sung et al.	Dementia	Music – Groups- Percussion- Anxiety	Quanti	elders	2012

Articles found according to (*cerebral palsy, assessment scales*)

a) COCHRANE LIBRARY (Articles considered: 0)
b) ERIC (Articles considered: 0)
c) PsycINFO (Articles considered: 0)
d) PUBMED

PUBMED	Argument	Other associated field	Method	Population	Year
Steenbeek et al.	PC	Interrater reliability of goal attainment scaling	Quanti	children	2010
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2012

e) SCOPUS

SCOPUS	Argument	Other associated field	Method	Population	Year
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Steenbeek et al.	PC	Interrater reliability of goal attainment scaling	Quanti	children	2010
Wagner and Davids	PC	Assessment instruments – Classification systems	–	children	2012

Articles found according to (*music therapy, cerebral palsy, assessment scales (or scale)*)

a) COCHRANE LIBRARY

COCHRANE LIBRARY	Argument	Other associated field	Method	Population	Year
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008

b) ERIC (Articles considered: 0)

c) PsycINFO (Articles considered: 0)

d) PUBMED

PUBMED	Argument	Other associated field	Method	Population	Year
Kim et al.	PC-MT (RAS)	Computer	Quanti	adults	2012

e) SCOPUS

SCOPUS	Argument	Other associated field	Method	Population	Year
Wu et al.	PC-MT	Acupuncture	Quanti	children	2008
Yu et al.	PC-MT receptive	Acupuncture	Quanti	children	2009

Appendix II

Presentation and description of the assessment scales selected

DUET Scale

Table 12: Categorisation of the types of communication patterns between a child with CP and the mother in a dyadic treatment with music therapy (DUET) - Gilboa and Roginsky (2010)

Categories	ITEMS
1: Non-verbal communication	1.1 Attention 1.2 Eye-contact 1.3 Location in the room 1.4 Expressivity 1.5 Touch 1.6 Use of objects 1.7 Humour
2: Musical Communication	2.1 Instrumental 2.2 Vocal
3: Verbal communication	3.1 Speaking

Table 13: Categorisation of the types of relation between a child with CP and the mother in a dyadic treatment with music therapy (DUET) - Gilboa and Roginsky (2010)

Categories	ITEMS
Category 1: Coordinated relations	1.1 Mutual playing relation 1.2 Creative relation 1.3 Intimate relation 1.4 Happiness relation 1.5 Relation in evolution 1.6 Relation related to age 1.7 Containing a relation 1.8 Differentiating relation 1.9 Intervention facilitates coming closer 1.10 Aggression= Attention relation 1.11 Manipulative relation 1.12 Relation of admiration 1.13 Unilateral relation 1.14 Sensitive relation 1.15 Anxiety encourages intimacy 1.16 Parental relation 1.17 Childish relation
Category 2: Uncoordinated Relations	2.1 Relation by means of criticism 2.2 Relation of lack of empathy 2.3 Fight relation 2.4 Relation of conflictive needs 2.5 Blocked relation

AQR

Table 14: AQR Scale

Categories	ITEMS	Sub-ITEMS
Instrumental dimension (IQR)	1. Election of an instrument	1. Duration and way of handling it 2. Way of playing it as regards to the quality of a relation
	2.Relation with the instrument	1. Way of handling it 2. Way of playing it as regards to the quality of a relation and the instrumental expression
	3. Musical parameters	1. Sound 2. Rhythm 3. Melody 4. Dynamic 5. Shape 6. Expression
	4. Space to play	1. Space 2. Musical spectrum as regards to the instrument 3. Mutual space of playing together
Vocal-pre-language (VQR)	1. Voice	1. Duration and way of vocal-pre-language expression 2. Way in which the patient discovers their voice 3. Way in which the patient uses their voice 4. The voice makes an interpersonal relationship possible
	2. Relation: intra-interpersonal	1. Intrapersonal: vocal expression and corporal feedback 2. Interpersonal: vocal expression in an interpersonal setting
	3. Type of vocalisation and pre-vocal expressions	(unspecified) Reference to Papoušek's (1994, p.48) description
Physical-emotional (PEQR)	1. Sense of body/ physical contact	1. Posture 2. Tactile reaction 3. Gesticulation
	2. Affection	1. Posture 2. Movements 3. Gestures
	3. Eye-contact	1. Quality 2. Quantity

Development of a relationship (TQR)	1. Initial point	1. Situation before the intervention
	2. Affection state of the therapist	1. Visual signs 2. Hearing signs 3. Sensory signs
	3. Intervention and its approach	1. Movements 2. State of the affection 3 Vocal expression 4 Instrumental expression
	4. Musical parameters	1. Sound 2. Rhythm 3. Melody 4. Dynamic 5. Shape 6. Expression 7. Harmony
	5. Space to play	1. Quality of the space between the therapist and the patient from the point of view of the intervention 2. Quality of the space between the therapist and the patient

DD-CGAS

Table 15: Punctuation of the levels of disability for the DD-CGAS scale (table of Wagner et al., 2007)

Categories	**Level of disability**				
• **Self-care** • **Communication** • **Social behaviour** • **School/ academic performance**	None	Minor	Moderate	Major	Extreme

GCS

Table 16: Glasgow Coma Scale – Punctuation

Categories	Punctuation
1. Eye-opening	1. no response (The patient does not open the eyes with painful stimuli) 2. response to pain (The patient only opens the eyes in response to pain) 3. response to speech (The patient opens the eyes in response to speech) 4. The patient opens the eyes spontaneously
2. Verbal response	1. no response (The patient does not respond verbally) 2. incomprehensible sounds (The patient responds with incomprehensible sounds) 3. inappropriate words (The patient only speaks with words or phrases with little or no sense) 4. confusing response (The patient is not oriented in relation to people, places and time but remains standing) 5. oriented response (The patient is not oriented in relation to people, places and time)
3. Motor response	1. no response (The patient has no motor response to pain in any limb) 2. extends with pain (The elbow of the patient extends and the wrist folds inwards; this is an involuntary response) 3. flexes with pain (The patient flexes their arms in response to pain; this and involuntary response) 4. localised pain (The patient tries on purpose to remove a painful stimulus) 5. obeys orders (The patient obeys an order of the type “raise your hands”)

MAKS

Table 17: Expression and Communication Sub-scales of the MAKS scale – Items

Expression Sub-scale: **Punctuation of the improvised musical solo (14 items)**		Communication sub-scale: **Punctuation of the musical interpretation in duet with the therapist (13 items)**	
Categories	ITEMS	Categories	ITEMS
1: Treat with the instrument	1. Range of the melody 2. Initiative	5: Commitment	1. Autonomy 2. Interior participation
2: Musical Shape/ Figure	3. Shape 4. Structure 5. Variation	6: Formal aspects	3. Need for space 4.Duration of the musical intervals 5. Logic structure
3: Vitality/ Expression dynamics	6. Suspension/ Tension 7. Power 8. Vitality 9. Flow 10. Dynamics	7: With respect to others	6. Reference 7. Intensity of contact 8. Contact behaviour 9. Variability in action 10. Domain
4: Quality of the expression	11. Quality of sound 12. Quality of the expression 13. Clarity of the emotions 14. Resonance/ Participation	8: Quality of the expression	11. Quality of the flow 12. Quality of affections 13. Quality of the music played

MATADOC scale

Table 18: BRC (Behavioural Response Category) Categories and items of the MATADOC scale

Main Sub-scale of Essential Categories **- Items 1-5 (utilities for the diagnosis)**	
Categories	ITEMS
Item BRC 1**: Response to visual stimuli**	1.1. no evidence of following/ turning towards a visual stimulus 1.2. inconsistent movement of eyes/ head towards the instrument/ therapist 1.3. consistent eye-following of the movement of the instrument/ therapist 1.4. can focus alternatively > 1 visual stimulus
Item BRC 2**: Response to hearing stimuli**	2.1. no location of hearing stimuli 2.2. inconsistent movement/ turning of eyes/ head towards hearing stimuli 2.3. consistent location of hearing stimuli 2.4. may focus alternatively > 1 hearing stimulus
Item BRC 3**: Awareness of musical stimuli**	3.1. no observed response 3.2. activity unrelated to the musical stimulus 3.3. inconsistent responses related to the musical stimulus 3.4. response only during musical stimulus 3.5. inconsistent interactive responses within musical exchanges 3.6. consistent interactive responses within musical exchanges
Item BRC 4**: Response to verbal commands**	4.1. no activity upon verbal commands 4.2. activity unrelated to verbal commands 4.3. inconsistent response to verbal commands 4.4. consistently followed verbal commands
Item BRC 5**: Excitement**	5.1. no sign of excitement 5.2. evident excitement during < 50% of the session 5.3. excitement shown during 50-90% of the session 5.4. excitement shown during the entire session

Musical Parameters Sub-scale and Behavioural responses **- Items 6-7 (information for the proposal of the musical treatment)**	
Categories	ITEMS
Item BRC 6**: Behavioural response to music**	6.1. change in facial gesture 6.2. change in eye-contact /eye direction 6.3. change in physical movement 6.4. change in vocalisation 6.5. change in breathing 6.6. change in excitement
Item BRC 7**: Musical response**	7.1. responses related to pulse/ rhythm 7.2. responses related to melody/ tone 7.3. responses related to the timbre 7.4. responses related to dynamics/ intensity 7.5. responses related to the shape: i.e. phrase, silence 7.6. responses related to tempo 7.7. responses related to the musical atmosphere

Clinical Information Sub-scale **- Items 8-14 (establishment of objectives and evaluation of the responses for the treatment proposal)**	
Categories	ITEMS
Item BRC 8**: Vocalization**	8.1. no vocalization related to the musical stimulus 8.2. vocal sounds unrelated to musical stimulus 8.3. unsuccessful attempt of vocalisation / increase of oral movement 8.4. inconsistent vocal sounds to the musical stimulus 8.5. consistent vocal sounds to the musical stimulus 8.6. attempt to sing songs 8.7. sung the last words of a phrase/ music as coda 8.8. sung all the words of a familiar song 8.9. unable to vocalise
Item BRC 9**: Non-verbal communication**	9.1. no interaction with others, spontaneous or by verbal command or +/- help 9.2. requires verbal commands or +/- help for verbal and social communication 9.3. inconsistent spontaneous use of social communication gestures without help 9.4. consistent spontaneous and appropriate use of social communication gestures
Item BRC 10**: Making choices**	10.1. no evidence of making choices 10.2. looked towards a unique object presented 10.3. change in physical movement 10.4. change in vocalisation 10.5. change in breathing 10.6. change in excitement
Item BRC 11**: Motor skills**	11.1. no active movement 11.2. active movement but unknown attempt 11.3. voluntary movement but which requires verbal aid and/ or physical aid 11.4. spontaneous voluntary movement but which requires aid 11.5. independent spontaneous voluntary movement 11.6. unable to move
Item BRC 12**: Attention to task**	12.1. did not pay attention to any task 12.2. paid attention in some moments to musical tasks 12.3. paid attention to all the musical task 12.4. paid attention to the complete session

Item BRC 13**: Intentional behaviour**	13.1. no intentional response to musical stimuli/ task 13.2. active response whose intention could not be determined 13.3. evident intentional response without achieving the objective 13.4. evident intentional response with achievement of the objective
Item BRC 14**: Emotional response**	14.1. does not respond to any command 14.2. change in expressive behaviours unrelated to stimuli 14.3. change in expressive behaviours related to stimuli in 1 occasion 14.4. change in expressive behaviours related to stimuli in more than 1 occasion

MATLAS

Table 19: Categories and items of the MATLAS scale

Categories	ITEMS
1. Motor responses	(unspecified)
2. Communication	1 vocal response 2 non-verbal communication 3 making choices 4 response to verbal commands 5 turn games
3. Excitement	(unspecified)
4. Hearing response skill	1 response to hearing stimulation 2 responses of musical behaviour 3 Musical parameters: a) pulse/ rhythm b) melody/ intonation c) timbre d) dynamics/ intensity **e)** tempo
5. Visual response skill	(unspecified)

MIR scale

Table 20: Punctuation of the MIR scale

LEVEL 1	**No Communication**
LEVEL 2	One part connects but there is no response from the person
LEVEL 3	One part connects but there is no musical response from the person
LEVEL 4	The person does not respond directly to the therapist, but in their own direction
LEVEL 5	Slight musical response directed from the person
LEVEL 6	Sustained musical response directed from the person
LEVEL 7	Establishment of mutual contact
LEVEL 8	Extension of mutual contact
LEVEL 9	Musical association

MTDA scale

Table 21: Categories and items of the MTDA scale

Categories	ITEMS
1. Categories of the autistic spectrum	a) interpretation b) commitment c) suggestion d) structuring with instruments e) abstraction f) voice g) history h) obsessive i) imitation j) game k) rejection l) no response
2. Categories of attention deficit	m) permanence in activity n) distraction o) restlessness with drumsticks or percussion p) permanence in place q) excitement r) impulsiveness s) playing at ease t) listening u) interrupting v) waiting to play w) ending an activity x) remembering phrases
3. Categories of emotional deficit	y) anxiety z) changes aa) control bb) conflicts cc) impulsiveness
4. Categories of disability in learning/ language	dd) pronunciation ee) speech ff) understanding gg) uncoordinated

Nordoff- Robbins Scales

Table 22: Thirteen Response Categories

1: Complete rhythmic freedom
2: Unstable rhythmic freedom
3: Limited rhythmic freedom
4: Obsessive hitting
5: Disorder in hitting
6: Evasive hitting
7: Hitting of emotional strength
8: Chaotic creative hitting
9: Playing the piano
10: Singing response
11: Response to singing
12: Responses to specific styles
13: Responses to modes or changes

Table 23: Evaluation of Scales I and II

Categories	ITEMS
Category 1: Child-therapist relationship	1.1 Forget/ Extreme reactions 1.2 Short-term knowledge /Abandonment/ Diffuse anxiety 1.3 Unaccepted knowledge/ Negativism /Active avoidance 1.4 Ambivalence/ Passive acceptance/ Intermittent implication/ Tends to reject 1.5 Limited response strategies / Willing to attend therapy / Evasive defence 1.6 Activity relation developed from pleasure towards music/ Recognises the role of the therapist/ Less defensive subsistence manifested in perseverance and manipulation 1.7 Assertive co-activity in musical interactions with the therapist/ Establishes work relationships with the therapist to achieve musical objectives/ Resistance as acerbity, inflexibility, rebellion or defiance 1.8 Intense commitment in musical activity as means of self-expression/ Has an exclusive mutual relationship with the therapist/ Crisis that leads to resolution or lack of negative resistance 1.9 Self-confidence /Believes in the therapist/ Working to achieve a personal musical objective/ Needs to go beyond in the relation patient-therapist but uneasy with the group/ Identification with the therapist to avoid regression 1.10 Functional independence in the musical group/ Cooperative with the initiative of the therapist and other members of the group/ Comfortable in the group
Category 2: Musical Communication	2.1 Not communicative/ Not active 2.2 Evokes responses in a fragmented manner/ Coordination of discontinuous and poor hitting/ Short-term relation with music 2.3 More sustained responses evoked musically / Impulsive and compulsive hitting more flexible to the interaction/ More controlled vocalisations and rhythmically related to the therapist/ Movement influenced by the musical style or mood 2.4 Oriented response and musical perception/ Synchronises short phrases, tempo and dynamic/ Wide range of vocal tones/ Movements related to their music 2.5 Maintained and oriented instrumental, vocal or motor responses/ Shows control and sensibility to the therapist's music / Occasional lapses 2.6 Musical implication developed in the way of individualised activity/ Focuses on preferred activities 2.7 Mobility and sensibility in musical responses/ Shows preparation to explore and expand their musical experiences

	2.8 Enthusiasm for musical creativity / Likes working with the therapist to achieve a musical objective 2.9 Musical communication independent from the therapeutic process/ Makes their music and accepts the group situation as a mean of social interaction and musical growth 2.10 Music-social intercommunication and musical contribution in the group

Table 24: Musical response Scale III (instrumental rhythmic responses)

Categories	ITEMS
1. Levels of rhythmic organisation	1.1. Rhythmic complexity 1.2. Classification of the tempo 1.3. Basic compass
2. Expressive components	2.1. Fluttering 2.2. Dynamic contrast 2.3. Delicate /Diminuendo 2.4. Accentuation/ Punctuation 2.5 Alto/Crescendo 2.6 Sound of the instrument 2.7 Accelerando 2.8 Slowing down 2.9 Contrast of the tempo 2.10 Permata 2.11 Rubato
3. Levels of skill-experience	3.1. Development levels: Establishing 3.2. Development levels: Discovering 3.3. Development levels: Incipient 3.4. Underdeveloped levels: Perseverance 3.5. Underdeveloped levels: Compulsive 3.6. Underdeveloped levels: Reactive 3.7. Underdeveloped levels: Not oriented/ unperceived
4. Levels of Capacity of Response	4.1. Musically expressive perceptive 4.2. Self-expressive assertive 4.3. Starts to get involved 4.4. Nascent

Table 25: Musical response Scale III (sung responses)

1. Levels of melodic form	1.1. Vast areas 1.2. Complex areas 1.3. Simple melodies 1.4. Melodic phrases 1.5. Musical motives 1.6. Loose tones
2. Vocal response capacity	2.1. Maintains a creative expression 2.2. Expressive freedom and initiative 2.3. Active and expressive sensibility 2.4. Oriented response capacity 2.5 Musical evocation 2.6 Unconscious reflexive
3. Vocal participation	3.1. Creative inter-response 3.2. Expressive coactivity 3.3. Self confidence 3.4. Participation 3.5. Coo-responsible 3.6. Interest but disability 3.7. Insecurity

Only the four first scales were considered in this description, excluding the last scale Tempo-Dynamic which is not relevant for this study.

SMART

Table 26: Punctuation for the SMART

Categories	Punctuation
1. Five sensorial modalities (visual, hearing, tactile, smell and taste) **2. Three other modalities: motor function, functional communication and insomnia/ excitement**	1 no response to stimuli 2 response to reflexive stimuli (shocks or flexor or extensor movement patterns) 3 response of withdrawal to stimuli (like turning the head, eyes or limbs) 4 localized response to stimuli (like turning the head or moving superior limbs) 5 differentiated response (the patient may follow visual, hearing orders or use objects properly)

Steen-Møller Scale

Table 27: Punctuation of the Steen-Møller scale

LEVEL 1	**The therapist feels the contact with their patient**
LEVEL 2	The therapist hears and sees the contact
LEVEL 3	The patient now controls the contact
LEVEL 4	The contact takes the shape of a dialogue
LEVEL 5	Therapist and patient make contact through free improvised music

Levels of intentionality according to Lewis

Table 28: Punctuation of the Levels of intentionality according to Lewis

Level I: The need coincides with the Intention and with the Emotion
Level II: The surrounding activates the Desire in the organisms
Level III: The Objectives are activated regardless of the environmental setting
Level IV: Intention includes multiple valid possibilities to achieve an objective
Level V: The manipulation of intentions is a property of objective consciousness: being aware of the desire becomes a new desire.

Punctuation methods of the selected assessment scales

DUET scale

Gilboa and Roginsky (2010) divide observation in two scales: 1) in the first (see Appendix II, Table 12), the types of communication and number of occurrences in all sessions are punctuated twice –qualitatively and quantitatively; and 2) in the second (see Appendix II, Table 13), the relationship between mother and child (with CP) is punctuated qualitatively.

AQR scale

For punctuation, one of the following Modes is selected for each one of the four sub-scales provided by Schumacher and Calvet-Kruppa (1999) (see Appendix II, Table 14):

- Mode 0: Absence of contact / Rejection of contact/ Pause
- Mode 1: Reaction to contact
- Mode 2: Sensorial/ functional contact
- Mode 3: Contact with oneself / sense of nucleus and of a subjective self
- Mode 4: Contact with others/ inter-subjectivity
- Mode 5: Relationship with others/ interactivity
- Mode 6: Shared experience /inter-emotional nature
- Mode 7: Musical-verbal space

DD-CGAS scale

The scale presented by Wagner et al. (2007) (see Appendix II, Table 15 is of general use and must be adapted individually. The instructions given by Wagner et al. (2007) to punctuate consist on selecting one of the numerical fields below (corresponding to the level of disability observed, compared to the ones expected in a child with a normal development, regardless of if the deterioration is due to disability, conduct disorders, environmental factors or other type of factors) and filling in the Table 15, specifying:

100-91: Adaptive functions of superior level in all fields (family, school, etc.)
90-81: Proper adaptive functioning in all areas

80-71: Minor disability in adaptive functions

70-61: Minor disability in adaptive functions and moderate disability in at least one category.

60-51: Moderate disability of adaptive functions in most areas.

50-41: Moderate disability of adaptive functions in most areas and major disability in at least one category.

40-31: Major disability of adaptive functions in some of the areas.

30-21: Major disability of adaptive functions in all areas and in all fields (family, school, etc.)

20-11: Extreme disability in at least one category

10-1: Generalized extreme disability

GCS scale

Punctuate choosing one of the fields that represent the response to the patient to stimuli (see Appendix II, Table 16).

MAKS

For the assessment with these scales (see Appendix II, Table 17), von Moreau et al. (2010) suggest a punctuation of seven possible levels, from a minimum level 1 to a maximum level 7, attributed to every item. For the purpose of punctuation, each level needs precise descriptions to avoid ambiguity. The authors describe only as an example the seven possible levels for the item 1.2. *Initiative*, in the sub-scale of Expression:

1) No initiative (only plays when it is needed and/or when helped)
2) Very low level of initiative (only reproduces familiar musical patterns)
3) Low level of initiative (1-2 ideas)
4) Normal initiative (2-3 ideas)
5) High level of initiative (3-4 ideas)
6) Very high level of initiative (> 4 ideas)
7) Extreme level of initiative (cannot contain themselves)

And the seven possible levels for the item 10, *Domain,* in the Sub-scale of Communication:

1) Totally subordinated (does not play or remains silent)

2) Moderately subordinated (conformist)
3) A little subordinated (partially conformist)
4) Equal
5) A little dominant (decisive, inviting)
6) Moderately dominant (influential)
7) Totally dominant (overwhelming)

MATADOC scale

It is important to point out that the procedure protocol of MATADOC indicated by Magee et al. (2012) foresees three observation phases before, during and after the session (Table 29):

Table 29: MATADOC three observation phases

3 minutes	**MATADOC session**	**3 minutes**
	Musical stimulation and behaviour as a response to verbal commands	
Observation of behaviour during non-stimulation with the patient in a posture of normal rest state	Observation of behaviour during the session	Observation of behaviour during non-stimulation with the patient in a posture of normal rest state

In their instruction manual of the MATADOC protocol, Magee et al. (2012) suggest for the assessment the following punctuation for the items of the 14 categories foreseen (see Appendix II, Table 14): Category 1 and 2: from 0 to 3; Category 3: from 0 to 5; Category 4 and 5: from 0 to 3; Category 6 and 7: yes/no; Category 8: from 0 to 9; Category 9: from 0 to 3; Category 10: from 0 to 5; Category 11: from 0 to 4, a subsequent value, 9, is foreseen for total immobility; Category 12, 13 and 14: from 0 to 3. The value 0 = no response and the maximum value of the possible corresponds to abundant consistent response.

MATLAS scale

For the assessment with this scale (see Appendix II, Table 19), Magee (2007), in his study only mentions the items of two categories, communication and hearing domain, mentioned for subsequent deepening in the corresponding manual for assessment, whose information I was not able to not find.

For the punctuation, the author foresees the following: from 0 to 3 or 7 depending on the cases, in which 0 = no response, 1 = inconsistent behaviour unrelated to stimuli, etc. (the next levels are not specified), and thus up to the maximum level. In the case of vocal response, he foresees a punctuation that goes from 1 = no response to 8 = sings everything, and besides a subsequent punctuation 9 = unable to vocalise.

MIR scale

The unique category is the objective of the scale (see Appendix II, Table 20): observe, evaluate and punctuate the level of contact in the musical interaction. Punctuate choosing one of the fields that represent the response of the patient to stimuli.

MTDA scale

For the MTDA scale (see Appendix II,Table 21), Oldfield (2006) came up with a punctuation system similar to that used for ADOS: 0 = This conduct was not observed at all, 1 = This conduct was observed sometimes, 2 = This conduct was observed sometimes.

Nordoff- Robbins scale

The punctuation of these scales (see Appendix II, Table 22, Table 23, Table 24, Table 25) go from the level 1 (no musical communicative response) up to the level 7 (maximum communication and enthusiasm for musical creativity).

SMART scale

The hierarchic SMART (see Appendix II, Table 26) is comprised of two categories whose punctuation following five levels of assessment that go from no response (level 1) up to differentiating responses (level 5), for all the categories of the sensorial modalities.

Steen-Møller scale

The unique category is the objective of the scale (see Appendix II, Table 27): observe, evaluate and punctuate the level of contact in musical interaction. Punctuate selecting one of the fields that represent the response of the patient to stimuli.

Levels of Intentionality according to Lewis

The unique category is the objective of the scale (see Appendix II, Table 28): observe, evaluate and punctuate the level of contact in musical interaction. Punctuate choosing one of the fields that represent the response of the patient to stimuli.