INTERACTION WITH AN ASD (AUTISM SPECTRUM DISORDER) CHILD THROUGH TURN-TAKING

Student: Josep M. Porté

Supervisor: Esperanza Torres

Master Thesis at the master programme in Music Therapy

Department of Communication and Psychology

Aalborg University

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ABSTRACT

This master thesis presents a study of a unique case based on the use of turn-taking to establish interaction with a child suffering from ASD in a clinical context. Starting from a phenomenological-hermeneutic qualitative design, it describes and discusses four events (video clips) of a music therapy treatment, using the method of the microanalysis. A narrative description is used, as well as a graphic template that represents the events and the quantitative table collection of the presence and evolution of the categories of observation: the child's musical behaviours, expressive behaviours and musical elements, which maintain a relation with joint attention, affective harmony and interaction. This study reflects on how through turn-taking games and especially the pause and reflection, a means for interaction is provided, enriching the intersubjectivity and the development of proto-communication.

Key words

Music therapy, ASD, improvisation, turn-taking, interaction and microanalysis.

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Chapter 1. INTRODUCTION

1.1 Personal motivation

The conception of this study came up after performing a music therapy treatment on Pau (figurative name), a 12-year-old boy diagnosed with ASD (Autistic Spectrum Disorder, schooled in the Special Education School "l'Estel" in Balaguer (Spain).

When talking about ASD, we refer to a number of symptoms that mark the degree of seriousness of the condition of the person showing this disorder, and which limit their every-day capabilities. Symptoms which constitute a continuum or spectrum, as Wing (1995) already put forward, which affect dimensions of the individual related with social interaction, communication, language, imagination and mental flexibility (Rivière, 2001). As is stated by the American Association of Psychiatry in the DSM-V, we will inevitably find, from early childhood, persistent deficiencies in communication and social interaction, and restricted and repetitive behaviour patterns or interests (American Psychiatric Association, 2013).

When approaching this music therapy treatment, I start from considering the child as an active part of the treatment where, as a therapist, I guide the process by basing it on our joint execution of sound-musical activities and games which stimulate interaction. The intervention process in music therapy, in its essence, is an interaction process. In this systematic process the therapist uses musical experiences with the objective of promoting in the client (Bruscia, 1997), changes favourable in their skills, ways of thinking, emotions and conducts (Peters, 2000).

The matching between therapist's music and clients's expression might motivate the patient to offer a response, even though he shows expressive and social difficulties (Robarts, 1999; Wigram and Elefant, 2009).

Improvisation in music therapy has proven valid in children with ASD, since it is based on the child's individual capacities and interests, helping them in the development and

expression of their emotions and in social interaction through music (Robarts, 1999; Trevarthen y Aitken, 2001; Gold C, Wigram T, and Elefant C., 2006).

Ferrari (2013) holds that "the music therapist has a fundamental role when it comes to providing a suitable environment for the development of communication, built intersubjectively, putting their musicality at the service of the child" (Ferrari, 2013; p.49).

Every treatment requires an adaptation during the process, its directionality and structure being modified according to the personal change that occurs. In this case, I devoted several sessions to containing such conducts and trying to be empathic with the child, through containment improvisation techniques as a rhythmic background and empathy techniques such as the mirror, according to Wigram (2005). This is fundamental in my work in order to create a therapeutic bond as several authors have suggested, showing that the objective of the music therapist consists in establishing a meaningful relationship by means of shared musical production - joint clinical improvisation - (Alvin and Warwick, 1992; Robarts, 1999). In this process I have tried to follow an integrating treatment model characterized by: 1) focusing on listening and musical production; 2) allowing the use of any sound-producing element, regardless of musical skills and 3) establishing a bond without imposing rules and respecting the client's space with the objective of favouring the liberation of feelings and emotions.

When proposing improvisations with turn-taking, I experienced that these affected our interaction, by making it more frequent and more significant. This resulted in a very exciting and encouraging experience and increased my curiosity to try to understand this process in depth, since as Wigram and Elefant point out (2009): the musical elements which appear in turn-taking dialogues, such as harmony, rhythm, melody or dynamics, produce structured patterns of shared activity, favouring the appearance of mutual communicative experiences, fundamental elements in the child's development process.

In the experience described in this study, I took an interest in the reflection around the global experience of improvisation, especially in turn-taking, and taking into account the aspects pointed out by Ferrari (2013): strictly musical elements of the experience,

together with non-musical elements, related to the bonding, intentional and interactive aspects related to those experiences.

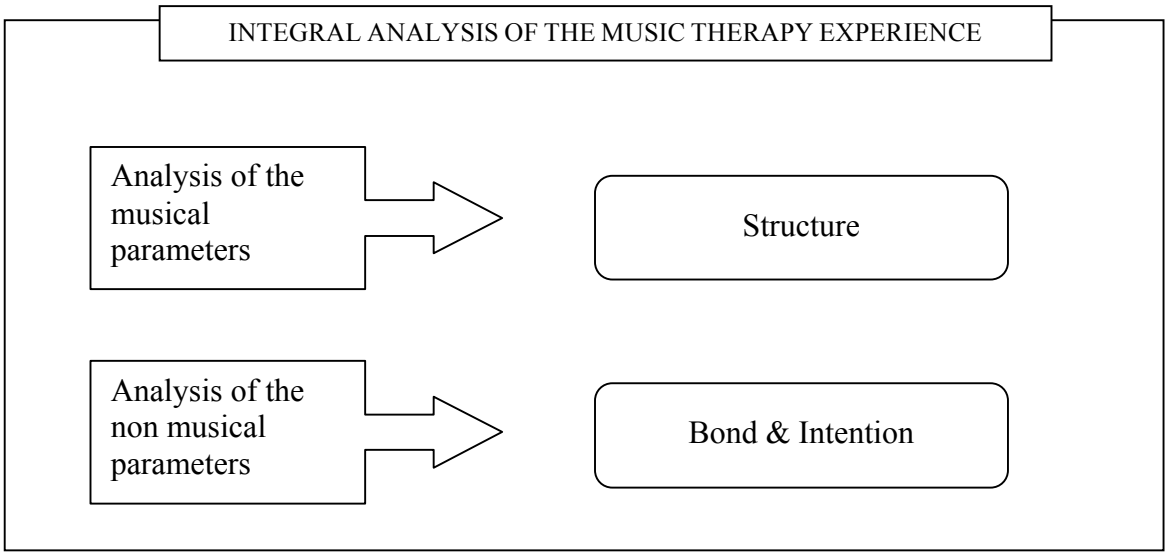


Figure 1: Adaptation of Ferrari's chart (2013; p.86)

1.2 Formulation of the problem

Moving from an initial hypothesis where shared rhythmic games could have a special relevance to establish interaction with the child, I asked myself the following question:

How does the use of turn-taking in a clinical context affect the interaction between a music therapist and a child with ASD?

1.3 Method

1.3.1 Instrument of analysis

With the aim of finding an answer to this interest developed from a clinical experience, I have, in hindsight, set out to observe and describe four extracts of video recordings selected from the overall treatment. This selection has been made by extracting several significant moments – in the communicative and interactive ambit- out of the sessions where we used turn-taking in the improvisational activities inside the music therapy

sessions. The criterion followed to select such fragments was: 1) Presence of turn-taking, except for the first fragment, where it is not observed. 2) Progression in the process of treatment, choosing fragments which correspond to different phases in its development. 3) Length of the selected extract, between 2 and 4 minutes, which allows detailed observation and, at the same time, is short in its development.

1.3.2 Data selection

These fragments were analyzed according to the following categories:

- The child`s musical response: imitating, initiating and replying.
- The child`s expressive reactions: motor expression, facial expressions, look and expression of vocalizations.
- The musical elements: tempo, intensity, main rhythmic and/or melodic formulae.

These observations were made separately by the investigator (also agent of treatment) and two other external observers of the selected fragment.
Firstly, a detailed observation was made by using three tables which contain the marked items and their evaluation in terms of presence (YES) or absence (NO) together with a quantitative evaluation of the frequency of such conducts in the video-clip, following the evaluation criterion: Few (+); Quite a lot (++); Many (+++).
These categories have been defined as follows:

1. **The child's musical response**. In order to observe these aspects, these items have been considered: a) imitating b) initiating c) replying to the therapist's proposal.

   a) **Imitating** the therapist's proposal refers to the client's musical performances that are equal or very similar to the therapist's musical productions. Its evaluation is considered taking into account if there is presence (YES) of imitation o not (NO) and, jointly, its frequency: Few (+); Quite a lot (++); Many (+++).

b) **Initiating** refers to the client's actions to start an interaction, by using to this effect a vocal or instrumental musical production. The evaluation is considered taking into account if there is presence (YES) of initiative o not (NO) and, jointly, its frequency: Few (+); Quite a lot (++); Many (+++).

c) **Replying** refers to the client's actions (vocal or instrumental musical productions) in response to the interaction proposals initiated by the therapist. The evaluation is considered taking into account if there is presence (YES) of initiative o not (NO) and, jointly, its frequency: Few (+); Quite a lot (++); Many (+++).

The consideration has been made to register these observations in the following table:

Clip	Imitates		Replies		Initiates	
Presence	YES	NO	YES	NO	YES	NO
Frequency	+/++/+++	0	+/++/+++	0	+/++/+++	0
1 / S2						
2 / S9						
3 / S11						
4 /S18						

Table 1.a: The child's musical response

2. **The child's expressive reactions**. In order to observe the non-musical conducts of the child, the following items have been considered:

a) **Motor expression**, considering the presence (YES) o not (NO) and, jointly, the frequency: Few (+); Quite a lot (++); Many (+++) of ambulatory, stereotyped and/or self-stimulating movements of the child, such as repetitive body movements and object-throwing. In this case, the lesser presence of such expressions will be the sign of a more positive conduct.

b) **Facial expressions**, considering the presence (YES) o not (NO) and, jointly, the frequency: Few (+); Quite a lot (++); Many (+++) of facial expressions, such as the smile.

c) **Eye contact (look)**, considering the presence (YES) o not (NO) and, jointly, the frequency: Few (+); Quite a lot (++); Many (+++) of direct eye contact with the therapist and the instrument.

d) **Vocalizations,** considering the presence (YES) o not (NO) and, jointly, the frequency: Few (+); Quite a lot (++); Many (+++) of vocal expressions.

The consideration has been made to register these observations in the following table:

Clip	Motor		Facial: smile		Look				Vocalizations	
					T		Instrum.			
Presence	YES	NO	YES	NO	YES	NO	YES	No	YES	NO
Frequency	+/++/ +++	0	+/++/ +++	0	+/++/ +++	0	+/++/ +++	0	+/++/ +++	0
1 / S2										
2 / S9										
3 / S11										
4 / S18										

Table 1.b: The child's expressive reactions

3. **The musical elements**. Out of all the possible musical parameters, the following ones have been chosen:

a) **Tempo**: it refers to the speed at which a musical fragment is played. In this study, it is observed taking into account if the client's is COMMON or DIFFERENT from the therapist's. If it is COMMON, degree of similarity: Little (+); Quite a lot (++); A lot (+++).

b) **Intensity**: it refers to the strength with which sound on an object is produced. In this study, it is observed taking into account if the client's is COMMON or DIFFERENT from the therapist's. If it is COMMON, degree of similarity: Little (+); Quite a lot (++); A lot (+++).

c) **Main rhythmic formulae or motifs**: it refers to sound fragments, made up of different sounds. In this study, it is observed by taking into account if the client's is COMMON or DIFFERENT from the therapist's. If it is COMMON, degree of similarity: Little (+); Quite a lot (++); A lot (+++).

This observation has been recorded in this table template:

Clip	Tempo		Intensity		Melodic and rhythmic formulae	
Presence	Common	Different	Common	Different	Common	Different
Frequency	+/++/+++	0	+/++/+++	0	+/++/+++	0
1 / S2						
2 / S9						
3 / S11						
4 /S18						

Table 1.c: The musical elements

Next, this information has been transferred to a **pick up graphic template**, inspired in Jacobsen's (2012), which helped analyse the behavioural information both of the child and the therapist, more visually, facilitating the analysis. It helps taking into account both the horizontal aspects, developed in time, and the vertical ones, observed events or parameters which occur simultaneously in time.

This presentation is followed by the **narrative description** of each episode/clip analyzed, which complements the information which could be recorded in the previous formats but which is important to understand the context in which the observed situation occurs.

1.3.3 Data analysis

For the analysis, the **microanalysis method** (Holck, 2007) has been followed; it permits the observation of the interaction between therapist and client, the communicative conducts, the facial expressions, the body movements and the identification of interaction patterns and the changes in such patterns.

So, after a thorough description which investigates small processes and changes/developments which take place in a music therapy session (through musical, graphical and narrative transcription of the video-clip) a horizontal and vertical reading of the transcription is made in order to find out –in this case- if an interaction and its progress through turn-taking exists or not.

Finally, an interpretation of the observations will be made, linked to the discussion of such interpretation, supported by the significations given from my previous knowledge and the revision of the literature about the topic.

Next I will expand on the presentation of the case object of this study.

1.4 Description of the clinical case

1.4.1 Description of the child

Pau is a 12-year-old boy, diagnosed with ASD. He lives with his parents and a younger brother. He was adopted from an Eastern Europe country at the age of 3. At that time, Pau already showed a language acquisition deficiency and relationship and communication difficulties. After several examinations made by neuropsychobiological teams, he was diagnosed with autism when he became 7 years old by means of the CARS (Childhood Autism Rating Scale) protocol. On this scale, Pau obtained a total of 36.5 points, which places him in the category of mild autism.

The child showed difficulties in communication and use of language. In the area of communication and language, he showed difficulties in holding another person's stare, initiating an interaction; his verbal expression was limited, circumscribed occasionally to syllabic and onomatopoeic productions; he made associations with simple objects and concepts and had the ability to follow simple orders.

In the psychomotor area, he showed: displacements on tiptoes and head or body twisting in a stereotyped way. As far as attention is concerned, he showed a selective attention, expressing interest only in several elements capable of producing crashing sounds (a door slammed or an instrument falling or being hit hard) and meteorology (wind, rain or storm). He was distressed by cloudy days and when those occurred, he

showed an obsessive behaviour, imitating the sound of the wind, covering his ears and screaming. His visual and aural memory skills were remarkable (he remembered a great deal of nursery rhymes which he used to hear at home and in his car on the journey to school), as were his musical skills (especially, with dance).

Despite the fact that his cognitive development was under the average regarding his age – his was an age of 7 years and 4 months according to the Battelle Inventory of Development-, he was well adapted to his school. He recognized his classmates and teachers, respected school routines and tasks in accordance to the day of the week. He communicated by using pictograms and had acquired elementary hygiene and personal care habits, (he could use the toilet or find his way to a classroom different from his without the need of someone going with him). His parents were fully conscious of his difficulties in maturation and communication and considered him an approachable boy, fascinated by any noisy element, and occasionally obsessive.

The child was schooled in the Special Education School “l’Estel” in Balaguer (Spain), an educational centre whose task has been taking care of students with special educational needs since 1982. The school follows the Primary Education syllabus with adaptations and bases its work on function-oriented activities and workshops, following the criteria established according to the developmental stage of every student.

1.4.2 Context of the intervention

The care received by the child in the educational centre was given in a small group and/or individually, depending on the activity which had to be done. A curricular adaptation was implemented in language subjects. An alternative communication system has been used, through SPC pictograms (System of Pictographic Communication), with the aim of encouraging oral expression. This adaptation has also affected the area of body knowledge and awareness, focused on improving his basic habits. Moreover, he received special attention in individualized sessions of speech therapy and psychomotor therapy.

The clinical work done on Pau took place between January and May 2009. It consisted of 18 fifty-minute music therapy sessions, in a physical setting in the schooling centre itself.

1.4.3 Music therapeutic intervention

The setting for the sessions was structured in a way that the child could feel secure. The decision was made to use a non-verbal approach and to use improvisation as a tool of communication and socialization between both participants, because the child didn`t have oral language.

The first two sessions of the process were used to carry out an evaluation with the purpose of finding out what abilities and difficulties were shown by the child, and what where his points of interest. From this first observation, it could be drawn that the child: 1) accepts the therapist's intervention and sonic proposals; 2) shows curiosity for the instruments making up the *setting,* being the tambourine, the guitar and the xylophone the ones that aroused his curiosity the most; 3) he plays repetitively and shyly and participates in very short periods of time, with soft sounds in each of them, especially when he is accompanied by nursery rhymes; 4) he shows difficulties before a bar instrument (xylophone), his strokes being very imprecise. His sound production is nearer to exploration than to communication; 5) there are no vocalizations or imitations. As regards his relationship with the therapist, initially the boy doesn't seek for interactions with him, even though he accepts his proposals, especially if the therapist sings.

Having into account this initial evaluation, the following objectives are established:

1. Increasing the number of child-therapist interactions (in the field of Communication).
2. Favouring the situations which permit the contact between the child and the therapist (in the field of relationship).
3. Increasing the permanence periods in an activity and reducing agitation.
4. Improving the movement accuracy in the child (in the field of motor development).

5. Offering a space where well-being feelings can be experienced.

The treatment was organized following a session structure where the child was received with a welcome song, followed by the performance of improvisational musical activities. The session ended with a goodbye song. During the development of this treatment, empathic improvisation techniques were used, such as imitation, turn-taking and structural techniques such as containment (rhythmic background) which allow improvisation when there is no clear structure. Moreover, the therapist caused variations in his musical performance (pulse, intensity, introduction of new songs and rhythmic patterns, combination of vocal and instrumental music).

The process can be divided into three main phases, according to bigger or lesser presence of turn-taking:

First phase: sessions 1-4, where no turn-taking games took place. During this phase, the *setting* is formed by string, percussion and wind instruments. In this phase of the treatment, the child initially accepted the therapist's proposals, above all, the songs, and showed curiosity to explore the instruments. Progressively, Pau seemed to show less interest in the proposals and experienced a big excitement by throwing the drumsticks in the air, yet increasing his isolation. From the 5th session on, the *setting* is changed significantly, since the afore-mentioned instruments were removed, leaving only two tambourines in the interaction space.

Second phase: sessions 5-13. In this phase the first turn-taking games take place, and from it I have chosen two clips, from session 9 and 11, respectively, which will be described in chapter 3.

The stimulation and over-excitement produced by the drumstick-throwing disappeared, occurring short moments of sharing and a certain improvement in eye contact, and a decrease in the ambulatory and swaying movements.

Third phase: sessions 14-18. The musical production changes, since the tambourines are hardly used; instead, the body is more profusely used now, through body percussion and voice, with songs on the therapist's part and progressive vocalizations by the child.

In this phase, eye contact, gestures –smiles- and moments of sharing increased. Pau's constant ambulatory movement in the room decreased, too, as did his swaying. In this phase, there were moments of great harmonization of affection between the two, like a "current" of relationship and communication.

1.5 Methodology of investigation

In order to respond to the case problem, I have resorted to a **phenomenological-hermeneutic qualitative design** with which to try to give answers to the initial question, as regards this phenomenon.

This design has become structured along the investigation process itself, modelling the analysis as new questions and theoretical foundations appeared. Robson (2011) called it flexible –or semi-structured- design. The conclusions have emerged from a detailed observation of events registered in the videotaping of a number of unique experiences, in the activity that develops improvisation and from an interpretation of said data. In this study, then, there is my own *subjectivity* and my *comprehension* of the facts.

The **qualitative perspective** entails the task of understanding or grasping what the other participant intended to express with his gestures, his musical nuances and even his silences, through his interpretation. From this *singularity* I have tried to build generalizations which permit us to understand aspects common to similar music therapy situations, from a constant revision of the related literature. In the qualitative investigation, we must find those patterns inherent to any action and get as close as possible to the construction of the world in the same way as the participants perceive it (Maykut and Morehouse, 1994).

Taylor and Bogdan (1992) point out, as characteristics of qualitative investigation: a) its methodological route is related to discovering and finding, and not so much to checking and verifying; b) the persons and the settings are considered an a whole, which obeys to a logic typical of organization, functioning and meaning: c) the persons are viewed from a perspective of totality; d) the effect of the investigator himself is factored in: e) it tries

to understand the persons inside their own reference frame; f) the investigator must distance himself from the influence of their own beliefs, perspectives and predispositions; g) data recollection and analysis are not excluded, nor are other viewpoints, since, for the qualitative investigator, all the perspectives are valid; h) the investigator's objective is observing the protagonist's perceptions, conceptions and actions; i) the qualitative investigation is implemented through an exhaustive analysis (detailed and deep) and as an inter-subject consensus that interprets and shares its sense (Sandoval, 1996).

In the **phenomenological paradigm** it isn't possible to analyze a phenomenon without accepting that it is anchored to the meaning that the persons experience it give to it and, in consequence, it cannot be analyzed in a totally objective way, since the investigator's values are present. It is a task about describing, understanding and interpreting the facts.

In the **phenomenological-hermeneutic** model of investigation, it is about developing understanding. From this hermeneutic vision, the essential origin of knowledge is attributed to practical activity (Packer, 1985) and turns the investigator into an interpreter/decipherer of the language offered by the subject (Kvale and Brinkmann, 2009; Robson, 2011). The objective is showing new interpretations that we might have not been aware of. Through explicitating the interpretation we search for a deeper understanding of the phenomena and so for understanding and explaining better the meaning of the experience lived.

In order to carry out this investigation and reflection process I have followed these steps: 1) selecting a part of reality, which I have considered studying from the observation and consciousness of my role both as an investigator and as participating subject; 2) looking for a theoretical body of similar situations and experiences to orient myself in the search for relevant data and in the organization of this information; 3) selecting only specific situations for their strategic and informational value, in the awareness of multiple other approaches; and 4) providing an explanation of these phenomena by trying to relate them to the previously existing theory.

The phase of interpretation of the events as a whole, together with the conclusions about the analysis, the bibliographic revision and my own previous positioning, is not so

linear as it might seem, since this investigation process has entailed to-ing and fro-ing among the whole and its integrating parts.

Furthermore, I am aware that the present study will show aspects that, even carried out through a protocol-driven method of analysis, are chosen for their relevance in the process and conduce to clarifying the fact that using turn-taking games in a shared clinical context affects the interaction between a music therapist and a child with ASD.

The development of the clinical task causes for the intervention and the decisions made during the process not to always be conscious. Carrying out this study has been a way of distancing my "therapeutic me" –totally involved in the intervention process- and my "investigative me", which has tried to observe, register and analyse the data to understand the phenomenon.

For this reason, I have tried to take measures of veracity and reliability such as:

- Being systematic in the collection of data, revising the video recordings several times.
- Creating and revising tables to organize the information in a way that they show progress and evolution.
- Describing the steps taken.
- Analyzing in depth the events several times.
- Contrasting my observations with the ones made by two external observers, -music therapists not involved in the treatment in course-, who have contributed to the description of the events and have discussed these observations.

1.6 Previous knowledge

From the beginning of this study I became aware of the importance of, on the one hand, knowing the general features of ASD, but, on the other side, not forgetting my personal and particular vision of a child as a person with needs, or as Del Campo (1997) likes to put it, with diverse capacities.

My personal position lies in assessing the person as a whole where physical, emotional and spiritual values intertwine forming an only being enabled to change and heal. In this way, my therapeutic conception considers the child as an active part in the treatment, where the therapist guides a process supported by the joint execution of sound-musical activities and games, which stimulate interaction.

Each client is unique, and for this reason the treatment requires an adaptation during the process, it directionality and structure being modified according to the change that occurs (Wigram, 2005). My premise is believing in the possibility of building communication and interaction bridges if we stimulate listening, empathic care and the real, affective and containing presence of the therapist and of the activities designed from music therapy.

In the music therapist's work, what the client offers, owns and carries is rescued and valued. Even when showing expressive and social difficulties, when the therapist's music matches a client's expression, it may motivate them to offer an answer, to be more participative and to interact with the music therapist (Robarts, 1999; Wigram and Elefant, 2009).

From my theoretical-practical experience, music therapy contributes the adequate context to create interaction and communication situations; a frame where social relationships can be developed stemming from the actual individual needs of a person with ASD.

Music therapy is considered a useful tool in the field of autism, especially in aspects such as communication, interaction and social relationships. Musical improvisation in the clinical practice becomes a facilitator of communicative skills, and of interaction and the development of maintained attention (Wigram and Gold, 2006). In this way, the aim is to establish a meaningful relationship with the client through shared musical production (Alvin and Warwick, 1992; Robarts, 1999).

Musical improvisation has been used as the main technique in the music therapy sessions, mainly using the turn-taking and containment improvisational techniques developed by Wigram (2005). The turn-taking dialogue technique entails making music

together, taking pauses to give each other space to participate in an alternate way. To signal and take such turns, the participants may use musical of gestural forms (Wigram, 2005). Bruscia (1999) defines two techniques which may help encouraging turn-taking: finding spaces in the client's productions and completing them -interposition- or for the therapist to offer spaces in his own improvisation so that the client contributes their own material –space-creation-. By developing both techniques, the ideal situation can be created to invite the other to participate in turn-taking.

Holck (2004b) utilizes the term *turn-taking* to describe a specific action where one of the participants takes the turn. In other words, it consists in an action involving a sequence of turns which are taken alternatively between the therapist and the child.

The music therapy improvisational techniques which are used to generate communicative interactions may resemble the play offered by a sensitive mother to that proposed by the baby. As Bunt (1994) suggests, if the mother is sensitive to the patterns proposed by the baby, she offers coincidences, dialogues, connection points and non-verbal pointers, which can give rise to the interactive turn game. In addition, musical improvisation can transform relational patterns barely using verbal language (Stern, 1997).

With these previous foundations, the bibliographic research has been conducted on these and other articles in order to widen the information about the use of music therapy intervention in ASD. More specifically, the clinical improvisation techniques, focusing on turn-taking with this type of clients and the aspects that have been considered relevant in it: joint attention, interaction and affect attunement, since they were the ones who caught my attention, albeit unspecifically, during the music therapy process. With this study I intend to approach the possible answers to the facts in a more concrete, detailed and objective way by using the guidelines of phenomenological-hermeneutic qualitative design.

Chapter 2. THEORY

2.1 Autistic spectrum disorder (ASD)

2.1.1 Definition

The ASD is defined as a disorder in neuro-development from an early age, characterized by a series of difficulties in communication and relations and by restrictive and repetitive behaviour and interests (Baron-Cohen, Meng-Chuan and Lombardo, 2013). This disorder has a series of very heterogeneous symptoms, which determine the level of affectation of the person with this disorder and which can be placed in a continuum (Wing, 1995). She describes six dimensions of affectation with different levels of seriousness in them: 1) qualitative disorders in social relations 2) communicative functions disorders 3) language disorders, 4) imagination disorders and limitations, 5) flexibility disorders y 6) activity purpose disorders (Wing, 1995).

Currently, the definition considered is the one contained in the fifth edition of the publication *Diagnostic and Statical Manual of Mental Disorders*, *DSM-V* (American Psychiatric Association, 2013), which states that ASD has two symptomatic domains which appear in early childhood and which, the two of them, cause a limitation on everyday life activities and a need for support at different levels.

- Group A: Characterized by social alterations combined with alterations in communication, presenting at the same time deficiencies in three areas: in social and emotional reciprocity; in the non-verbal communication used in interaction; in the creation of relations adequate to their vital moment.

- Group B: Characterized by repetitive and restrictive behaviours, interests and activities, showing simultaneously at least two of the following conducts: language, motor conducts or even of objects in a repetitive or stereotyped way; excessive resistance to change or adherence to routine, ritual conducts, verbal or not; centres of interest highly restricted and/ or unusual with excessive intensity; hiccups or sensory hypersensitivity.

This change in the conception of ASD emphasizes the individuality of every ASD-afflicted person and factors in the famous triad for the diagnosis and understanding of ASD (communication deficiencies, interaction deficiency, and restricted and repetitive interests) (Baron-Cohen *et al.*, 2013). According to this new vision, autism is no longer considered a static diagnostic category and reaffirms the possibility of evolution and development inside this wide continuum, inside the margins of ASD and even outside them (Morral, Sánchez, Mestres, Farrés and González, 2012). Clearly we can observe that this disorder carries some determining factors that affect the development of interpersonal comprehension and collaborative actions (Muratori, 2008).

2.1.2 History

In 1943, psychiatrist Leo Kanner, after systematically studying eleven children, made the first description of the disorder that he himself called child autism. The features that Kanner considered fundamental were: 1) a deep lack of affective contact with people; 2) an obsessive wish for invariability; 3) a certain fascination for objects susceptible to manipulation; 4) silence or non-communicative language and 5) a cognitive potential visible in special skills. At the same time as Kanner, another investigator, Asperger, described a similar disorder with two main differences in relation to the ones specified by Kanner: the presence of language (albeit altered) and motor difficulties (Morral *et al*., 2012).

After these studies, there have been many publications about autism, giving rise to new interpretations, definitions and descriptions. The main ones have been collected in the diagnosis manuals DSM I and II (APA, 1952, 1968) and ICD 9 (WHO, 1977), where the term “child psychosis” was introduced to cover the most serious cases of ASD. In later editions of DSM III and IV (APA; 1980, 1994) and ICD 10 (WHO, 1992), autism was placed in the category of Generalized Developmental Disorders (GDD).

Wing and Gould (1979) observed that persons with deficiencies in the three characteristic areas of autism (the autistic triad) showed very different degrees of affectation, proposing the term Autism Spectrum Disorder (ASD).

Rivière (2001) contemplates different stages in the study of ASD. 1st stage: between 1943 and 1963, where autism was considered an emotional disorder produced by an inadequate affective bond or care; 2nd stage: from 1963 to 1983, where signs of neurobiological causes started to be taken into account, formulating cognitive explicative models; and the 3rd stage: the current approach, where ASD is considered from an evolutionary perspective with important changes in the explicative models.

2.1.3 Etiology

Genetics is profusely investigated as a credential in the etiology of the development of autism, currently existing different theories to explain its origin. Chromosomal anomalies have a great interest in pathologies of unknown origin since they can point to genes involved in autism. Salmon *et al.* (1999), for instance, have pointed out that one of the anomalies most frequently described in chromosomal disorders associated with autism is the one affecting chromosome 15 (the maternal interstitial doubling of region 15q11-q13). Also, more recent investigations point towards mutations in chromosome X (Jamain *et al.*, 2003) or towards the ones produced in the gen codifying the synaptic protein SHANK3 (Durand, *et al.* 2006). Recently, mutations have been identified in the neurexin genes in different disorders of neurologic development such as autism (Camacho-Garcia, *et al.*, 2013). Nevertheless, the investigation of autism-related genes is very complex and, although many chromosomes have been involved, the answers are not clear enough, and new investigations will be necessary (Alcantud, 2003).

There are studies that firmly suggest that there are persons with a higher genetic predisposition to developing this disorder. The occurrence of autism is between 3 and 4 times higher in men than in women. The risk of recurrence for brothers is of 3%, being between 50 and 75 times higher to that of the rest of the population (Bolton *et al.*, 1994; Filipek, 1999).

Investigations about “mirror neurons” also try to reflect about the etiology of autism. A deficiency in the mirror neuron system could appear in the human being through the autistic spectrum disorder (Rizzolatti and Sinigaglia, 2006). These neurons get activated when a person executes an action or when they observe a similar activity carried out by another individual. For this reason, they have a relevant function in the cognitive

capacities related to social life –such as empathy and imitation – and make up a key element to understand the others' intentions, for the development of a theory of the mind, they enable us for social life and for the comprehension of the others' emotions.

In studies with metabolic neuro-images (PET and SPECT) we can observe a decrease in the neurons with connection functions between the neurons recipient of sensations in the thalamus, processor of emotions, and the cortex, processor of intentionality and symbolic representation. (Morral *et al.*, 2012).

Some authors, such Baron-Cohen *et al.* (2013), stress the importance of environmental factors in interaction with the genetic factors which increase the risk of the disorder appearing. Among them, the advanced age of the father or the expectant mother, the exposition to chemicals during pregnancy, or biological agents (Holguín, 2003).

2.1.4 Description of the main symptoms

The detection of the disorder may vary a lot, depending on the case; the heterogeneity of autistic syndromes entails an arduous task when the diagnosis is made. There are no biological markers and this demands the use of psychological markers. In the most serious cases, the first signs are related to retardations in development (hypotonia, hyperactivity) and the typical symptoms of autism appear later on. Normally, the signs appear from the second year of life, when serious alterations in development manifest themselves clearly, being the intersubjective, linguistic and cognitive abilities the ones that are affected in relation to other children who do not suffer from autism. The first suspicions aroused on the parents are usually related with the lack of response to oral demands and the absence of verbal communication (Cuxart, 2000).

Taking Rivière's (2002) Inventory of the Autistic Spectrum as a reference, we can describe the variety of characteristics that can be found in ASD, classified into twelve dimensions with different levels of affection and/or development in each of them:

1. Disorder in **social relations**, in the inner complicity of relations: from the impression of absolute isolation, through ignoring peers but not adults, to motivation to relate but not being able to understand the other.

2. Disorder in **joint reference abilities**, of sharing focuses, interests or actions whose indicators are look, proto-declarative gestures: from total absence of joint actions or interests through looks without joint reference or only in directed situations.

3. Disorder in the **mentalist and intersubjective abilities**: primary and secondary intersubjectivity, theory of mind and false beliefs.

4. Qualitative disorder in **communicative functions**: from the absence of communication to instrumental conducts to achieve or ask for something, to communicative conducts to share experience or communicate the inner world.

5. Disorder in **expressive language:** from total or functional silence, through isolated words or echolalias, to speech with or without limitations.

6. Disorder in **receptive language**: from a tendency to ignore oral language to the comprehension of simple statements or statements linked to specific conducts and literal-meaning or limitless comprehension.

7. Difficulties in **anticipation**: from big resistance to changes, adherence to stimuli, no anticipatory conducts, tantrum conducts before change, to simple anticipatory conducts, small self-regulation of routines, accepting environment versatility, etc.

8. Difficulties in **flexibility**: from predominance of stereotyped conducts to small rituals, excessive attachment to objects, little functional interests, etc.

9. Disorder in the sense of **own activity**: from predominance of conducts without an aim or relationship with the context, function-oriented only activities, with difficulties to refer to the future.

10. Disorder in **fiction and imagination**: which implies imaginary attribution of things or situations: from total absence of symbolic play to presence of games, albeit repetitive or simple, or complex functions of fiction with difficulties to distinguish them from reality.

11. Disorder **imitation**, which is a necessary resource for intersubjective development: from the absence of imitation to motor imitations which are simple, non-spontaneous or sporadic, rigid, etc.

12. Disorder in **suspension**: leaving an action or representation on hold with the aim of creating meanings for oneself or another person to interpret.

Children with ASD may manifest other symptoms like problems with motor functions and integrating the body scheme; motor clumsiness; different pain threshold, appearance of panic episodes, emotional self-control problems, which may lead to a high level of activity; self-lesions, alterations in nutrition or sphincter control, etc. (Morral *et al*., 2012). In addition, other habitual symptoms are hyperactivity (childhood), hypoactivity (teenage and adulthood) mood instability, agitation crisis, paradoxical responses to aural stimuli, sleep alterations and epileptic crisis (20-25% of the total population) (Cuxart, 2000).

2.1.5 Diagnostic

There are different tools that can be used to diagnose an ASD, such as:

- The ADOS scale (Autism Diagnostic Observation Schedule), which consists in a standardized and semi-structured evaluation of communication**,** social interaction and play or imaginative use of materials (Lord, Rutter, DiLavore, and Risi, 1999).

- The ASI inventory (Autistic Spectrum Inventory) has the objective of evaluating twelve dimensions characteristic of persons with autistic spectrum and/or

development disorder, by assessing the severity and depth of the autistic features that the individual has, regardless of their differential diagnostic (Rivière, 2002).

- The ADI-R (Autism Diagnostic Interview- Revised) interview is another means for the diagnosis; it consists in a semi-structured interview to the child's parents/guardians where three big areas are questioned about their child: **language/communication, reciprocal social interactions and restricted, repetitive and stereotyped conducts and interests (**Lord, Rutter, and Le Couteur, 1994).

Music therapy can have a fundamental role in the diagnosis of ASD (Wigram and Gold, 2006) by offering the chance of assessing areas such social participation and non-verbal communication, which are the main difficulties for persons with ASD. This assessment can be made through the analysis of musical events and conducts and so detect not only deficiencies but also abilities (Schumacher and Calvet-Kruppa, 1999; Wigram, 2002; Oldfield, 2004b; Wigram and Gold, 2006; Wigram, 2007; Raglio, Traficante and Oasi, 2011).

Wigram was in pioneer in that he proposed music therapy diagnostic sessions as a part of the multidisciplinary demand that such a complex diagnosis requires. These music therapy sessions make it possible to balance the development of a therapeutic relation and the search for relevant information in the areas of general interaction and response, communication and musical behaviour or physical activity (Wigram, 1996).

On the other hand, Oldfield (2004a) proposes MTDA (Music Therapy Diagnostic Assessment), a flexible and open diagnostic test, through two diagnostic sessions of ASD by means of music therapy. It includes a series of activities that can be proposed during the session, out of which 8 or 9 are chosen depending on the child, in order to achieve the assessment.

Other contributions to the diagnosis of persons with ASD can be found in Bruscia's (1999) Individual Assessment Profiles (IAPs) in music therapy, where, through the

analysis of musical events, we can value, among other things, the level of autonomy or of variability, fundamental areas in the development of persons with ASD.

Also, the AQR **(**Assessment of the Quality of Relationship) scale, created by Schumacher and Calvet-Kruppa (2007), can be used with diagnostic criteria since it has been developed to assess the quality of the relation through music and musical instruments. This tool allows the analysis of the interaction mode of a client in order to determine which development phase they are in; it has four scales with seven to eight variants each, which show the characteristics corresponding to the *self*'s progressive development (Schumacher and Calvet-Kruppa, 2007).

Be as it may, the early detection of ASD is fundamental, since an early intervention seems to favour a better development and evolution in the persons affected. Several studies point out that some early symptoms could be seen between 6 and 12 months of age, period in which social development starts (Baron-Cohen *et al.*, 2013).

2.1.6 Therapeutic approach

Just as there is not a common symptomatology for each individual, we cannot establish an only method to treat this disorder. The children diagnosed with ASD can turn to a wide range of therapies for their physical, sensory, emotional and educational development (Fuentes-Biggi *et al.*, 2006). Some examples of these therapies recommended for their multidisciplinary intervention are physiotherapy, occupational therapy or music therapy (Visootsak, Warren, Anido, Graham Jr, 2005; Fernández-Carvajal and Aldridge, 2011). There is also a medical approach based on the use of medicines with the objective of relieving situations of anxiety, concentration, decrease of blood pressure, convulsions, behaviour, etc. (Palacio, 2007).

Authors like Alcantud (2003) point out general aspects that can guide a therapeutic approach, such as: 1) reducing those sensory stimuli which can interfere in the communication between the therapist and the client; 2) offering a structured environment where the child feels secure; 3) allowing work with flexibility on aspects of social interaction, verbal and non-verbal communication, obsessive and repetitive routines and interests; 4) working coordinately on the whole system surrounding the

person, since it will favour new communication networks and alternative languages and 5) reinforcing the educational interventions that improve communication, adaptation and reduction of symptoms.

2.2 Music therapy and autism

Whipple (2004; cited in Kern and Humpal, 2012) has made an updated revision about music therapy and ASD with the aim of presenting the most recent studies about areas such as communication, interaction, personal responsibility and play. The conclusion is reached that music therapy is an effective treatment to promote, amongst other things, communication and interpersonal skills in children with ASD. This same author, in 2004, concluded in a previous meta-analysis that through intervention with music therapy on persons with ASD we can observe benefits in the increase of adequate conducts, reduction of sterotypies and self-stimulation, increase of attention, of vocalizations, of symbolic play and reduction of anxiety.

In the study conducted with 40 music therapists working in treatment programmes longer than 2 years on persons with ASD, the following data are described: 70% of the clients were men, compared to 30% for women; 80% of the sessions are performed individually, whereas 8% is done with couples, or 2% in groups; 8% combines individual and group sessions; 40% proposes increasing the area of communication and language, 40% the psychosocial and conduct area, and 8% the cognitive area (Steele and Kaplan, 2005). Long term treatmenrs and musical improvisation performed by an experienced music therapist have shown higher effectiveness (Geretsegger, Holck and Gold, 2012).

In Simpson and Keen's revision (2011) about the interventions with music therapy and autism, 128 articles where identified, out of which, 20 met the inclusion criteria of the study showing that the techniques most frequently used in music therapy are improvisation and the song creation with the aim of facilitating social, communicative and behavioural skills. The revision also points out the importance of assessing the

intervention context since it is an aspect that can influence the efficiency of the intervention.

Different studies and descriptions of clinical cases with music therapy intervention testify their benefits on persons with ASD, since it can increase social conducts and skills (Finnigan and Starr, 2010; Gattino, Riesgo, Longo, Leite and Faccini, 2011), promote cognitive development and emotional connection (Trevarthen, 2002) or augment turn-taking and reduce stereotypies (Müller and Warwick, 1993).

Specifically, musical improvisation in music therapy has proved its validity on children with ASD, since it sets out from the child's individual capacities and interests, helping them in the development and expression of their emotions and in social interaction through music (Robarts, 1999; Trevarthen and Aitken, 2001; Gold *et al.*, 2006), boosting the development of the sense of identity and the ability to create bonds with the therapist (Kim, 2013; Vaiouli, Grimmet and Ruich, 2013); it helps to reduce anxiety and increases the receptivity of the child with ASD, providing a pleasant way of being with the other (Trevarthen, 2002); is offers an ideal setting for the development of interaction, involving joint attention, eye contact, synchronicity and turn-taking (Trevarthen, Aitken, Robarts and Papoudi, 1999; Kim, 2006).

Carpente (2011; cited in Kern and Humpal, 2012), analyzing other authors, proposes 6 steps to facilitate musical interactions through improvisation: 1) listening and observing the child's responses and reactions before the sonic surrounding; 2) creating a musical-emotional environment; 3) following the child's musical proposals; 4) synchronizing with the child musically, through sound, movements or gestures; 5) opening a communicative circle though musical interaction; and 6) promoting musical experiences conducting to contact and communication. There are several musical elements in improvisation that favour working flexibility and resistance to changes, emphasizing dynamics (Thompson, 2012).

The revision by Gold *et al.* (2006) showed that the effects of music therapy on verbal and non-verbal communicative skills can be superior to similar forms of therapy where music was not used, which can point to a specificity of the effect of music and music

therapy. The results determined limited applicability, because its long-term effects haven't been studied.

Wigram and Gold (2006), after a revision of controlled studies from reports about intervention with music therapy, showed the potential of this treatment on children with autism, especially when using improvisation. This intervention can contribute to improving the communicative behaviour, the development of language and the capacity for emotional response, the capacity for attention and behavioural control. This article points towards the importance of structure, and the foresee ability that can be provided by music helps reciprocate interaction and an attitude of tolerance, flexibility and commitment to build relations that makes it possible for proper and significant interpersonal answers to emerge.

The results of the studies by Kim, Wigram and Gold (2008, 2009) show that improvisation in MT is a therapy effective to facilitate joint attention conducts and social skills of non-verbal communication in autistic children, compared to play situations. In their conclusion they took into account eye contact and turn-taking in improvisation.

In the equation music therapy – children with ASD, it is necessary to take into account the psychological theories about development than support the way of describing the relation established between the participating elements.

2.3 Development psychology and music therapy

In the last years several studies have appeared about the concept of intersubjectivity, being always linked to the study of human communication and becoming a key element in the investigation of the alterations that appear in the development process of the autistic child. From the standpoint of evolutionary psychology, it is clear that one of the first alterations detected in ASD are the functions of knowledge and affection, in the area of interaction (Rivière, 1984).

In the first years of life, the child's development depends on interaction with the persons with whom they relate affectively. Nagy and Molnar (2004) expound that the instinct to initiate an action is present in the baby since birth, as an essential element in subjectivity, in motivational processes and in biological maturation processes. In that sense, Muratori (2008) points out two indicators oriented towards the early detection of ASD: the ability to cause a reaction, and intentionality in the baby's interaction.

Stern (1991), Meltzoff (1995) and Trevarthen (1998) have studied child conducts to draw inferences about the origins and representation of their own self and about the development of interpersonal relations. According to Beebe, Sorter, Knoblauch and Rustin (2004) the ability to communicate is innate in the human being, standing out the capacity of imitation and of proto-communication, which let the baby integrate expressive movements of the eyes, the mouth, the vocal area, the hands and postures. They can also discriminate aspects such as tempo and rhythm in a musical cell. This innate ability in the baby is stimulated in the first months of life by the maternal expressive conduct, which transmits liveliness, vitality and energy and which, somehow, adapts to the child's disposition. Trevarthen (1993) states that the mother's movements include mirroring, exaggerated emotional expressive forms and changes in the intensity of the strength of the expression. He also expounds that both mother and child strengthen their relation through mutual imitation and coupling or complementarity. Later, this usual relational play between mother and child is mutual and regulates not only the child's *self* but also interpersonal contact and relations.

Malloch (1999) has defined this capacity as "*communicative musicality*". It features a pre-verbal intervention between the mother and her child based on sound improvisation, where the two of them exchange replies, adjusting and modifying several musical parameters, such as pulse, rhythm and dynamics, in relation to one another. This type of conversation has been considered musical because it also contains changes in intonation, volume or repetition of some words, consequently, elements related to music.

Trevarthen (1998) mentions several levels of *intersubjectivity*: *primary intersubjectivity,* which refers to the coordination of the *self* with the other, based on a correspondence in form, tuning and intensity, and *secondary intersubjectivity,* which includes an object

and refers to the coordination of the *self*, the other and the object, while there is an exchange of referential gestures. For this author, this capacity of interaction with the others, with objects, and with phenomena, is present from birth, but there is an evolution between 9 and 12 months where such capacity evolves into initiative-taking and joint orientation. The development of these behaviours is considered a precursor of verbal communication and symbolic intelligence.

This theory of intersubjetivity indicates the presence of parameters of synchronization, intensity and form in both subjects, which capacitates them to resonate or reflect off each other. These patterns may come to form chains and be imitated. It all enables empathic communication between child and mother (Trevarthen, 1993). "The idea of in the child is a theory about how human minds, human bodies, can recognize another subject's impulses in an intuitive way, with cognitive or symbolic elaborations or without them" (Trevarthen, 1998, p.17).

According to these authors, the intervention of another person is necessary for the development of such communicative and social skills: the mother helps to render the baby's conducts meaningful and adapts to them, where each one changes alongside the other. Both Trevarthen (1993) and Stern (1991) point out the importance of synchrony, form and intensity in this relation.

For Stern (1991), this intersubjectivity takes place when the child can point their fingers, use gestures to refer to objects, starts using words and to show intentions of communicating. When the child finds out the attention focus (looks at the object) the emotional status (feeling of pleasure) and the intention can be shared. This author places the appearance of intersubjectivity around 9 months of age and shows how intersubjectivity is created and structured through shared activities which are organized in a non-verbal, affective and narrative way. Furthermore, he points out that the focus changes from a mutual regulation of conduct to an exchange of the experience (Stern, 1997).

Stern (1991) defines three forms of intersubjectivity: joint attention, joint intention and joint affection. So, he refers both to *joint attention* and to *joint intention* as communicative features where the child concedes the recipient with the ability to

understand and share the child's intention. He refers to affect tuning, joint affection or *affect attunement*, when the child establishes a certain correspondence between their emotional status and the one observed in the other interlocutor. This conduct is observed in several dimensions of behaviour; for example, in the facial expression, the vocalization and the gesture. These manifest and simultaneous conducts differ qualitatively, according to Stern (1997), from an imitation or from the concept of empathy (which requires the mediation of cognitive processes). This affect attunement contributes to strengthening attachment and feelings of security and anticipates the concept of psychic intimacy (cited in Beebe *et al.,* 2004).

Trevarthen's (1998) description of subjectivity falls very near to the concept defined by Stern (1991) as affect attunement, since intersubjectivity is the psychological ability to have and share actions, interests or emotions in a way that the infant be able to exchange their own psychological events with other persons with the aim of obtaining new ideas and objectives from them (Aitken and Trevarthen, 1997. Cited in Trevarthen, 2002).

Another concept developed by Stern (1991) is *affective-energetic states*. They are emotional states that accompany the human being permanently and pop up in interpersonal situations. Their qualities can be described through intensity, speed, strength, progressive fading, a burst, etc. These affections of vitality accompany the ones usually known as: happiness, sadness, surprise, fear, etc.; they are easily recognizable since they feature similar facial expressions in all the persons and possess a certain energetic quality. Affective-energetic states show fluctuations in intensity and frequency and can be detected at a very early age in children.

Bunt (1997) writes that in the first proto-conversations between mother and child there may be imitation processes, turn-taking, vocalization, etc. In the turn-taking occurring between the two of them, the mother uses the spaces offered by the baby to return a sound through imitation, or creates new element in the ongoing communication. The music therapist acts similarly to achieve a communicative interaction with their client. When two persons with communicative intention try to understand each other's emotional status, and one of them manages to do so, communication can develop (Bunt, 1997).

2.3.1 Joint attention – Ability for joint reference capacity

The acquisition of joint attention skills plays an important role in early development, since without this skill development is hindered in the skills of communication, interaction and language, this being an area remarkably affected in the autistic spectrum (Rivière, 2001).

The concept of joint attention has been used to define the activities of pre-linguistic social communication which involve the use of gestures (including pointing or looking) to share interest regarding situations, objects, etc. (Bruner and Sherwood, 1976. Cited in Martos and Martínez, 2001). As pointed out by Mundy, Sigman, Ungerer and Sherman (1986; Cited in Martos and Martínez, 2001, p.10), "it involves the conjunction of affection and cognitive activity in relations that define joint references", which implies the inclusion of an emotional component, not only cognitive.

According to Kim (2006), joint attention conduct involves three actors: the child, another person (therapist) and the objects (musical or vocal instruments). It may or not be expressed in the visual focalization between persons and objects, but it will always show the interactive state of the *primary and/or secondary intersubjectivity* processes (Kim, 2006).

Picking up the ideas expounded by Morral *et al.* (2012), three levels can be mentioned in the development of joint attention (Tomasello and Call, 2004; cited by Muratori, 2008): a first level, when the baby is able to perceive the others as beings different form objects, and can share emotional states with them; a second level, where referential look appears and lets the baby follow the look of their mother or of the referent person and consequently, look at the same object as her. In this level, the child begins to share purposeful actions and to integrate them in the relation. And a third level, in which *joint attention* already appears, in such a way that the child can share with another person intention in the actions made jointly, and attention with another person on the same object. This is the moment when a child can look towards what another person is pointing and recognize an object marked as a shared attention object, or is able to point their finger at an object to draw another person's attention towards it. (Hernández, Martín y Ruiz, 2007).

The presence of joint attention may be inferred when there are: musical response by the child together with some element in the child's expressive response in their visual contact, be it with the therapist or with the instrument; smiling during musical interaction with the therapist and/or changes in their body agitation, such as stopping (Holck, 2007; Wimpory, Hobson and Nash, 2007).

2.3.2 Turn-taking - Interaction

When working with children suffering from communicative disorders, some type of developmental difficulty or autism, it is of paramount importance to reinforce such skills that allow such children to participate in some kind of social interaction, such as turn-taking.

Holck (2004b) uses the term *turn-taking* to describe a specific action where one of the participants takes a turn. In other words, it is an action which implies a series of turns which are taken alternatively between the therapist and the child. When it is part of a musical improvisation, the dialogue technique of turn-taking entails making music together, taking pauses to give each other space to participate alternatively (Wigram, 2005). This author argues that music is a wonderful means to promote different types of dialogue between several persons (Wigram, 2005).

Kim (2006) defines turn-taking as a pattern where a sequence of turns is established and alternated between therapist and patient. In his investigation, Kim was able to confirm that a much higher quantity of turn-taking occurred during music therapy sessions than in play sessions. In fact, the author considers it instrumental pivotal in social interaction, as she considers it one of the most common clearly-structured forms of interaction.

To organize such turns, the music therapist can use techniques that are useful as explicit signs; for example, the sudden pause. Or signal more implicit, such as amplifying a melodic motif, using eye contact, etc. (Knapp and Hall, 1992; Holck, 2004b). Wigram (2005) adds that, to mark and take such turns, the participants can use musical or gestural forms, which are useful to confirm and guarantee the interaction (Holck, 2004a) and in this way therapist and client develop codes that render interaction significant (Ruud, 1998; Cited in Wigram and Elefant, 2009).

Bruscia (1999) defines two techniques which can help fostering turn-taking: 1) finding spaces in the client's productions and completing them (which he calls interposition) or 2) for the therapist to offer spaces in his own improvisations so that the client participates with his own material (making spaces). By developing both techniques, an ideal situation can be created to invite the other to take part in turn-taking. Wigram and Elefant (2009) propose different ways of contributing and developing a dialogue: with therapist and patient replying to each other without a pause or leaving a pause between the interventions, interrupting each other, overlapping each other, with one of them making very long interventions and the other, very short answers, by replying to one another emphatically, or, on the contrary, by doing it in a contrasting way, in analogy with verbal dialogue. Some of them, such as the fact of inserting the pause, can be viewed as promoters of turn-taking. Holck (2004a) remarks that when there is true interaction, both participants get involved in initiating, maintaining and organizing turn-taking, and this context can provide us with signs about the social skills of those participating in it.

Jacobsen (2012) considers turn interaction fundamental in human interaction. And he describes several cues to initiate the turn (decreasing intensity, tempo, including pauses, touching the patient or saying a sentence to them); maintain it (raising the volume, making changes in our voice, shorter pauses); asking for the turn (sighs, raising a finger or a hand, straightening up); denying or not continuing the turn (head-shaking, long pause).

In this sense, autistic children often seem to perceive that the therapist's music has something to do with them and this encourages them to participate in the activity and even to initiate the interaction with the therapist. This is so because the therapist promotes the creation of predictable patterns by including materials coming from the child. This approach uses non-verbal musical interaction and compares to the principles of reciprocal interaction between child and mother (Kim *et al.*, 2008; Wigram and Elefant, 2009).

Some studies expound that children with development disorders show great difficulties in interaction based on turn-taking (Rogers, 1988; Moseley, 1990). Nadel, Guérini, Pezé

and Rivet (1999) indicate that turn-taking between adults and ASD-afflicted children is built on two links: the child's production is related to something that the adult imitates, or the adult's production is related to something that the child imitates. The replies offered by the child will have the continuing of interaction as their objective. Also Holck (2004a) considers that an interaction entails the alternation between imitation and initiation.

For the very purpose of maintaining attention and participation in this interactive turn play, Stern (1997) expounds that a certain amount of repetition is necessary to be able to understand, organize and create structure from what is happening, besides the fact that it gives familiarity to interaction. But, on the other side, variation or novelty are also required, to maintain an ideal level of tension and interest (Stern, 1997). Even more so in persons with ASD who need that structure –repetition and predictability- but who also need to make them more flexible by introducing small variations to help them tolerate changes and uncertainty (Wigram and Elefant, 2009).

With the same objective, Holck (2004b) describes changes in intonation, in tempo or pauses to maintain turn-taking. The mother, in the game of interaction with the child, always pauses when she wants the child to reply (Mayer and Tronick, 1985; cited in Holck, 2004b).

2.3.3 Synchronization / Musical attunement / Affect attunement

According to Jiménez and Rivera (2010), the phenomena of joint attention and synchronization are closely related: it is not possible for an event of this nature to occur if the actors involved are not synchronized around the same objective. These authors distinguish two types of synchronization: *intra-synchronization (oneself)* where facial and bodily expressions are related and advance in exact correspondence; and *inter-synchronization (action)*, where the correspondence in time occurs between two or more persons.

Also the term "musical attunement" has been used to refer to these aspects. Stern (1991) wrote about the term musical attunement as "showing conducts that express the quality of the feeling of a shared effect without imitating the expression of the exact behaviour of the previous state" (Stern, 1991, p.142). According to this author, there are three

main behavioural characteristics that could make up the basis of attunement: intensity, time and form (cited in Dimitriadis and Smeijsters, 2011). This implies taking into account pulse, rhythmic patterns and dynamic forms of expression until there is a common musical basis between the child and the therapist (Kim *et al.,* 2008).

The music therapist, unlike an external sound source, can match the child constantly by changing their expression (Wigram, 2005; Oldfield, 2006; Wigram and Elefant, 2009) making it especially relevant to follow the child's initiatives and to offer a communicative intentionality to their productions (Kim *et al.* 2009).

When Wigram (2005, pp. 81-111) presents different musical interaction methods that can be used in the treatment of ASD, he describes techniques such as mirroring, imitation and coincidence, which approach the concept of affect attunement. So, when he uses coincidence in music, he helps tranquilize a child and validate the game. In any way, the music therapist tries to tune into the client's mood, reflects it in his music, providing a frame for therapeutic relation. According to this author, it is not only about imitating the child's sounds but about establishing a musical theme and a variation on it for its further development in the therapeutic process.

In the study presented by Raglio *et al.* (2011) some elements of affect attunement are analyzed, and, from the musical standpoint, two behaviours are taken into account: tuned production and variations. Tuned production expresses the intersubjectivity of the relation and confirms the prevalence of the exchanges with the music therapist from the communicative-relational standpoint. These exchanges are more significant if they are connected with the progressive increase of variations during the treatment. In fact, the variations show an intense activation of the subject and creative and non-stereotyped aspect of musical sound communication, an important element in the evolution of music therapy treatment.

Chapter 3. DATA ANALYSIS

This retrospective study is based on the observation, description and reflection on the data selected from a music therapy treatment on an ASD-affected child, carried out during the school year 2008-09.

With that objective, the microanalysis method has been used, following Holck (2007) with the aim of observing the interaction between the Therapist and the Client (Pau); the holistic (global) experience of music therapy improvisation and his facial, body and vocal expressions and identifying the patterns of interaction and the changes in such patterns, so that they help clarify the question: How does using turn-taking games in a clinical context affect the interaction between a music therapist and a child with ASD?

The following phases, hence, will be presented:

- Data selection and transcription.
- Patterns observed and their interpretation.

3.1 Data selection and transcription

Extracts have been selected from the recordings of sessions 2, 9, 11 and 18 from an 18-session treatment. In each of them, a 2- to 4-minute observation and transcription has been made, where significant moments appear communication and interaction-wise, from the sessions where the turn-taking game has been used in the improvisation during the music therapy sessions.

These fragments were observed according to the following categories, attributing (YES) if there is evidence of such conduct or (NOT) if it is not observed. At the same time, a value is attributed to the frequency of such conducts in the clip observed, and it is coded: Few (+); Quite a lot (++); Many (+++):

- The child's musical response: imitating, initiating and replying, where progress in all its items is considered positive and healthy.

- The child's expressive reactions: motor expression, facial expressions, look and expression of vocalizations. On this occasion, a bigger presence of these conducts is considered positive and healthy, except in motor conducts, of which a decrease is considered a healthier and more convenient factor (since they are related to the stereotyped conducts typical of ASD).

- The musical elements: tempo, intensity, main rhythmic and/or melodic formulae, where coincidence (COMMON) or difference (DIFFERENT) are taken into account. This last evaluation is considered positive and remarkable since it enriches the musical motif.

3.1.1 Tables to register changes in the categories observed

3.1.1.1 The child's musical response

Clip	Imitates		Replies		Initiates	
Presence	YES	NO	YES	NO	YES	NO
Frequency	+/++/+++	0	+/++/+++	0	+/++/+++	0
1 / S2		0	+		++	
2 / S9	+		+++		++	
3 / S11		0	+++		+++	
4 /S18	+		+++		+++	

Table 3.a: The child's musical response

Its evaluation is considered taking into account if there is presence (YES) of imitation or not (NO) and, jointly, its frequency: Few (+); Quite a lot (++); Many (+++) in 1) the items: a) imitating b) initiating c) replying to the therapist's proposal, defined in the first chapter (p.6).

3.1.1.2 The child's expressive reactions

Clip	Motor		Facial: smile		Look				Vocalizations	
					T		Instrum.			
Presence	YES	NO	YES	NO	YES	NO	YES	No	YES	NO
Frequency	+/++/+++	0	+/++/+++	0	+/++/+++	0	+/++/+++	0	+/++/+++	0
1 / S2	+++			0	+		+		+	
2 / S9	++		+			0	++		+	
3 / S11	+		+			0	+++		++	
4 / S18	++		++		+++			0	+++	

Table 3.b: The child's expressive reactions

Considering the presence (YES) o not (NO) and, jointly, the frequency: Few (+); Quite a lot (++); Many (+++) both of motor expressions such as facial expressions (smile); look, whether directed towards the therapist (T) or to the instrument (Instrum.) and the vocalizations, described in chapter 1 (p.7).

3.1.1.3 Analysis of the musical elements

Clip	Tempo		Intensity		Rhythmic and melodic formulae	
Presence	Common	Different	Common	Different	Common	Different
Frequency	+/++/+++	0	+/++/+++	0	+/++/+++	0
1 / S2		0	++		+	
2 / S9	++		++		+++	
3 / S11	++		+++		++	+
4 /S18	+++		+++		++	++

Table 3.c: Analysis of the musical elements

They are observed taking into account if the client's are COMMON or DIFFERENT from the therapist's. If they are common, degree of similarity: Little (+); Quite a lot (++); A lot (+++), both for the tempo and the intensity and the rhythmic and melodic formulae, where there are common aspects and different aspects.

They are defined on page 8 in chapter one. Regarding the last item of rhythmic and melodic formulae, in the last two sessions, it was considered relevant to take into account that the client's formulae and the therapist's are clearly different in rhythm and melody but it is also noteworthy that both have common or similar aspects.

3.1.2 Pick up graphic template

After picking up these observations, a transcription of these data has been made on to a **pick up graphic template**, both in the horizontal aspects, developed in time longitudinally, and the vertical ones, events observed that happen simultaneously in time. This template, inspired in Jacobsen (2012), contains a timeline that shows the seconds of the fragment and is also used, at the same time, to divide the space between the observations on the child's behaviour and also the ones on the therapist.

Musical notation has been used (the rhythms produced, regulators and intensity indicators). The gestural parameters have been represented with the following icons: eyes, smile, and person. The child's vocal production has been transcribed by means of speech bubbles with an approximate inscription of the production, while the therapist's has been inscribed under the musical transcription.

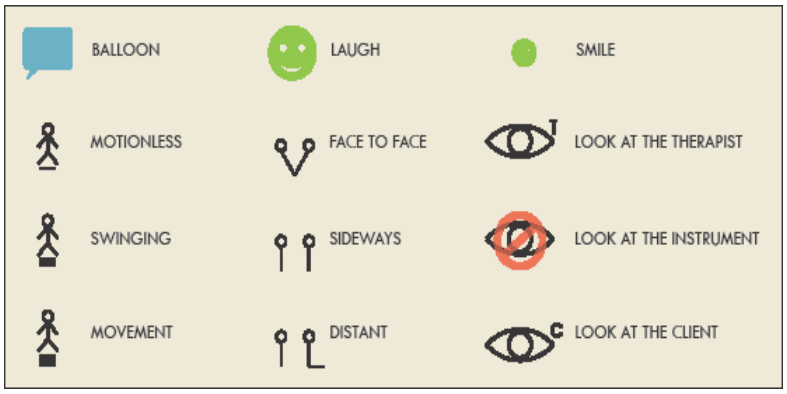


Figure 2: Graphic template notation

The pick up graphic templates corresponding to sessions 2, 9, 11 and 18 will be shown below. An enlarged version of each template is attached in the appendix in order to facilitate its observation.

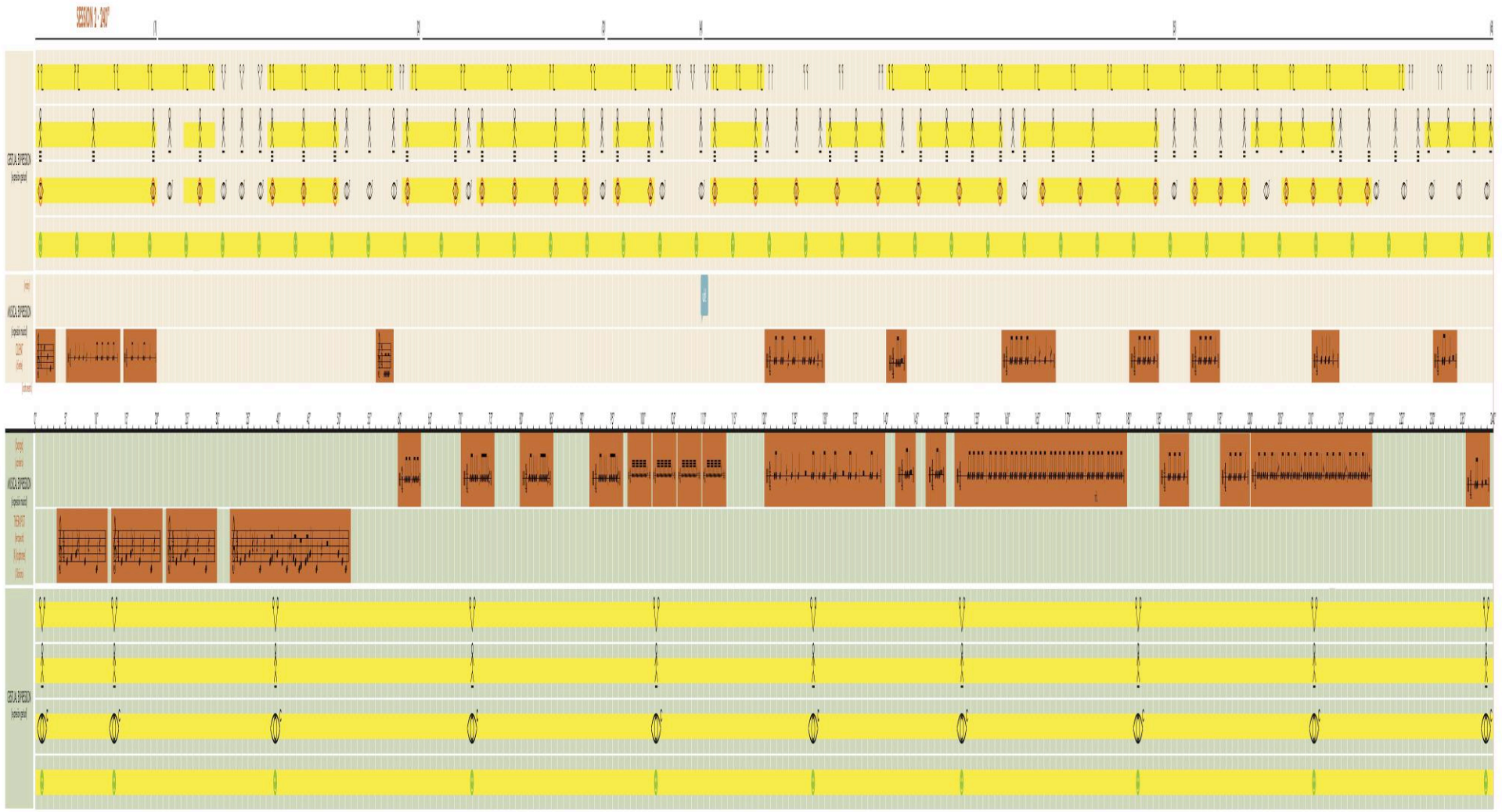


Figure 3: Session 2

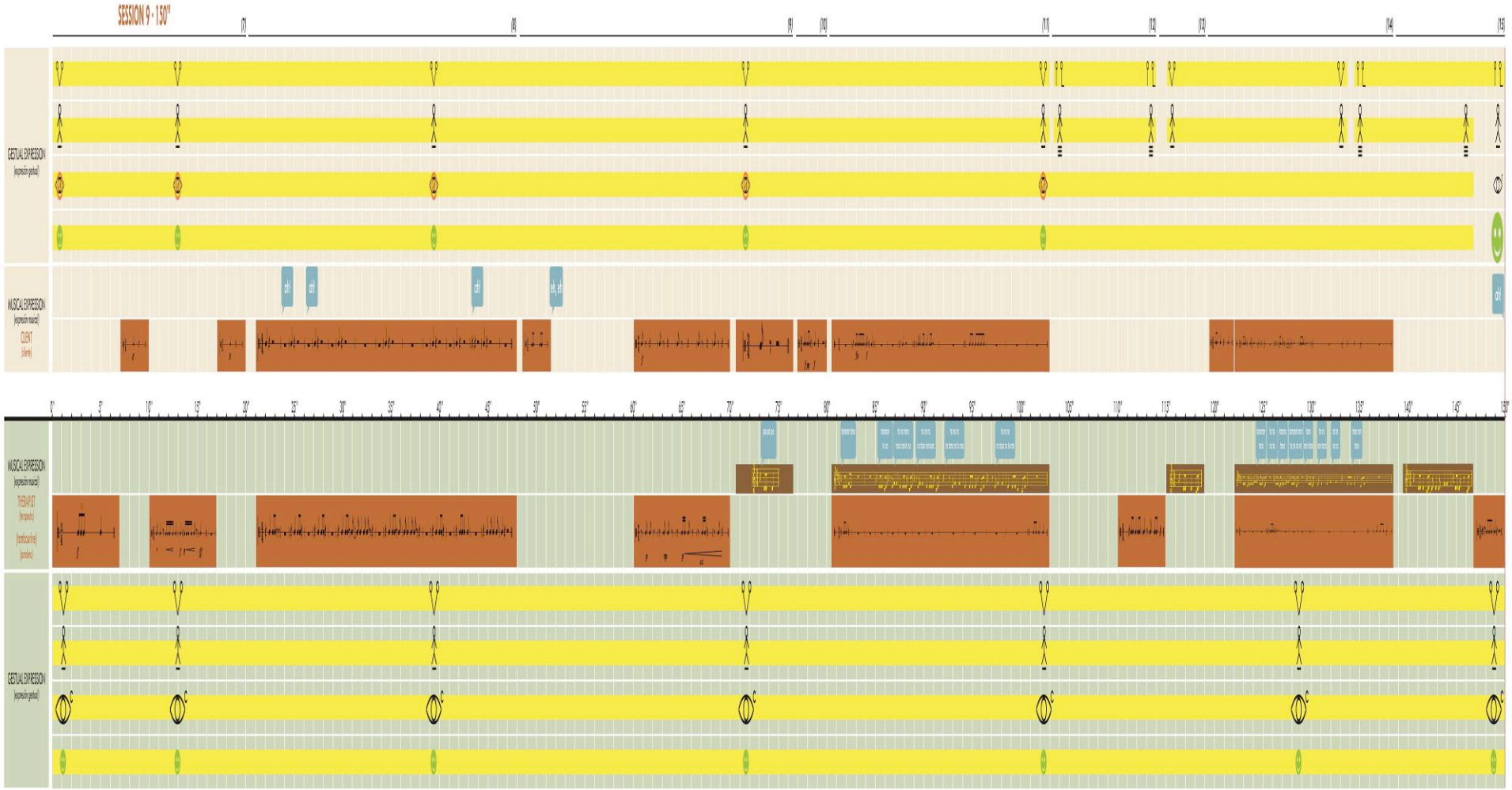


Figure 4: Session 9

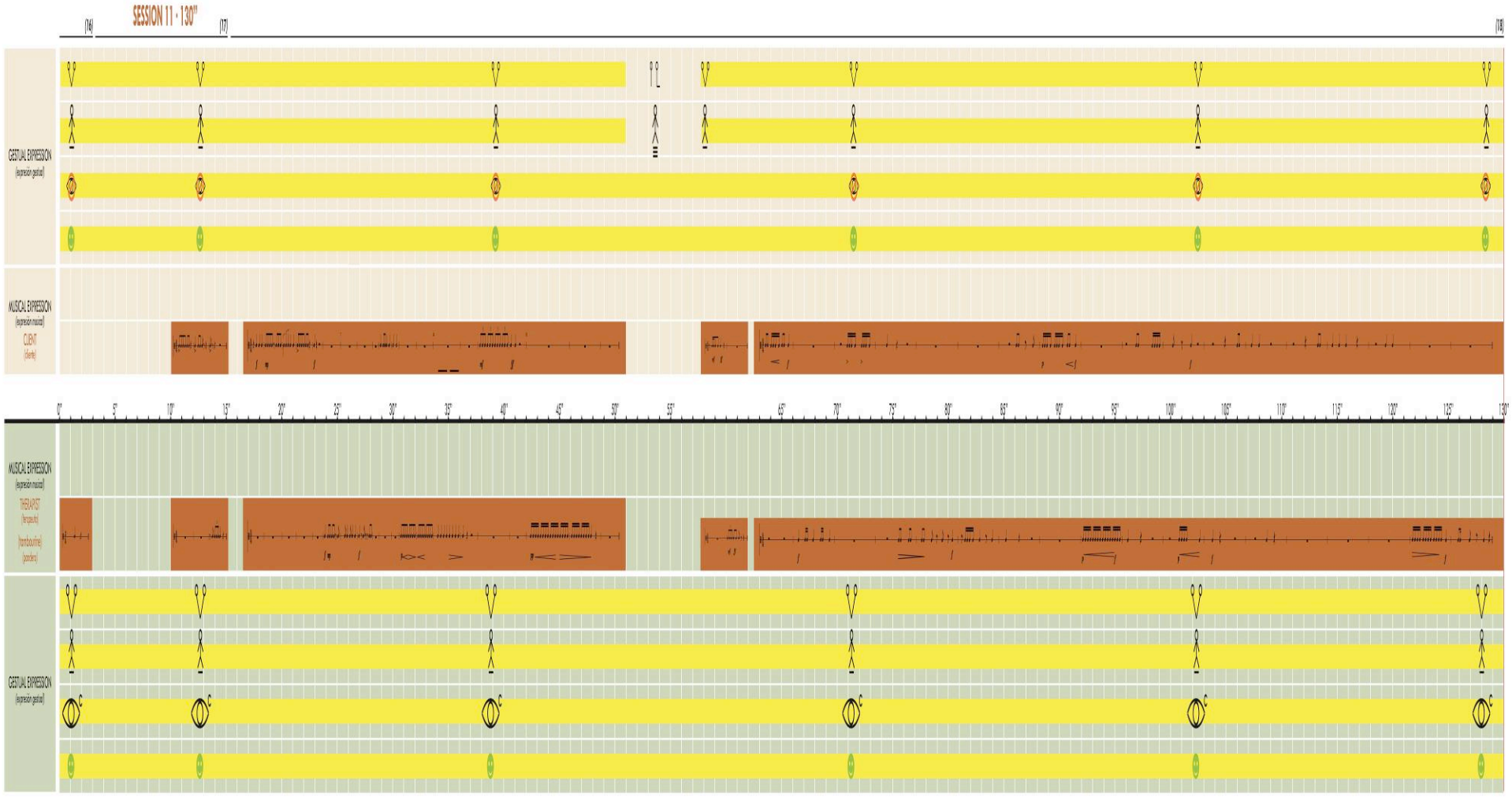


Figure 5: Session 11

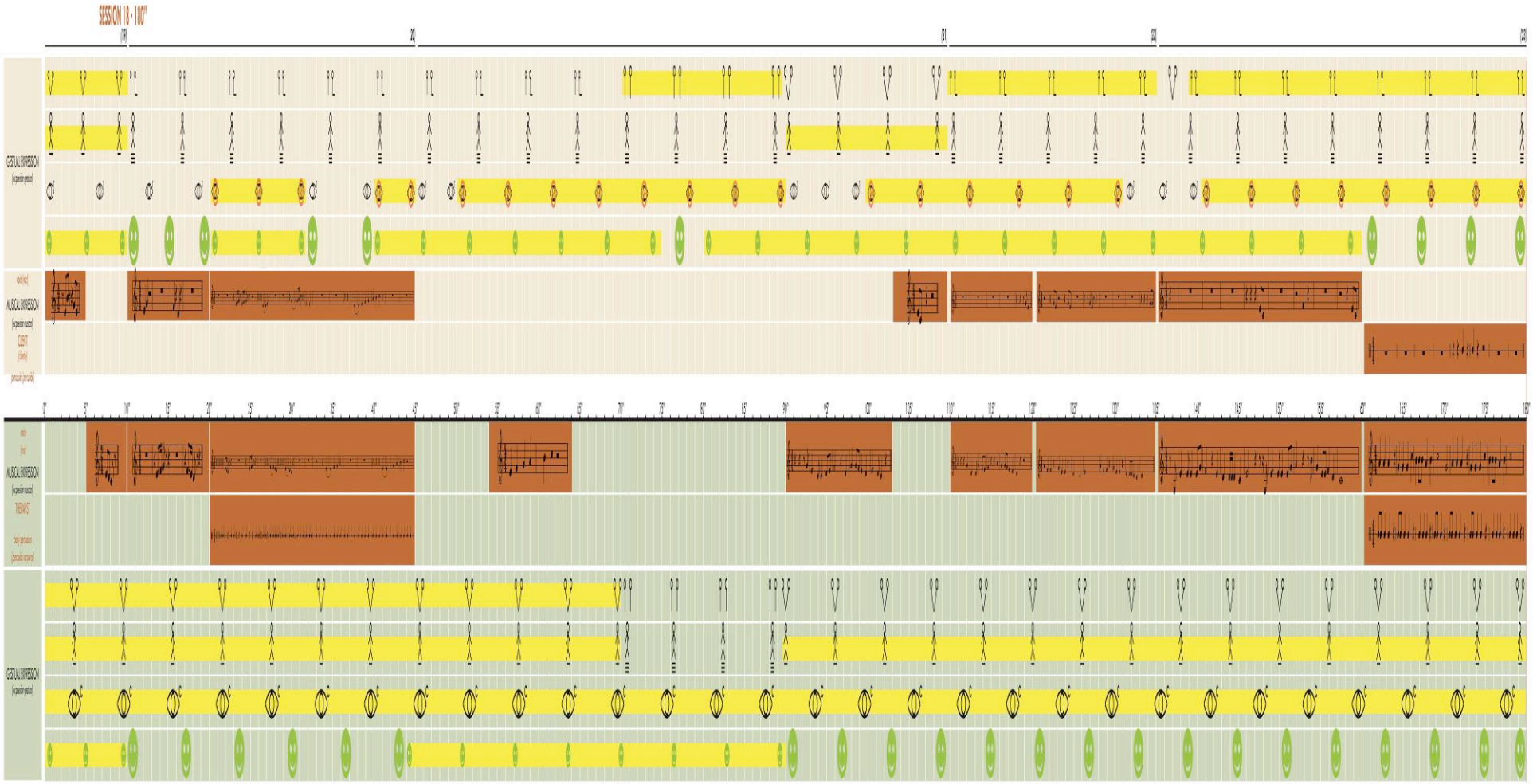


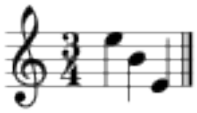
Figure 6: Session 18

3.1.3 Narrative description of the events

The narrative description of each episode/clip analyzed complements the information picked up in the previous formats and is important in order to understand the context in which the situation observed happens and to continue with the subsequent analysis that implies identifying interaction patterns and changes in them.

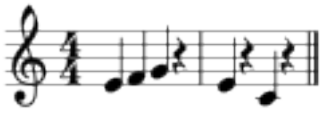
3.1.3.1 Narrative transcription of VIDEO 1 - SESSION 2

Pau and the therapist are on opposite sides of the room. The therapist is situated at the xylophone, waiting. Pau is holding a drumstick in his hand. He approaches the guitar and looks towards it. He strikes the strings, obtaining three sounds that the therapist hears and picks up immediately.



(a)

Pau strikes the guitar exploratorily, both on its strings and on the wood and the therapist supports those sounds, by creating with them a drone that he repeats.

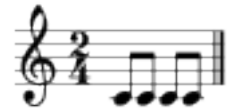


(b)

On seeing that, Pau, turns around and looks at the therapist for an instant. He continues to strike the guitar until it falls. He looks at the fallen instrument and at the wall (1).

As a background, the drone with the melodic formula the therapist has created from Pau's three initial notes continues to sound. He, for the first time, turns around and looks for an instant at the therapist. But he immediately throws in the air the drumstick that he was holding in his hand, following its trajectory with his gaze, looking for where it has landed. He repeats this action, always accompanied by the melodic background that the therapist keeps on repeating. In one of the repetitions, he extends the rhythmic formula.

Pau becomes interested again in what is sounding, so he looks at the therapist again and this time he approaches him. He picks up the drumstick with which he is playing and after a little pause, plays four repeated notes on the xylophone.



(c)

The therapist replies to this proposal on the bongos, by repeating in duplicate the notes proposed by Pau and looking for his eye contact.

(d)

But during the course of his intervention, Pau walks away, throws the drumstick in the air, following its trajectory with his gaze.

The therapist insists and makes a new proposal, a little more elaborate than the previous one, and seeks eye contact (2).

(e)

As soon as the first note sounds, Pau looks at the therapist, they establish eye contact but he immediately continues his game throwing the drumsticks (3).

The sequence repeats itself again: for the second time, the therapist repeats the rhythmic proposal and Pau keeps on throwing drumsticks. But, as he is outside the shot, we cannot see if he has made eye contact.

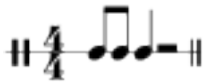
The therapist insists and for the third time he starts his rhythmic proposal and Pau looks for an instant. Then the therapist introduces a modification immediately after the eye contact by means of a tambourine drumroll.

(f)

This musical proposal is made several times. Pau looks at the therapist, approaches him and, for the first time, he emits a vocalization (4).

The therapist repeats the drumroll but this time there is no response and Pau picks up a drumstick from the floor.

Pau, with the drumstick that he has picked up, places himself beside the therapist, starts beating the wall and the radiator in the room. The therapist listens and starts accompanying, looking for a pulse as a background, but without reaching a development. Pau throws the drumstick in the air again. The therapist keeps repeating the rhythmic drone:



(g)

Pau approaches the xylophone. The therapist maintains the common pulse. Pau walks away and approaches the guitar, which he strikes with the drumstick with the same pulse as the therapist's. Pau stops playing, looks towards the therapist and then starts wandering around the room. The therapist continues with the rhythmic background but adapts its tempo to Pau's steps.

Pau arrives at the radiator and strikes it again. The therapist reflects those strokes. Pau, swaying, stops playing and looks at the therapist. There is a pause (5). The sequence is repeated: Pau beats again -the wall, this time-, the therapist reflects it and Pau stops playing and looks at the therapist. On this occasion there is no pause on the therapist's part.

Pau beats on the wall again over the intermittent rhythmic background and leaves and throws the drumstick. The therapist stops and Pau looks at him. He keeps on wandering and jumping. The therapist waits. Pau picks up his drumstick and returns to the therapist's side and the sequence starts again: Pau beats, the therapist reflects (6).

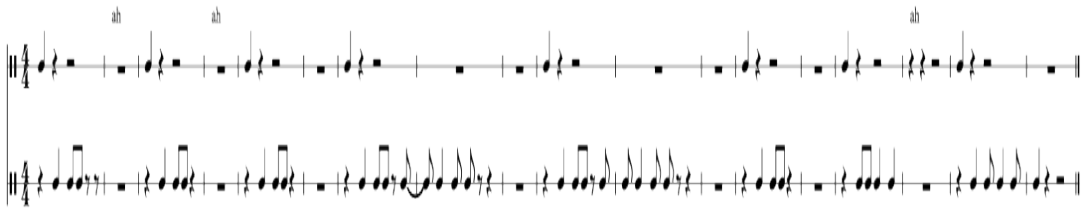
3.1.3.2 Narrative transcription of VIDEO 2 - SESSION 9

Pau and the therapist are face to face. Pau presents a low body tone, with loose arms and bowed head. The therapist is holding a tambourine which he places between them two.

The therapist makes a first rhythmic proposal, with a rapid triplet and a crotchet and makes a pause and makes the gesture of holding an instrument out to Pau. Pau responds with a loud blow on the tambourine.

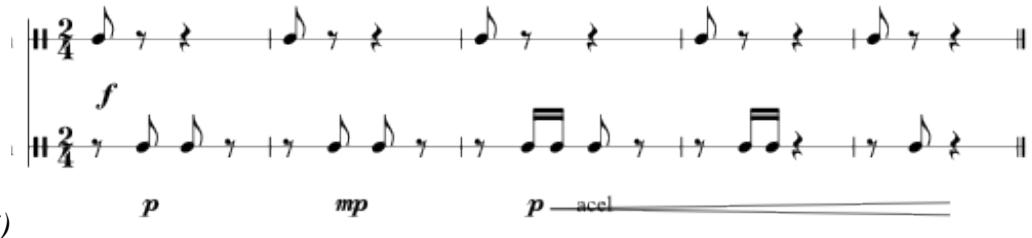
The therapist produces a long rhythmic phrase, rescuing at several points the loud blow proposed by Pau as an accent, followed by very soft notes. Pau interrupts with a new loud blow (7).

The therapist makes a pause, and a turn-taking is established where Pau participates by striking the tambourine loudly and the therapist replies with a short 3-note rhythmic formula, which will be developed, increased, added notes to, rescued again. Always replies with a very marked rhythm and very high intensity. Patient and therapist alternate this pattern on 9 occasions (8).

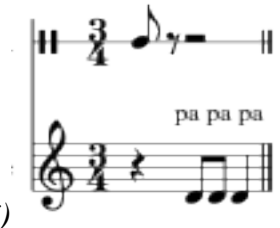


(h)

Pau stops, strikes the back of the chair twice and softly marks twice with his foot (48´´), together with vocal sounds.
The therapist observes and waits. Pau initiates again the turn-taking with his usual loud blow, looking at the instrument. The therapist incorporates Pau's soft sounds as motifs in his new response in the turn-taking. They make 5 exchanges:

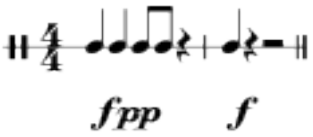


(i)
The therapist introduces a new change in the musical pattern by replying to Pau's blow with percussion and voice (9).



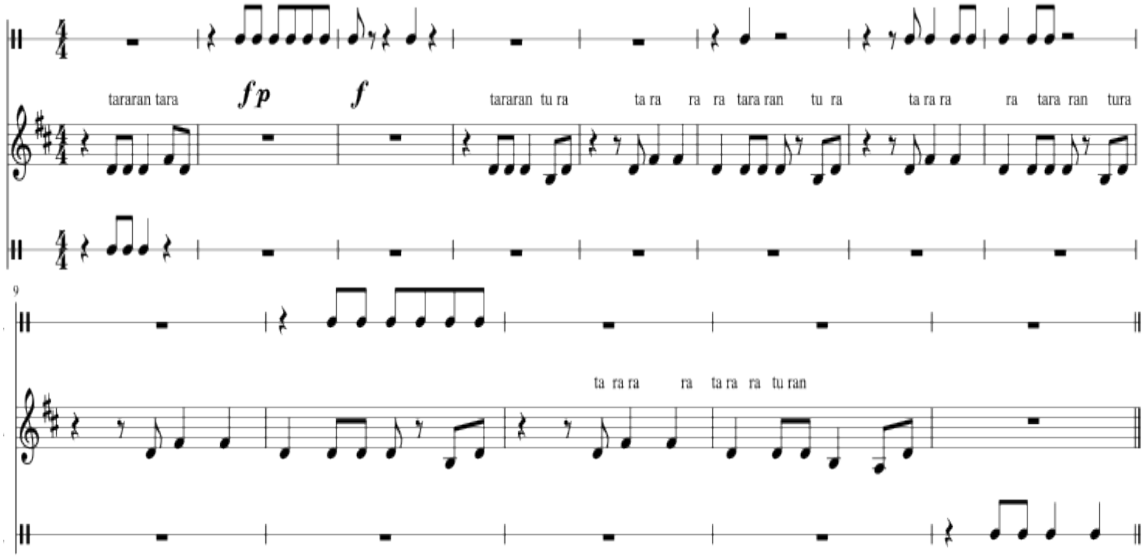
(j)

On this occasion, Pau's response is unifying in an only rhythmic idea, his loud blow and the therapist's 3-note soft reply (instead of his characteristic sharp and loud blow). (10). And the result is the following rhythmic formula:



(k)

And with it, a new phase in the improvisation begins where together they develop that melodic and rhythmic idea, complementing each other, accompanying each other (11).

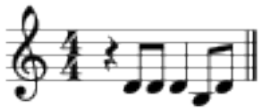


(l)

After this moment of musical interaction and complementation, Pau moves away, the therapist maintains the melodic and rhythmic proposal and waits, repeating it (voice plus percussion, or percussion only)

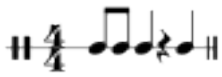
Pau wanders, walks and plays with body movement but without moving far from the therapist, who keeps on repeating the musical proposal (12).

Pau is opposite the therapist again, and the latter proposes, in this case, half the melodic and rhythmic proposal, very clearly, and pauses, inviting Pau to complete the its second part and participate again in the idea which they have developed together (13).



(m)

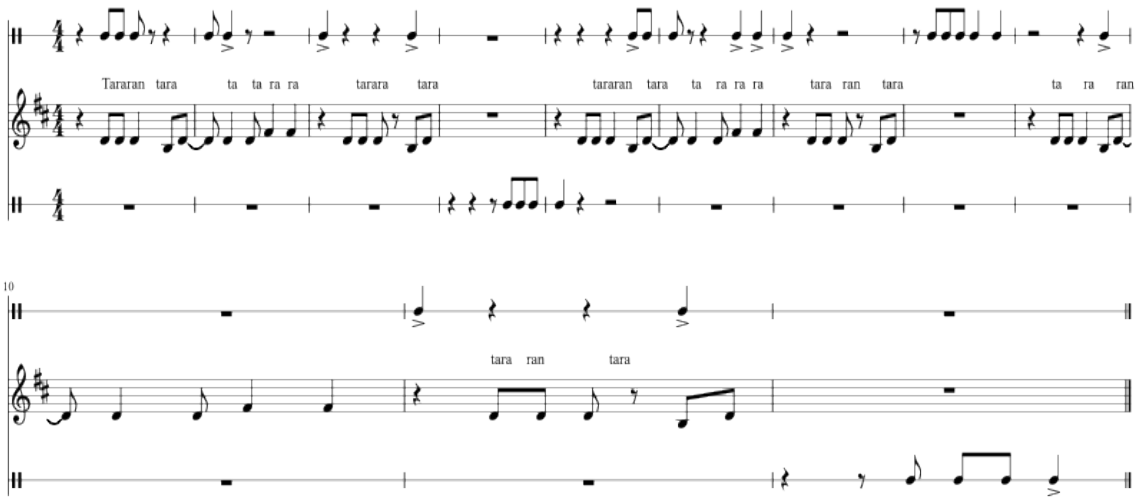
Pau responds with rhythmic formulae corresponding to the rhythmic idea that he is developing:



(n)

And a new joint participation part starts in the improvisation, where both of them complement and accompany each other.

Pau, on several occasions, recovers rhythmic elements proposed previously by the therapist, and they complement each other musically with great precision, completing the bars or bar times, keeping the same pulse, the same game of intensities where both of them mark accents which make up the rhythmic formula, or doing off-beats (14).



(o)

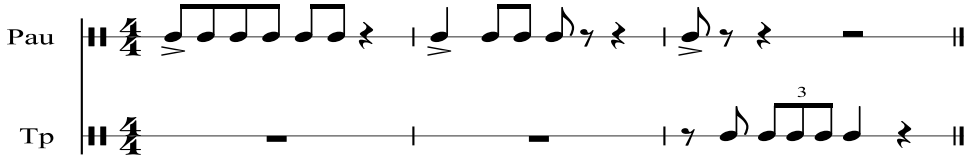
After this, Pau leaves. The therapist maintains the proposal and keeps his position as a reference point, waiting.

But Pau wanders around the therapist, raises his face and looks towards the therapist, gets up on a chair, where for the first time in the whole sequence he stands upright and vocalizes: ah. Accompanied by a facial expression, eye contact and muscular tone unseen until now (15).

3.1.3.3 Narrative transcription of VIDEO 3 - SESSION 11

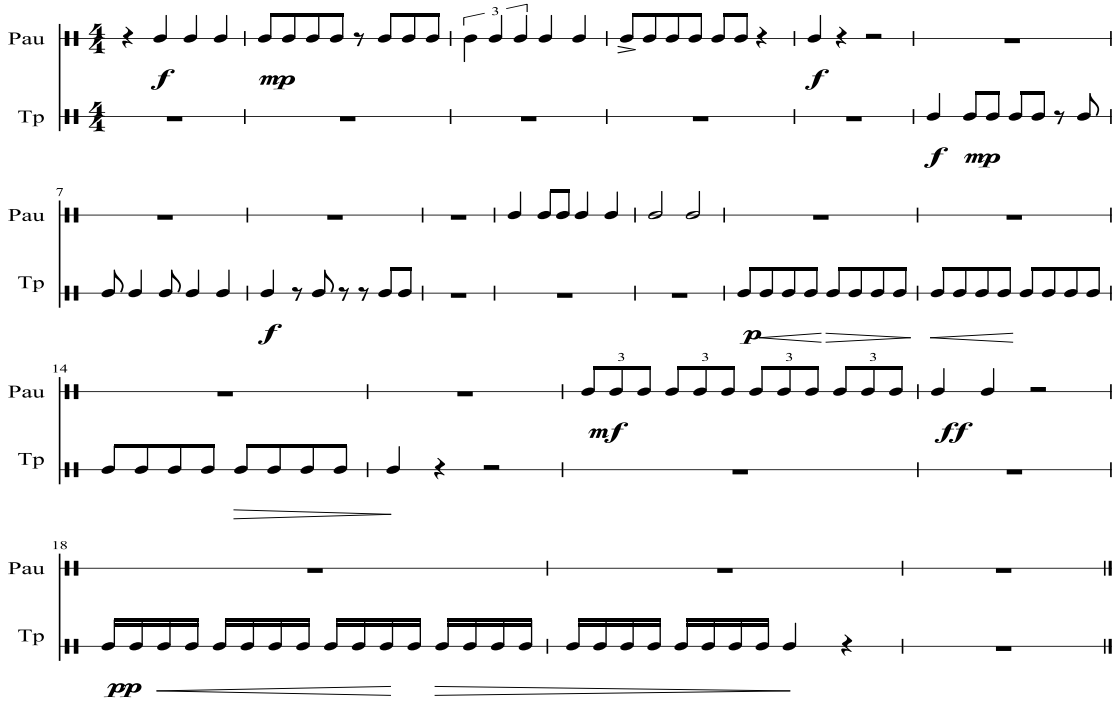
Pau and the therapist are face to face. The therapist is holding a tambourine in his hand, strikes it and holds it out to Pau. The therapist does so with an expecting position, looking at Pau (16).

Pau is opposite the therapist, his arms and head loose, looking at the floor. Pau gets nearer, makes a highly rhythmic proposal playing with the accents and the intensities, with a very fast pulse. At no moment does he raise his head. The therapists immediately replies to Pau, keeping his gaze and his body position (17).



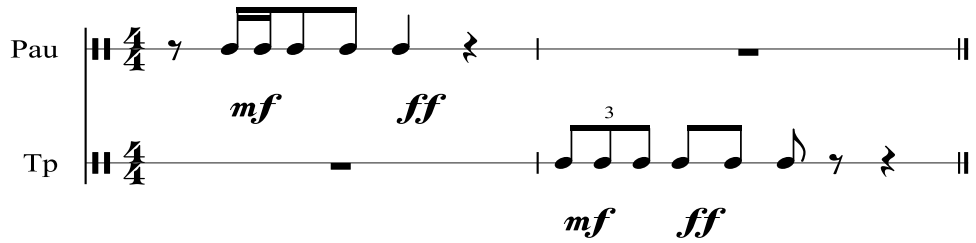
(p)

In this way, a clear and lasting turn-taking episode starts, full of contrasts and reflections, changes in intensity and speed, totally matching the time proposed by the therapist, playing with the tempo and changes in dynamics (crescendo - accelerando e decrescendo - ritardando) and subdivisions. There is bigger excitement, which shows in the body tension that Pau expresses when playing the tambourine and in the accompanying vocalizations (18).



(q)

At this moment, Pau moves back a bit from the interaction spot but returns immediately to play and makes a very short, fast and loud proposal. The therapist replies, reflecting the same intensity and speed.



(r)

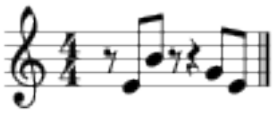
And a turn-taking improvisational phase begins, full of changes in intensities, speeds, accentuations, duration of the rhythmic phrase on both parts. It causes tension and maintained participation.

There are many coincidences and congruencies at a musical level, all the improvisation happens face to face, but there is no eye contact. Pau does look at the instrument on many occasions.

3.1.3.4 Narrative transcription of VIDEO 4 - SESSION 18

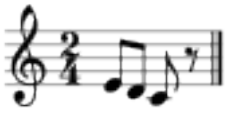
Pau is opposite the therapist, looking at him face to face, smiling.

And he makes a vocal musical proposal, short and with soft intensity, without a specific melody.



(s)

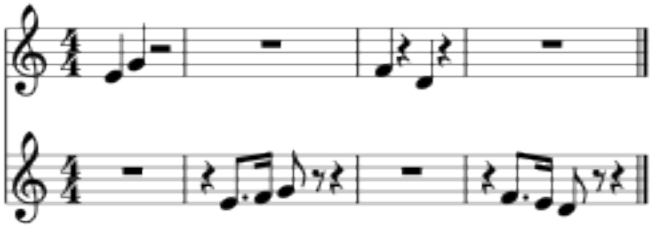
The therapist listens and replies also vocally. And he does so reflecting Pau's intensity and duration, creating a small melodic sequence (19).



(t)

In this way, a turn-taking dialogue starts. Pau responds to the therapist with eye contact and a smiling facial expression.

Pau walks around the room. The therapist remains fixed in a spot in the room. Together they start developing, alternatively, the melodic exchange just started, interspersed with smiles and eye contact.

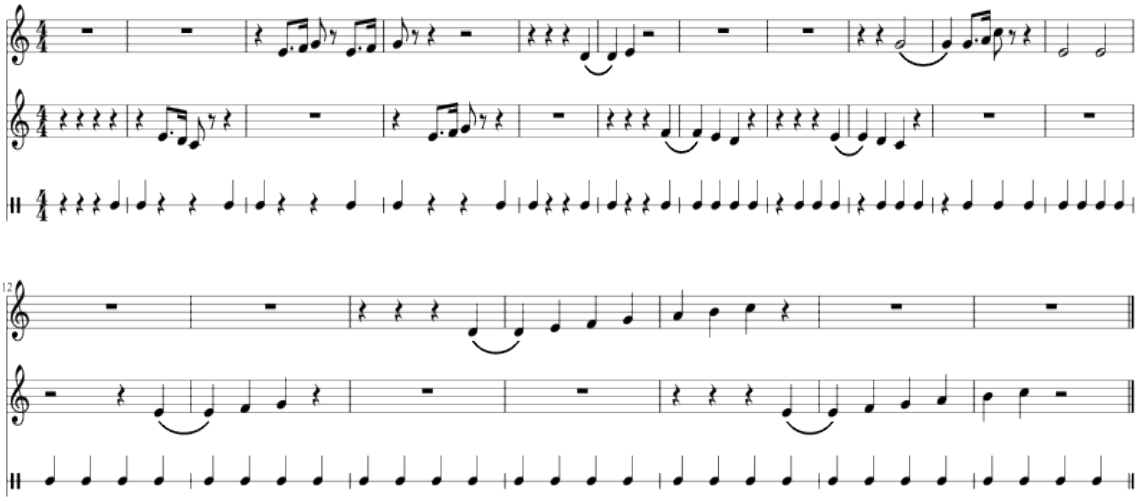


(u)

At this time the therapist introduces body percussion by means of his hands on his legs, which accompanies and supports the melodic exchange, beating his hands on his knees. And with this background, the vocal exchange between Pau and the therapist continues.

It is worth noting the coincidence as regards the warmth of the vocalizations, the soft intensity and the duration of the melodic phrases, which increase gradually.

Even though Pau keeps on wandering around, frequently there is eye contact and smiling facial expressions towards the therapist (20).



(v)

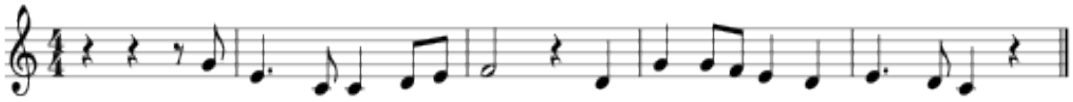
The exchange finishes and Pau keeps walking about.

The therapist repeats the last melodic phrase but Pau does not respond.

At a point in the exchange (1´15´´) Pau picks up a bottle full of stones doubling as a maraca. He moves it while he walks. The therapist starts walking by his side. On

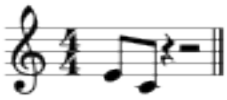
arriving at the end of the room he throws it to the floor. The therapist picks it up. Meanwhile, the smiling expressions continue (in this case, not the look).

Taking as references the tempo, the intensity and the range of the vocal exchanges, the therapist initiates an improvised song, proposing the following melodic phrase. At that very moment, Pau places himself opposite the therapist and looks at him (21):



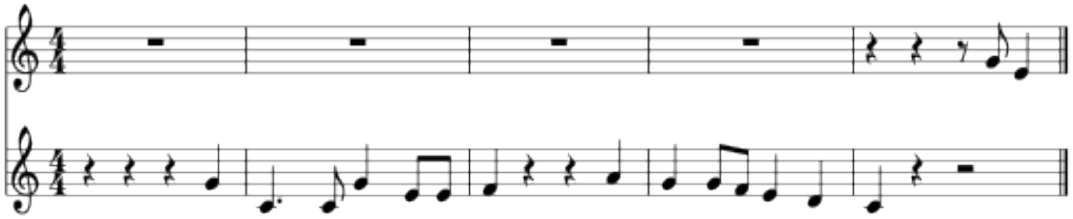
(w)

And Pau replies:



(x)

The therapist continues and proposes one more phrase, and Pau completes:

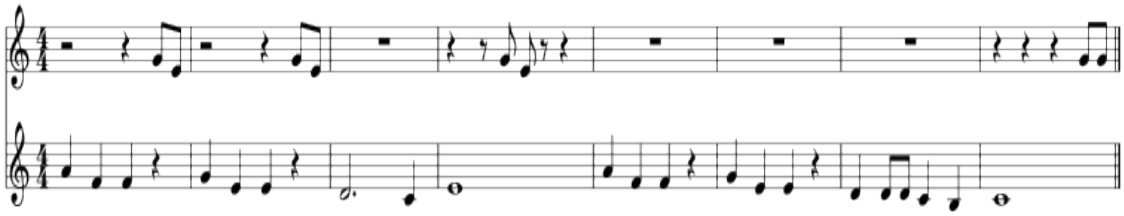


(y)

These phrases make up a triplet.

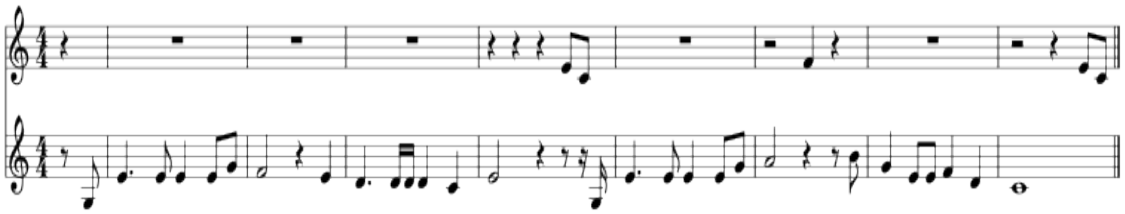
The proposal continues with one part, verse style, and Pau replies again, perfectly completing the therapist's musical proposal, vocalizing at the final space of the bar or of the musical phrase (22).

In this last exchange Pau makes eye contact, which for the first time is sustained for several seconds. And Pau completes again the melodic phrase:



(z)

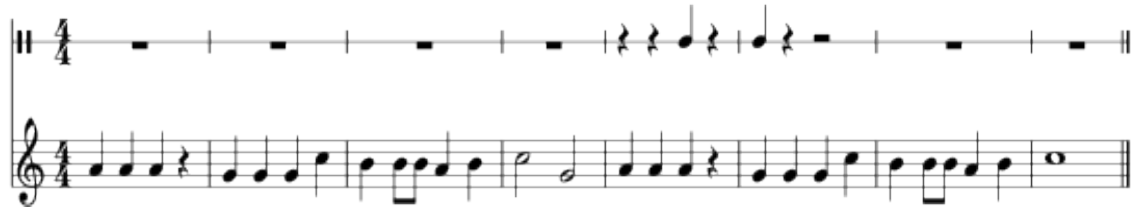
The song chorus starts again with several melodic variations. Again Pau looks at the therapist, and again at the exact tempo and place, vocally he completes perfectly the therapist's musical proposal on several consecutive occasions.



(aa)

The verse is retaken with a small change in the rhythmic accompaniment, whose notes are subdivided, contributing energy and intensity to the musical phrase. Pau smiles as a reaction to this change.

On this occasion, his response changes and he does not do it vocally but he strikes the wall, on the first and second bar of the last phrase (23):



(ab)

During the whole improvisation we can observe a relaxed and smiling facial expression in both participants.

3.2 Patterns observed and their interpretation

For the description of this analysis phase tables has been used where we pick up on the left side the chains of interaction that contain the pattern expectation and on the right side the real interaction pattern is picked up, which is observed and interpreted after this retrospective and detailed analysis. Also, the Therapist's (T) relevant conduct is highlighted in green; Pau's relevant conduct, in yellow, and in blue, the changes that point towards a new possibility.

3.2.1 Interaction patterns Video 1 (2nd session)

Pattern expectation	**Interaction pattern**
(1) Pau plays three sounds. The therapist creates a drone (b) from Pau's three initial notes. For the first time, Pau turns around and looks at the	

therapist for an instant. (2) Pau picks up the drumstick, and after a little pause, he plays on the xylophone four repeated notes. The T. replies to this proposal on the bongos, repeating in duplicate the notes proposed by Pau and looking for his eye contact. (3) The T. insists and makes a new proposal, a little more elaborate than the previous one and looks for eye contact. Pau looks at the therapist, they make eye contact but immediately Pau continues with his drumstick-throwing game. (4) Several times is this musical proposal made, although initially Pau's face is not seen. Next he can be seen to keep on looking at the therapist and, what is more, approaches him and emits a vocalization for the first time. **This is repeated several times:** **Pau plays - the T. replies - look, T. reflects, repeats o develops. Pau shows motor stereotypies.**	(5) Pau arrives at the radiator and he strikes it again. The T. reflects those strokes. Pau, swaying, stops playing and looks at the T. There is a pause. Pau beats again, the wall this time, the therapist reflects it and Pau stops playing and looks at the therapist. The T. **waits**. Pau picks up his drumstick and returns to the therapist's side. Pau strikes, the T. reflects. **Pau plays-T. picks up – look – pause - Pau plays**

Table 3.d: Interaction patterns Video 1

3.2.1.1 Interpretation

In this first video (session 2) we can observe that there is no turn-taking, but the frequent presence of dynamics of reflection and containment through the background, which seems to correspond to the initial objective of the therapist and of this first phase of the treatment: listening to the child empathetically, that is to say, accepting his proposals, reflecting them and containing them. It is noteworthy, then, the fact that Pau,

on several occasions, glimpses fleetingly at the therapist at moments when the latter has picked up his proposal, suggesting that Pau recognizes or at least is interested in some part of what he has heard, even though he quickly returns to his stereotyped or self-stimulating movements.

The presence of brief glimpses and of an only vocalization by Pau seems to indicate the start of an attention and interest towards his own exterior.
In this way, it seems that the first attempt at a pattern of interaction has been established, which could be summarized as:

Pau plays – the T reflects, repeats and/or develops – Pau moves away or shows stereotypies.

It seems that the therapist (T) has tried, consciously or not, to continue a predictable pattern the way that Pau initiates and the T. picks up and reflects Pau's musical production. The therapist repeats and/or develops this production apparently trying to catch Pau's attention, show empathy and for it all to make their musical interaction easier.

But in this first fragment of the video not all the sequences trying to generate interaction between Pau and the therapist belong to the previous pattern. After deeper observation, at the end this video fragment happens what follows:

Pau plays – The T. reflects – Pau looks at him – the T. pauses and waits and, then, Pau plays.

The T. seems to perceive this sequence by giving value and presence to the pause and including waiting time, this fact being the precedent that causes Pau to act not only musically but also with gestures (look) and his movement (stopping), reducing his stereotypies. This could be the real interaction pattern facilitating the advance to turn-taking.

3.2.2 Interaction patterns Video 2 (9th session)

Pattern expectation	Interaction pattern
(7) The T. plays a first rhythmic proposal, with a fast triplet and a crochet, and takes a pause and holds out the instrument to Pau. Pau responds with a loud blow on the tambourine. The T. plays a long rhythmic phrase, rescuing in it several times the loud blow proposed by Pau as an accent, followed by very soft notes. Pau interrupts with another loud blow.	(8) The T. pauses, Pau strikes a loud blow; The T. responds with a short 3-note rhythmic formula. They start the turn-taking, developing, increasing, adding notes, rescuing again. Patient and therapist alternate this pattern on 9 occasions (h). (9) Pau stops, lightly strikes twice on the back of the chair and softly marks twice with his foot and vocal sounds. The therapist observes and waits. Pau plays his typical loud blow, looking at the instrument. The T. incorporates Pau's soft sounds and the voice. (10) Pau plays his loud blow and incorporates the three soft notes. (11) A new phase starts in the improvisation, where together they develop that melodic and rhythmic idea, complementing and accompanying each other (l).
(12) Pau moves away, the T. maintains the melodic and rhythmic proposal and waits, repeating it (voice plus percussion or only percussion). Pau wanders around, walks and plays with body movement but without getting far from the T. The T. keeps on repeating the musical proposal.	(13) Pau stops, the T. proposes, in this case, half the melodic and rhythmic proposal (m), very clearly, and pauses, inviting Pau with his gesture to complete its second part and so to participate again in the joint idea that they have developed. (14) Pau rescues rhythmic elements previously proposed by the T., complementing each other very accurately (o).

Table 3.e: Interaction patterns Video 2

3.2.2.1 Interpretation

In the second video (session 9) we can observe, from the beginning, the presence of the pause, which appears after the first proposal by the therapist, who holds the tambourine out to Pau, inviting him to participate, reply and share the instrument. The therapist keeps on replying to Pau with a long musical phrase in which he picks up and develops Pau's proposal, with practically no space or pause. But, on this occasion, Pau, instead of moving away or starting the stereotypy interrupts the therapist with a strike on the tambourine, just as before. This reaction by Pau is very significant, so qualitatively different from the one observed in the previous fragment, where we could observe a reiterated stereotyped conduct as an answer to this situation. It could be interpreted as an attention call reaction, to make himself heard. It is then when the therapist seems to understand that the interaction mode is:

Pau starts - T. Replies - pauses **– alternation playing (turn)**

Following this dynamics where the need for a pause –the space for the other to appear- seems clear, there also appears a variation, which is that the therapist responds incorporating Pau's sounds or strikes in his proposal. It could be said that the therapist no longer expects the child to be the one to respond imitating but it is the therapist who picks up and develops the child's proposal by giving it significance. When, in one of the intervention turns, the therapist introduces voice (introduces variations), there is a new reaction by Pau since, on this occasion, also he integrates in his answer his loud blow and the sounds picked up by the therapist in the new proposal. This reply is significant in that Pau makes a longer musical proposal where he integrates his sound and that proposed by the therapist. This action is followed by a join improvisation full of complementation and integration on both parts, with presence of tension and excitement, sharing an energetic tone.

Again the therapist seems to understand the most predictable pattern and when Pau moves away, he continues to use the melodic idea as a background, ignoring the pause and the waiting time. To this, Pau reacts with repetitive sways and with displacement.
In spite of this episode, again the therapist retakes the pause, beats on the tambourine half the proposal previously known and developed jointly, and makes the gesture of

offering the instrument. This lets Pau, on the one hand, recognize the rhythmic formula (that's to say, the repetition and the structure) and, on the other hand, it awakes his interest and attention again, making it easier or him to introduce new elements.

This session seems to show the consolidation of the pause as an element conducing to a shared game, and the reinforcement provided by the support of the inviting gesture, and repetition as a containing and structural element.

Moreover, we can see how offering little variations such as introducing one's voice or offering just half the rhythmic cell, facilitates the development of a true dialogue where there is complementation, intensity, accents, etc. This moment seems to give satisfaction, presence and energy to Pau, who appears upright, tall, maybe acknowledged when he vocalizes "ah".

3.2.3 Interaction patterns Video 3 (11th session)

Pattern expectation	Interaction pattern
	(17) Pau is opposite the therapist, his arms and head loose, looking at the floor. Pau approaches, makes a highly rhythmic musical proposal playing richly with accents and intensities, with a very fast pulse. He keeps his head down. The T. responds maintaining his gaze and his body position. (18) Turn-taking is initiated. It is accompanied by vocalizations. There is bigger excitement on Pau's part. (q) Pau looks at the instrument on multiple occasions.

Table 3.f: Interaction patterns Video 3

3.2.3.1 Interpretation

In the third video (session 11), the pattern seems clear; it starts from the pause and continues with Pau's proposal and the therapist's reply. It looks like this interaction pattern is already clear and significant for them both because it clearly enables the development of a musically very rich turn-taking (playing with contrasts, also with

reflection, accents, with changes in notes, in intensities…) but also relations-wise, since we can observe listening and common focus in the complementation and the shared musical elements.

It is worth remarking the great development and permanence and connection time in this fragment.

In this sense, we can emphasize the fact that Pau and the therapist are sharing this experience with a common excitement and level of energy, a musical and bodily tension which gives a hint at the great involvement in what is happening. There is also a bigger presence of vocalizations.

Although there is not a clear look towards the therapist, from all the previously expounded we can perceive a joint affective nearness, which also occurs through a shared instrument.

3.2.4 Interaction patterns Video 4 (18th session)

Pattern expectation	Interaction pattern
	(19) Pau initiates a vocal musical proposal, short and soft in intensity. The T. listens and responds, also vocally. And does so by reflecting the same intensity and duration, creating a short melodic sequence. **Dialogue in turn-taking** (20) Pau responds to the T. with eye contact and a smile. The T. introduces a small variation in the rhythmic accompaniment, whose notes subdivide, contributing energy and intensity to the musical phrase. The vocal exchange continues (v). (21) Pau stops responding. The T initiates an improvised song, based on the tempo, the intensity and the range of the previous vocal exchanges. (22) Pau responds by perfectly completing the T.'s musical proposal long the whole improvisation (y) and (z). Eye contact is established repeatedly and smiling

	expressions are constant. (23) The T. makes a small change in the rhythmic accompaniment. Pau smiles as a response to this change and responds, instead of vocally, by beating on the wall.

Table 3.g: Interaction patterns Video 4

3.2.4.1 Interpretation

In the fourth and last video (session 18) we can observe that the relations mode created from the turn-taking pattern is already clearly shared.

Pau starts - T. Replies - pauses - alternation playing –complementing in the rhythmic, melodic and vocalic proposals (dialogue).

Very significant in this session is the affect attunement that can be observed in the interaction between Pau and the therapist. It can be perceived in the warmth of their vocalizations, in the absolute synchrony as regards intensity and tempo, and how their vocal productions match perfectly the time and the musical form that it takes.

In addition, eye contact and smiles increase. We may infer that both participants look for the reflection of what they are sharing in the look and facial expression of the other. This fact seals significantly the interaction between them.

Again, they are sharing the energy level, which in this case is reflected, on the one hand, in a relaxed, casual, open body position, a facial expression both happy and tender at once, and on the other side, a rise in both in the level of excitement towards the end of the fragment.

Chapter 4. RESULTS AND DISCUSSION

In this chapter there are presented the results of this study, whose data has been extracted from the detailed observation of several events selected from the music therapy process from a horizontal analysis (facts occurred along time) and vertical (occurred simultaneously but intermodally) together with their discussion, interpreting the observed reality and its meaning from my previous conceptions and the revision of related literature.

4.1 Musical and expressive behaviour of the client (Horizontal analysis)

I will start by describing the results of the analysis of Pau's conducts, from the registered data about the child's musical and non-musical behaviour, focussing, with this aim, on Table 3.a, Table 3.b, and Table 3.c (pp.37, and 38).

4.1.1 Results and analysis of the child's musical response (Table 3.a)

In this area, we can observe that there has been a progression in Pau's musical response since the first selected video-clip, where there was no imitation, although he did show a slight response to musical activity. Nevertheless, we did observe initiative, through proposals with different sounds which were picked up by the therapist. Progressively, in video-clips 2, 3 and 4, an increase could be observed in the responses to the therapist, as well as in initiative, but not in imitation.

Imitative conduct has been defined as musical executions by the client that is equal or very similar to the musical productions by the therapist (p. 4). It can be observed in video-clip 2 (session 9) when, in response to the introduction of the therapist's voice, Pau imitates the therapist, so his musical intervention is not a blow as in previous interventions but a brief response where he integrates his reply and the therapist's (10) (k). Subsequently, in the same session, Pau imitates again, integrating other rhythmic formulae (o) in his musical production. In this same line, in session 18, Pau imitated the therapist's melodic sequence –of 3 notes in an ascending scale- and expanded it (v). On

seeing these results, we can say that Pau has shown a slight response in imitation, alternated with replies and initiative, which can be considered positively if we take into account the difficulty of this aspect in persons with ASD and also in Pau. The presence of this conduct can be an indicator of intersubjective development or a social value for interaction.

These results are consistent with what Holck (2002, 2004b) and Kim (2006) expounded, where the latter emphasizes the importance of including elements from both the therapist and the client to build the history of their joint interaction, remarking that mutual interaction, in turns, implies alternating between the roles of initiating and **imitating**. It is well certain that clinical experience also shows the other extreme, where children with ASD imitate what the others do literally, looking for a secure and predictable setting.

Similarly, there has been an increase in the ability to **respond** to the therapist's proposal. As previously defined (p. 5), this item refers to the client's actions in response to proposals to initiate an interaction on the therapist's part (Kim, 2006), by using, for this purpose, instrumental or vocal musical productions. The ability to reply to a proposal can be seen tenuously in video-clip 1 (session 2) and more clearly in video-clip 2 (session 9), where Pau replies to musical proposals integrating elements by the therapist (transcriptions 12, 14, 15).

Kim *et al.* (2009) have concluded that musical improvisation promotes interpersonal response, besides initiative and emotional expression.

From my viewpoint, the attitude and therapeutic technique of picking up and reflecting to promote a response in the child, be it reply or imitation - or even of generating an initiative as also Kim *et al*. (2008) suggest – have influenced this progressive change in the child's behaviour. Also Holck, Oldfield and Plahl (2005) point out that it is usually the therapist who first imitates some of the child's musical parameters in order to show empathy and as a starting point in the interaction.

Equally relevant and significant has been the progressive growth of the attitude of **initiating**. Initiating refers to the client's actions to start an interaction, using, for this

aim, a vocal or instrumental musical production (p. 5). This attitude about initiating is observed from the first session, and it is increased to a high level in the rest of sessions (++ or +++ in Table 3.a). I share with Holck (2004b) the premise that it is fundamental to **awaken the desire to share** in children with ASD whose difficulty to take this initiative and show a communicative impulse is very big, on the understanding that intentional communication is that where the sender looks for the effect that their expression has on the other (Stern, 1997). Nagy and Molnar (2004) expound that the instinct of initiating an action is present in the baby from birth, as an essential element of subjectivity, motivational processes and biological maturation processes.

My interpretation, in this case, consists in taking into account the importance and therapeutic relevance of the music therapist rescuing every initiative by the child, by including it in bigger rhythmic or melodic cells, developing it or expanding the proposal. In this very sense, Kim *et al.* (2008) have described that the fact that the ASD-afflicted child can recognize their own sound material in the therapist's production may encourage them to reply, participate and even initiate. I concur with Bunt (1994) when he compares this space used by the therapist with that of a mother and her child, when I return sounds to Pau, by imitating and creating new sounds in order to promote communication.

Later on I will revisit the fact that, after the analysis of developed joint interaction, what is remarkable is not only picking up the child's sounds, expanding them and/or developing them, but also the pause introduced by the therapist, to give space, waiting time, to make it easier for Pau to retake the initiative (transcriptions 10, 16, 17). This reflection makes full sense when the therapist becomes aware of two fundamental premises in music therapy and communicative interaction, which are: a) trying to pick up and render every initiative by the player meaningful and b) offering spaces, silences and/or waiting times for the clients to express themselves. This not only favours interaction, but also is the beginning of the development of turn-taking.

4.1.2 Results and analysis of the child's expressive reactions (Table 3.b)

Regarding progress in the child's non-musical behaviour, their expressive reactions, an evolution can be seen from the first video-clip, where there barely is presence of eye

contact and gestural changes, and only one vocalization, to the following clips, where there is an increase in facial response, smiling and eye contact. There is also a progressive increase in vocalizations as precise and meticulous as the ones in the last clip (session 18). A transition is also visible since the first clip from an abundance of self-stimulating motor conducts to a reduction in such motor conducts or their intentionality, whether towards the therapist or the instrument.

The observation of these aspects which complement the musical response relates, according to authors like Kim (2006), Holck (2007), Wimpory *et al.* (2007), Kim *et al.* (2008, 2009) and Jacobsen (2012) to the presence o absence of joint attention. The presence of joint attention can be inferred when there is: a musical response by the child, together with some element in the child's expressive response through visual contact, whether towards the therapist or the instrument; smiling during the musical interaction with the therapist and/or changes in the child's body agitation, such as stopping.

Regarding **motor responses**, an evolution can be seen from repetitive and stereotyped manifestations, typical of Pau and of ASD, to a decrease in them, even an intention or direction in them. In the first clip, Pau spends practically all the time wandering around the room, absorbed in his repetitive behaviour, throwing objects, maintaining such manifestations even when the therapist contributes a musical background, with the object of containment. Progressively, we can observe a decrease in these stereotypies and changes in his motor conduct, along the evolution of the session observed, with the disappearance of object-throwing, modifying his muscle tone, becoming more present, stopping before the therapist or heading in specific directions and showing purpose.

The fact that it all is either reduced in such a significant way or redirected with intentionality (as is the case of displacement, which changes from incessant and random in session 2 to directed towards the instrument or the therapist in the remaining sessions), correlates with the changes in other facets described later and matches what some authors point out about the usefulness of musical improvisation in music therapy to help reducing anxiety, augmenting receptivity in persons with ASD (Trevarthen, 2002) and reducing stereopypies (Müller and Warwick, 1993).

So, there are also changes in **facial expression, smiling**, with a significant increase also in sounds and **vocalizations,** which can be interpreted as a sign of pleasure, satisfaction and affective contact, as I will expound later. Furthermore, this increase in vocalizations proved to be significant, since, as stated in chapter 1, Pau hadn't developed verbal language. These vocalizations can be considered communicative.

Similarly, the facial expressions observed are also considered by Stern (1991) as proof of the existence of *affect attunement* or, as Threvarthen (2002) puts it, of the presence of *intersubjectivity,* understood as the psychological ability to have and share actions, interests or emotions with another person.

In the same line, changes were observed in **eye contact**, which increased, both when directed towards the therapist and towards the instrument. This change ranges from brief glimpses to the therapist (in session 2) as a sign of Pau recognizing part of his music in the therapist's or showing interest in the novelty introduced, evolving to great interest in the musical object channelling the interaction, to exchanging and holding looks, accompanied by smiling, relaxed attitude and warm-timbred vocalizations (session 18). According to Stern (1991), the baby uses looks to regulate the level of desired stimulation, which is used to show interest in the proposed focus of attention, and from this eye contact, communicative intention may be inferred.

Holck (2004a) describes that looks and gestures are proof of commitment in interaction on the child's part, apart from being necessary and fundamental to guarantee it. According to Kim (2006), they are instrumental too in the development and maintenance of joint attention, having found evidences of increases in eye contact in interaction during intervention with music therapy.

As described in chapter 2, the persons with ASD can have serious difficulties in the described conducts. The advances in some and the reduction in others make it possible to define an improvement and, with it, a development in Pau without it being concluding or extrapolatable to other types of circumstances, outside the therapeutic relation analyzed.

The evolution of these conducts is related to the development of a joint attention, of the evolution of primary and secondary intersubjectivity and of emotional attunement in the child, which will have their clearest expression in turn-taking.

4.1.3 Results and analysis of the musical elements (Table 3.c)

The results reflected in Table 3.c show a progressive coincidence in **tempo and intensity** (especially in sessions 11 and 18). There was also an evolution in **rhythmic and melodic motifs**, from a very scarce presence of some common motif (session 2) to a higher level of coincidence, in sessions 8 and 11, where both Pau and the therapist find themselves integrating each other's motifs, with changes in intensity, speed and accents, that is to say, creating together. Several authors, amongst them, Stern (1997), view intensity, tempo and form as behavioural characteristics which could form the basis of affect attunement (Dimitriadis and Smeijsters, 2011). Also Kim *et al.* (2008) underline the importance of observing if there is coincidence in pulse, rhythmic patterns, dynamic forms of expression or melodic variations, since they can they can constitute a common musical basis between child and therapist. Malloch (1999) also writes about sound changes and exchanges, adjusting parameters such as pulse, rhythm, intonation and/or volume as indicative of pre-verbal intervention between mother and child.

The observation of such musical parameters, in relation with non-musical expressive conducts such as smiling, eye contact or vocalizations, lets us infer affect attunement and with it, the intersubjectivity of relations, and confirm the existence of exchanges with the music therapist from the communicative-relational standpoint, as also Raglio *et al.* (2011) point out in their study.

This affect attunement appears in the alternation in the instrument-playing game, that is to say, in **turn-taking**. This alternation can be observed in the transcriptions of sessions 8, 11 and 18, together with an increment in the child's expressive conducts (eye contact, smiles and vocalizations), as well as a coincidence in tempo and intensity. Also Kim (2006) describes that during turn-taking, between therapist and patient there is spontaneous eye contact, facial expressions of smiling and guffawing, spontaneous uses of vocalizations with excitement or changes in intonation, etc.

As pointed out by Wigram and Elefant (2009), the musical elements which appear in turn-taking dialogues, such as harmony, rhythm, melody or dynamics, produce structured patterns of shared activity, favouring the appearance mutual communicative experiences, fundamental elements in the child developmental process.

4.2 Musical and expressive behaviour in the therapist

In order to render these behaviours significant, we must take into account the interaction between both participants in the dyad, together with the rhythmic and melodic motifs that appear and, above all, the interpretation that the two of them give to this series of facts, simultaneous, giving them a meaning shared by both participants adapting to these small signs. If the therapist is watchful for receiving, signifying and promoting these conducts, as mothers have been described to do with their children, it will set the basis to promote a chance of developing interaction. As stated by Holck *et al.* (2005), success in the progress of music therapy in children with ASD depends on the child's abilities, but also on the music therapist's abilities to bring out the communicative potential in these children. With such objective, the therapist has used both his musical expressivity and his bodily and gestural adjustment to the process being developed jointly with Pau.

Thus, he offers and adapts his look. It is observable that the therapist looks at the child incessantly, in all the sessions, looking for his complicity, just as depicted by other authors when they describe turn-taking between mother and child: the mother looks constantly at the baby, regardless of whose turn it is at that time. As Bunt (1994) points out, the adult must pay close attention to the child's patterns during the musical relation. To these referential behaviours by the therapist we can add his general bodily disposition, open and special, staying in the same place in the *setting*, except for the occasion when he walks alongside the child, providing accompaniment and sense to the child's wanderings (session 18).

On the other hand, he offers **gestures**. Wigram (2005) wrote about the possibility of triggering participation in interaction and turn-taking by means of inviting gestures or musical forms. These actions can be seen in session 9 (7) and session 11, where the

therapist hold the tambourine out to Pau as an invitation to respond and participate in musical creation. This very indication is made by Holck (2004b) when he points out that, in order to organize such turns, we can use techniques useful as explicit signs, for instance a sudden pause, or more implicit signs such as amplifying a melodic motif, eye contact, etc. Other authors also indicate that a music therapy intervention accompanied by gestures causes an increase of communicative conducts, such as vocal expressions (Farmer, 2003).

Musically, the therapist has also shown this attitude by using mirroring. The therapist continually tried to listen to the child's production, pick it up and reflect in by somehow using it as a basis to make an accompaniment with rhythmic or melodic background.

The therapist recovers the client's sounds and incorporates them reflecting their intensity and duration in his own production. He doesn't just imitate since, as Wigram (2005) described, mirroring reaches beyond simple imitation. The therapist's production can be somewhat different from the client's, because the objective is to transmit to the latter that he has understood and reflected musically his mood, existing a relationship between the two of them, matching what Kim *et al.* (2008) described about a greater joint attention or synchrony during interaction if the adult's conduct is complementary to the child's.

The interrelation among all these elements –musical and extra-musical behaviour both by the therapist and the child- come to creating an interaction pattern which has been gathering shape in the treatment process, as is exemplified in these sessions, observed in depth.

4.3 Interaction pattern in both participants (Vertical analysis)

In this area, an evolution has been observed in the formation of the pattern of interaction, reaching a mutual understanding towards which the therapist works. In the interaction process, common codes are established (Ruud, 1990; cited in Holck, 2004a) and rules that both of them assume (Holck, 2004a). This pattern contributes a structure that provides security, stability and also flexibility and the possibility of change and opening to creativity (Wigram and Elefant, 2009).

So, as shown in Table 3.d, Table 3.e, Table 3.f and Table 3.g and the subsequent

interpretations, as early as the second session, the therapist, consciously or not, seems to handle a pattern expectation, showing an empathic attitude necessary at this stage of the treatment, besides trying to draw Pau's attention. Thus, the following sequence appears several times:

Pau plays – the therapist reflects, repeats and/or develops

The therapist puts forth this proposal of intervention through background and reflection, but the result shows that Pau reacts with stereotyped conducts and distancing himself, though he concedes a brief eye contact. (1) (3) (4).

In accordance with what Raglio *et al.* (2011) expound, there are phases where it is complicated to understand the other party's behaviour and the therapist needs to elaborate his reflections and emotions in order to later translate them into changes in attitude or into the answer in the intervention. As previously indicated, the subtle adjustment between them two becomes fruitful when the therapist adjusts his intervention in a way that it is Pau who initiates and the therapist picks up and expands the child's proposal rendering it significant. Also in this session, as formerly described, glimpses start to appear of what in the next sessions will become the interaction pattern:

Pau starts – The therapist replies – Pause - Pau initiates

The therapist changes the way he acts when Pau can't clearly identify the space in which he must *reply*. Only when the therapist waits, leaving a *pause*, does Pau react and *initiate* a new intervention (5). Wigram (2005) claims that by taking pauses, space can be provided to the other participant to intervene in an alternate way and is one of the ways to contribute and develop a dialogue in turn-taking.

The therapist shows constant flexibility to adapt his musical production to the client's intensity, tempo, range and rhythm (5) (9) (19) and, at the same time, Pau shows a high rate of initiative and reply in the sessions (Table 3.a). Both of them show great affinity in musical and non-musical replies (Table 3.a and Table 3.b), accompanying their dually-created process with non-musical responses (eye contact, smiling (20) (23), decrease in stereotyped conducts, vocalizations denoting excitement or emotion (4) (18) (19)). A

sensitive, receptive and communicative music therapist augments his own skill to interact with clients with ASD and is one of the keys for a successful therapeutic intervention (Kim, 2006).

This joint development in interaction takes us to the realization that a common **interaction history** is being created (Stern, 1991) which will result in the appearance of expectation. And this continuity is crucial, according to Stern, to evolve from an interaction to a relation. As expressed by Holck *et al.* (2005), actions repeated in time create a common history which endows actions with meaning.

This evolution proves to be very significant, taking into account Pau's characteristics and the interactive and communicative determinants typically associated with ASD. In this relation, where the child plays and the therapist responds in a self-complementing turn-taking, we can identify joint attention, emotional excitement and affect attunement.

4.4 Turn-taking

An evolution is observed, in this specific form of interaction, which goes beyond turn alternation. As Ferrari (2013) points out about this significant form of interaction, there has been a concurrence of strictly musical elements alongside the non-musical elements connected with the bonding, intentional and interaction aspects regarding those experiences, closely related with the theories about development previously described.

Hence, turn-taking has advanced through different stages. Starting from its absence at the beginning of session 2 (video-clip 1), with the first instances of the interaction pattern at its end, and its consolidation in session 9 (video-clip 2), the turn-taking alternation seems to constitute itself as a significant form of interaction between the therapist and Pau. Once the interaction pattern is established in the form of turns, for its maintenance and evolution it is fundamental to use gestures and signs that invite the other member to participate and strike an effective balance between repetition and variation.

With the aim of sustaining attention and participation in this interactive turn game, Stern (1997) claims that a certain amount of repetition is necessary to understand, organize, create a structure, confer familiarity to the interaction. But, on the other hand, variation or novelty is required to maintain an ideal level of tension and interest. According to the same author, the adult plays an instrumental role in the regulation of such variation, to make sure that it is novel and so it may raise curiosity, attention, explorative spirit, as can be observed in the therapist's proposals (9) and (10) which are accompanied by changes in Pau's performance.

In the same way, the therapist introduces new elements, variations (vocal, or half a sound cell, for example), as well as gestural actions of invitations, managing to hold attention and generating changes in the course of the interaction (9) (13) (21) (23). As a consequence, unprecedented and integrating musical replies stem from the therapist's innovative changes (10) (14) (21) (23), and there is also different and positive bodily and facial attitude and eye contact. Wigram (2005) mentions that both musical and gestural impulses may foment the beginning, the development and the progression of a dialogue.

The results of this study show that when this turn-taking, this alternation, is produced, Pau changes his non-musical expression: there is more smiling and he directs his look towards the therapist, including exclamations and vocalizations.

Stern (1991) says that mutual interaction games in the dyad mother-child generate in the child an experience very high excitement of their *self,* full of joy and suspense. This state, with several repeated cycles and crescendos, cannot be achieved by the child alone. Stern lists excitement, activation, stimulation and tension as fundamental elements in a significant interaction. These elements are visible in session 11, where, from my interpretation, the establishment and comprehension of a turn-taking interaction pattern causes a state of excitement and sustained tension in the child, thus keeping a high level of maintained and shared attention. We could consider this state, as does Stern (1991) an "affective-energetic" state, an emotional state always present in the human being which pops up in interpersonal situation and can be quantified through intensity, speed, strength, progressive decay, a burst, etc, and which possesses a certain energetic quality.

The same author (Stern, 1997) declares that some communicative parameters such as tempo or intensity are necessary for the child to decode and organize sensory experiences of interaction. This could explain the importance of incorporating changes in dynamics (changing from playing *forte* to *piano* and/or vice versa, using indicators – *crescendos* and *diminuendos*-) and in musical production, in situations characterized by the absence of changes. In concordance with what Holck (2004a) expounds, the child's reaction to the therapist has been more flexible when the latter introduced small changes in his conduct.

On unifying the analysis of the evolution of both musical and non-musical elements, we can observe that, apart from the establishment of an interaction pattern, and of doing so in turn-taking form, there is qualitatively significant evolution in all of these elements, which progress towards sharing an emotional complicity visible when analyzing the constituent elements of tuning or attunement within a development of intersubjectivity.

4.5 Reflection in concordance with the theories about development and subjectivity

The analysis results show a very significant qualitative change in Pau's interventions. A change which means changing from participating in the improvisations by reacting to the therapist with independent sound productions (h) (i), to a way of responding characterized by complementariety, attunement an synchrony, both in the musical aspects and in the non-musical expression previously analyzed (g) (v) (z). Pau is able to reply in the part of the bar where there is a space, to propose rhythmic formulae coherent with those made by the therapist, or to reflect changes in intensity. This fact may be interpreted as a development in the ability to *share a common focus and to show affect attunement*. We could venture the statement that this type of interaction reaches well beyond the mere fact of initiating or replying; according to Stern (1991), an empathic process has actually served as a bridge between two persons.

In the second clip (session 9) Pau plays the same tambourine as the therapist, which translates as an opening-up to secondary *intersubjectivity*, with these aspects: ability to

share a common attention focus, attributing intentions and motifs to others and learning them correctly, and attributing to other people affective states and feeling if they are or not coherent with one's own affective state (Stern 1991). So, Pau establishes a common attention focus, by looking frequently at the tambourine, emitting exclamations while he is playing. It can also be inferred in accordance to Stern (1991) and the development of affect attunement.

Session 11 can be viewed as proof that the interaction pattern created and assumed by both participants as an interaction route, promotes dynamic exchange and complementation. Mother and child anchor their relation through mutual imitation and coupling or complementarity (Trevarthen, 1993). This dynamics is mutual and regulates not only differentiation with the other but also interpersonal contact and relations. Pau stays opposite the therapist when he plays, and constantly looks at the instrument he shares with him, making vocalizations of exaltation or tension and fluctuating in intensities.

I would like to point out, in session 18 (video-clip 4) the part where therapist and child relate by incorporating voice. This brings Pau to turn-taking again. He initiates a dialogue and seems pleased, laughs and continues with his production. The therapist also moves, placing himself beside Pau, much closer now, with remarkable affect activity. Musically, I would like to highlight the all-important complementariety that occurs in the vocal dialogue, where Pau perfectly fills in the spaces left by the therapist and/or makes contributions just at the end or beginning of the musical phrase. In this action there seems to exist an affect harmonization in a way that facilitates communication between them.

In the last sequence, belonging to the last session of the treatment, we can see intentionality in Pau's verbal musical productions. Pau and the therapist exchange sounds, pre-verbal communication, and relate through different musical parameters, such as intensity and rhythm, in a way that similar to how Malloch (1999) depicts an intervention between mother and child based on sound improvisation, where both participants exchange replies adjusting elements in the conversation according to one another's productions.

4.6 Reflection about the music therapeutic question

The results achieved in this study show a global process of intervention in music therapy where the use of musical improvisation makes up turn-taking, and the therapeutic attitude allows considering that to establish an interaction between the therapist and Pau, where musical and expressive responses seem to show the development of joint attention, affect attunement and intersubjectivity.

The painstaking revision of the child's musical and expressive development has allowed the detection of an interaction pattern that makes this development possible. In this pattern, it is the introduction of silence –the pause- together with the fact of picking up and reflecting Pau's sound proposals what seems to favour that interaction, which reaches beyond a mere alternation in participation and which entails an implication and a personal development both on the child and on the therapist's part. Both strategies have been introduced by the therapist from his conception of therapy as an active process, and from his view of the client as an active agent.

All this leads me to consider if it is the use of turn-taking in a clinical context what has favoured interaction between a child with ASD and the therapist, or if it was the therapeutic attitude of listening, empathic trust in the other participant's potential and the fact of conceiving him as an active agent in his own process what has favoured the use of turn-taking to make interaction between them possible. The analysis guides me to the conclusion that turn-taking is more than an improvisational technique. Turn-taking has become a mode of relation and interaction which has facilitated the interaction between both participants. That is because when using it through active listening, empathy, reflection, silence –as a space that smooths the progress of the listening – or the identification with the other's musical motifs, it has enabled to recognize oneself in the other participant and thanks to him.

After this microanalysis, we can say that the main factors to create this alternation and enrichment in moments of joint tuning are the chances of being listened and picked up offered by Pau, reflecting and giving sense to his sound, picking up his sounds first, then waiting. The use of a method such as microanalysis seems to have contributed to the confirmation of interpretations that might seem speculative if deprived of such

analysis, and to improving the reflections that have taken shape from them. This to-ing and fro-ing was not easy or one-dimensional in any way, but it required a circular current which has clarified both my previous positioning and the interpretation of the facts.

This investigative methodology has been, from my point of view, a way of respecting the singularity of this case, of accepting the influence of my own beliefs and theoretical fundamentals, both when observing and when explaining the facts, and of daring to gather some distance to describe and interpret a reality based on me, as a therapist, and Pau.

4.7 Limitations

This study presents some limitations which I will relate next. Firstly, from the qualitative perspective an attempt has been made at building generalizations which permit the comprehension of aspects common to similar situations in music therapy, always from a constant revision of the related literature. Even so, care must be taken when it comes to generalizing the results obtained, since it is a unique case.

Secondly, in the phenomenological paradigm, it isn't possible to analyze a phenomenon without admitting that it is anchored in the meaning given to it by the persons who experience it and, in consequence, it cannot be analyzed in a totally objective way, as the investigator's values are present. It is a task about describing, understanding and interpreting a study carried out with a reflexive and interpretative purpose, and this can always be strongly influenced by subjectivity, even though the highest possible objectivity has been aimed at. But the distance between the investigative me and the therapeutic me may have left some aspects open to new interpretations and discussions.

4.8 New perspectives

This study of a unique case allowing the reflection about interaction between a child with ASD and the music therapist through the creation and development of turn-taking

opens the possibility to keep on analysing the always complex and difficult reality of intervention on ASD, where communication is initially damaged, but not broken or inexistent.

This study may see itself enriched by other studies with different designs, attending these aspects from other methodologies, more measurable and/or through reading and interpreting negative examples. In the future, it might be interesting to develop an investigative design which collects parallel data from several clinical cases of similar characteristics, to widen the evidence of what this study tries to expound.

Another line of investigation open after this study might be the generalization of the changes observed in interaction towards contexts other than music therapy. With this objective, a possible line of action could be complementing the data of the treatment with complementary assessment and evaluation of both the child's parents and the teachers through, for example, the use of the interview method, to analyze if the changes in interaction and communication are applicable to areas such as school or family unit.

Together with this possible collection of data, later or simultaneous to the treatment, it could also prove very interesting, in future investigations, to consider a more exhaustive initial and posterior collection of data, with a previous assessment of specific aspects in the area of interaction. With this aim, measures could be applied pre- and post-treatment, by using convenient tools such as the AQR or Mir scales.

In the same way, wider and more exhaustive documentation work with the topic-related literature, both from the field of psychology and of music therapy, could also bring new light and/or perspectives on this study, such as, for example, the latest investigations about "mirror neurons".

The growing interest in considering ASD-afflicted persons from a wider and less static continuum will make it easier for other music therapists to keep on working with this population; this study is intended to constitute proof of it.

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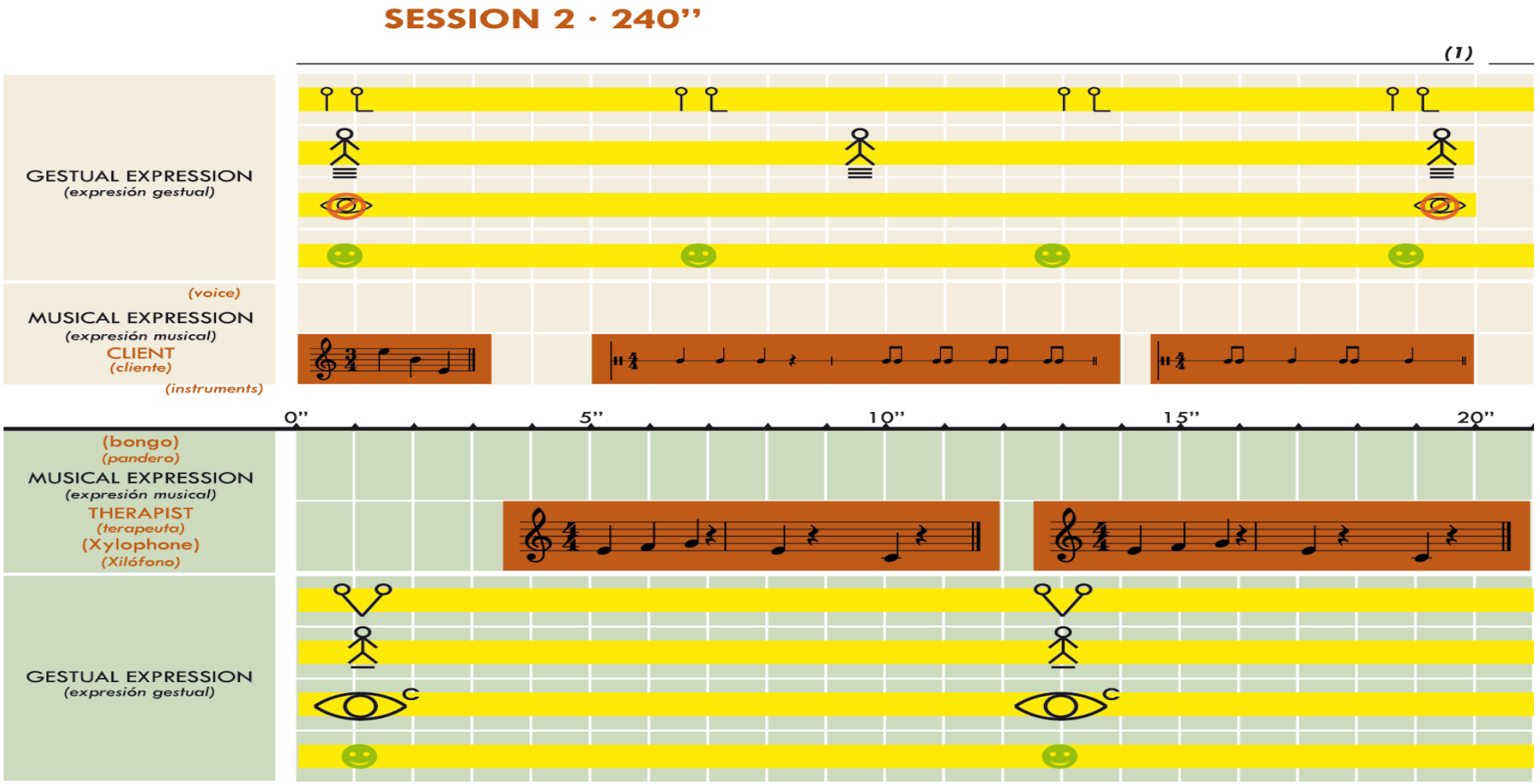
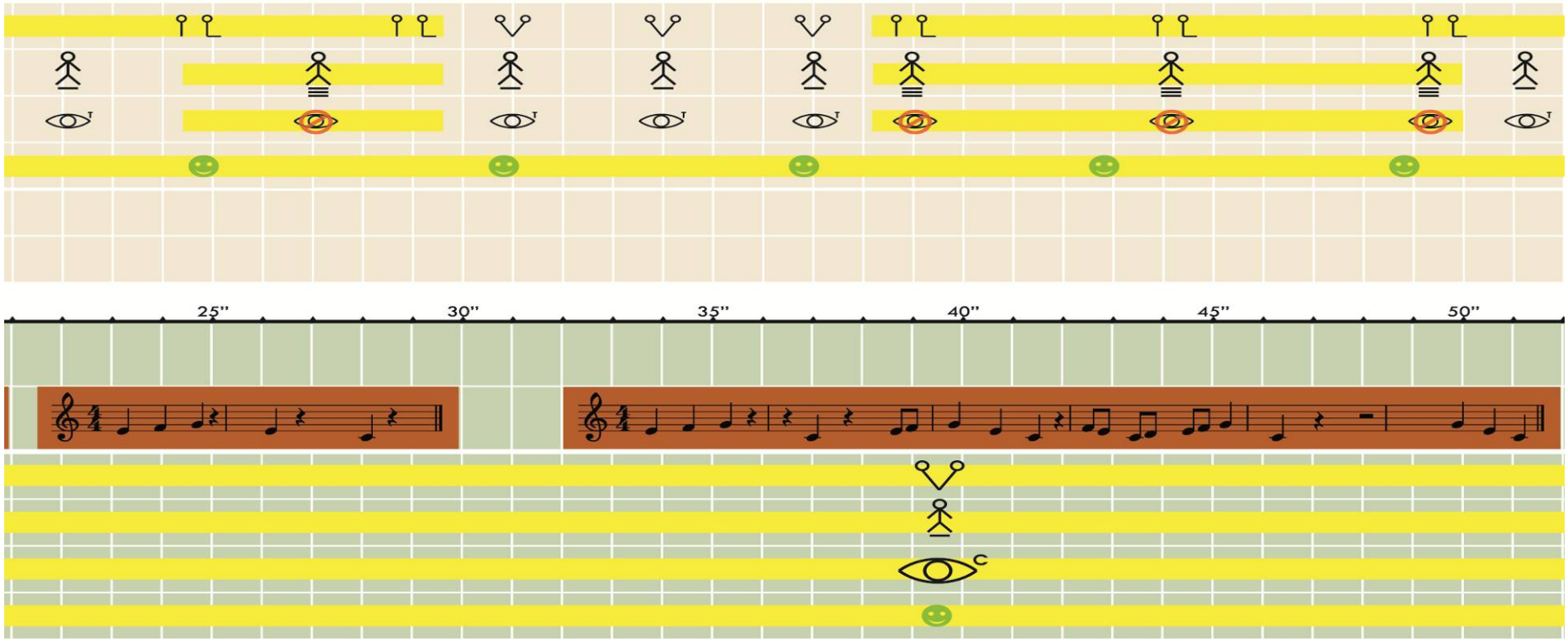
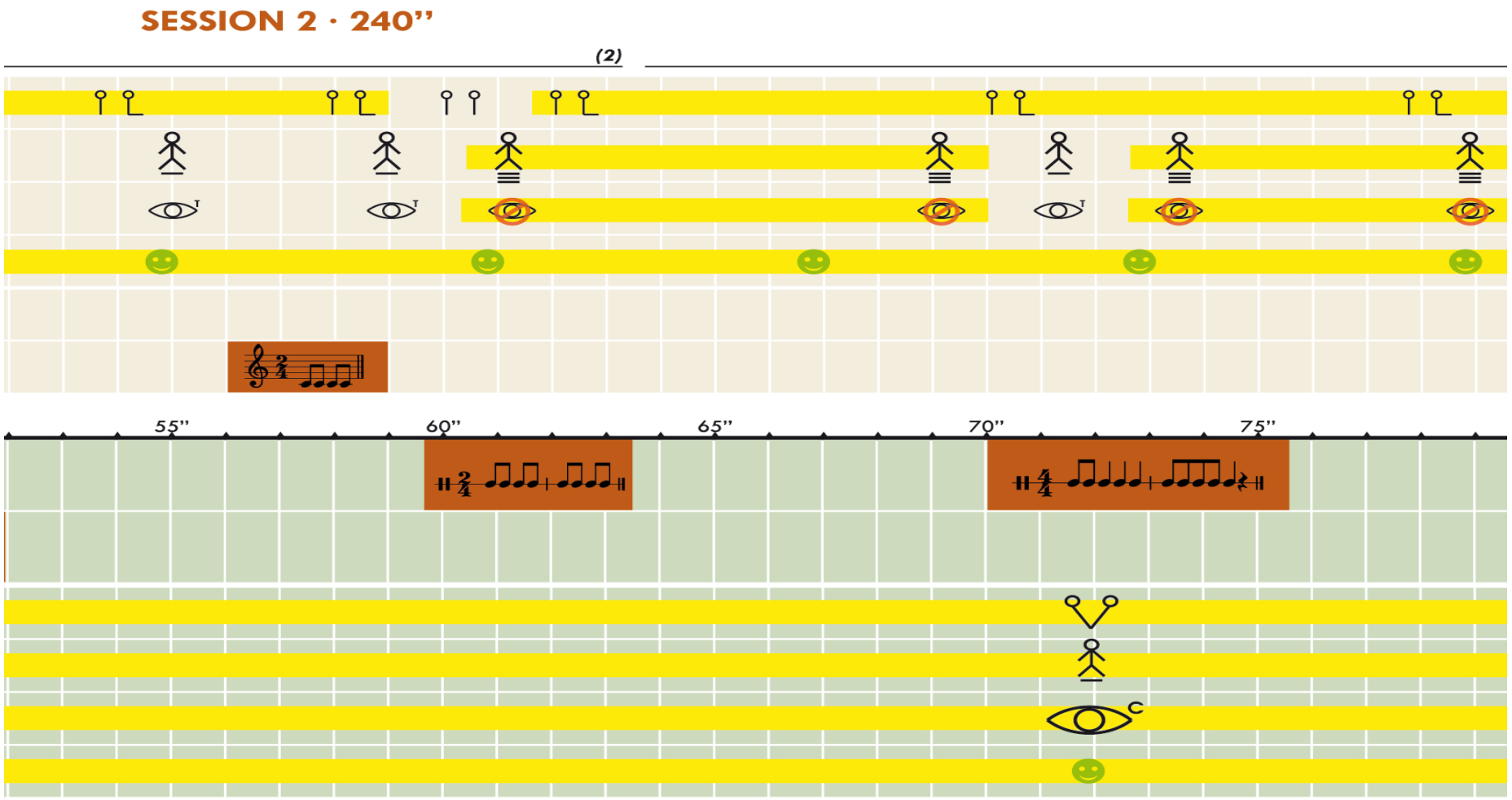
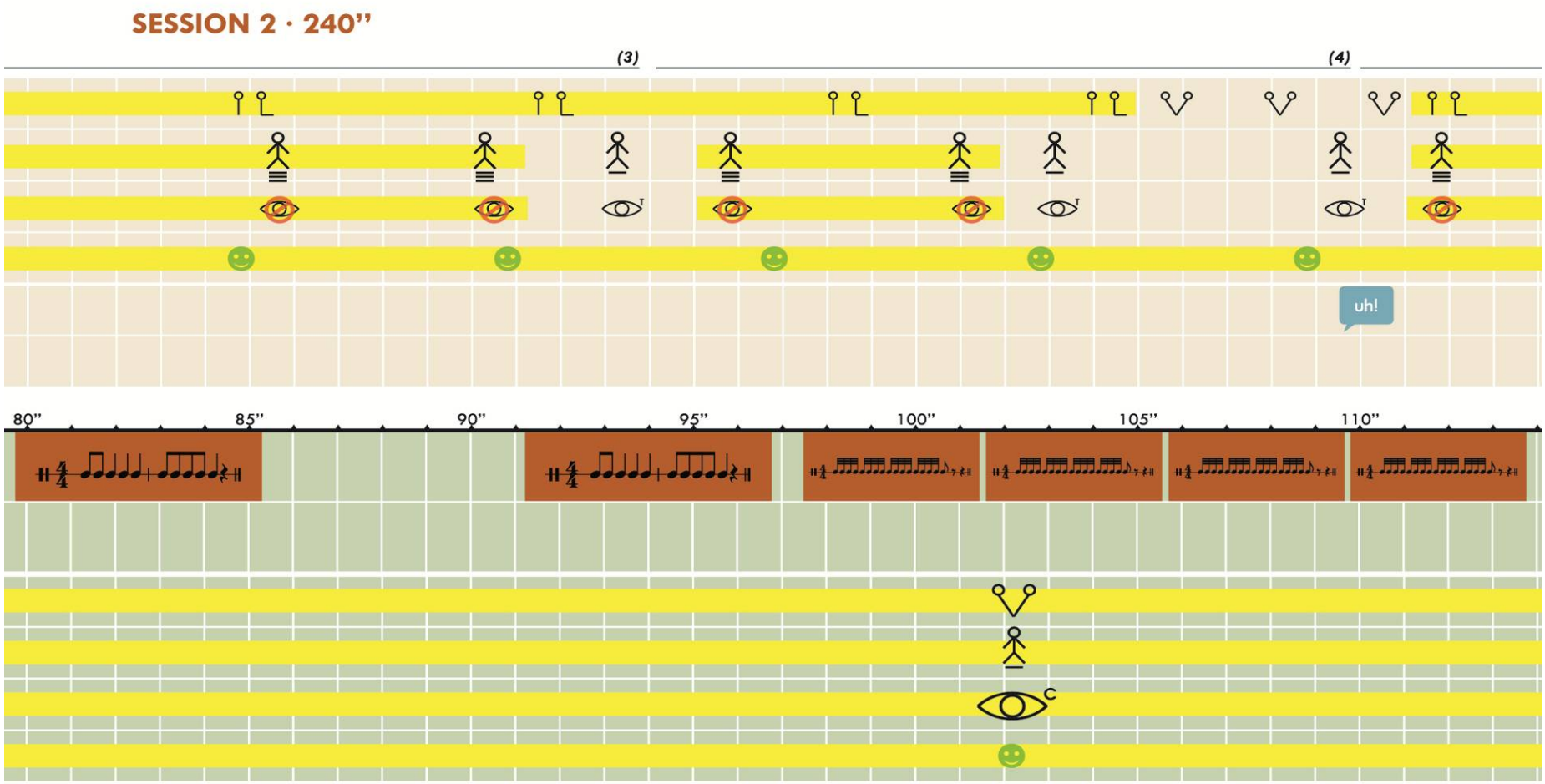
Appendix 1: An enlarged version of the pick up graphic templates corresponding to sessions 2, 9, 11 and 18 will be shown in this appendix as it has been quoted in chapter 3 (p. 39)



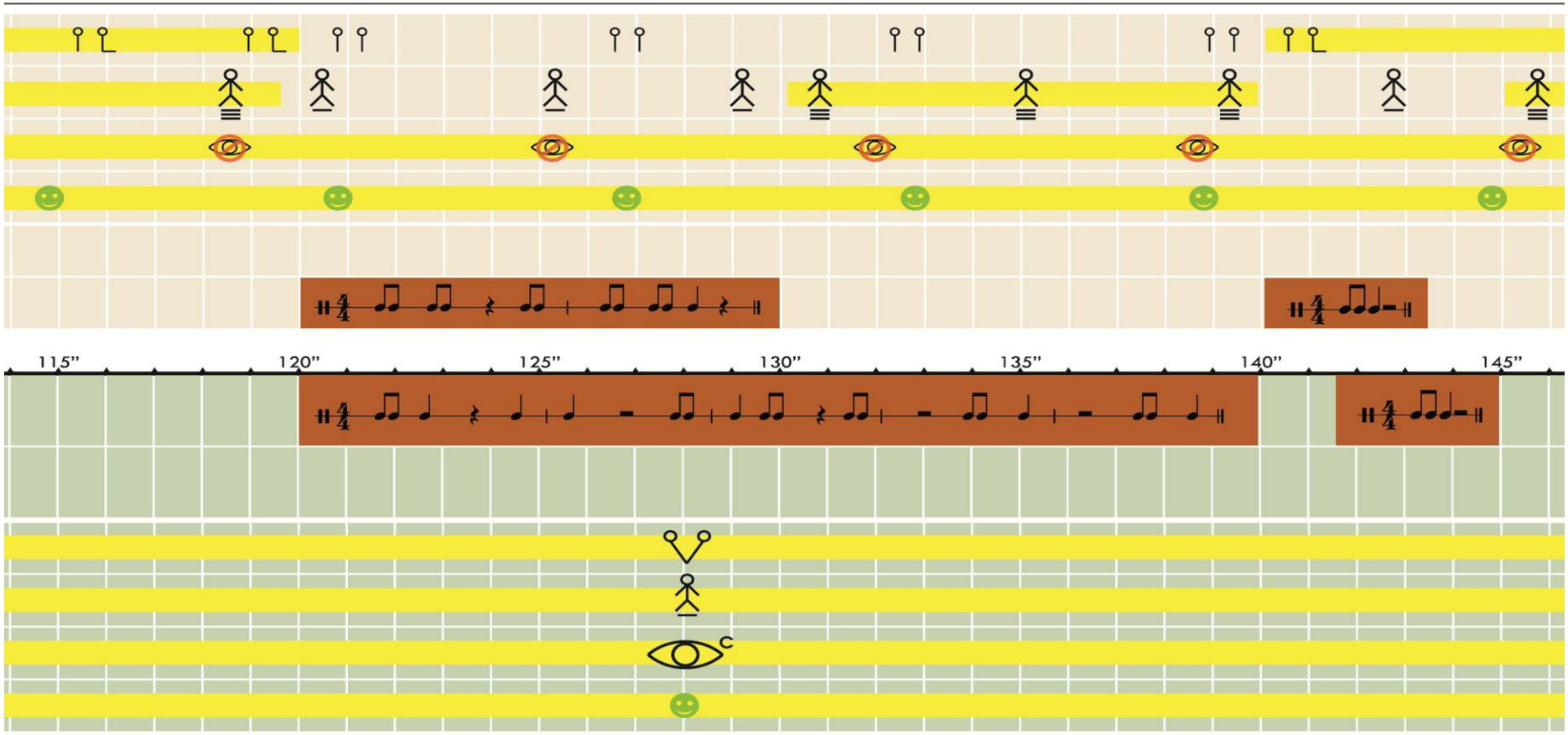
SESSION 2 · 240”



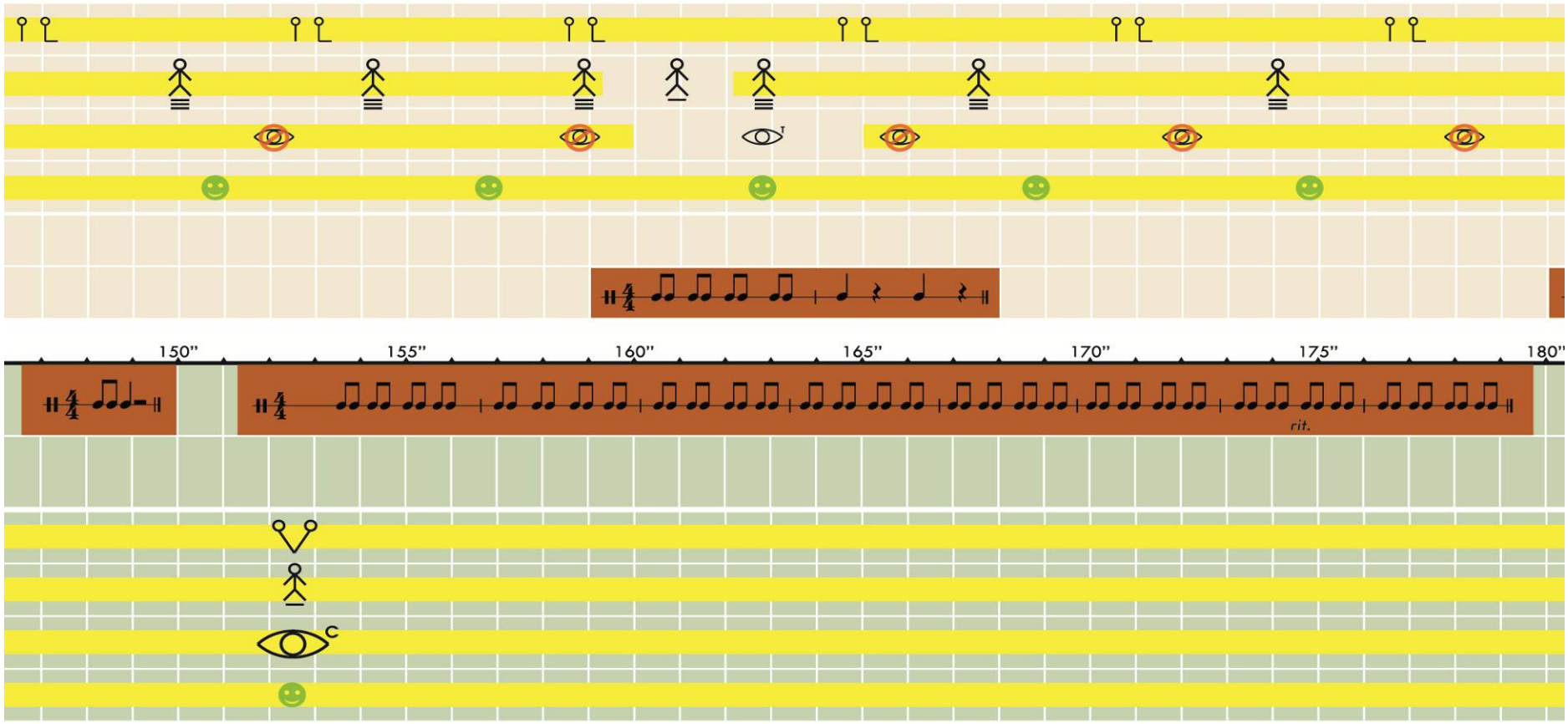

SESSION 2 · 240''
(2)
55''
60''
65''
70''
75''

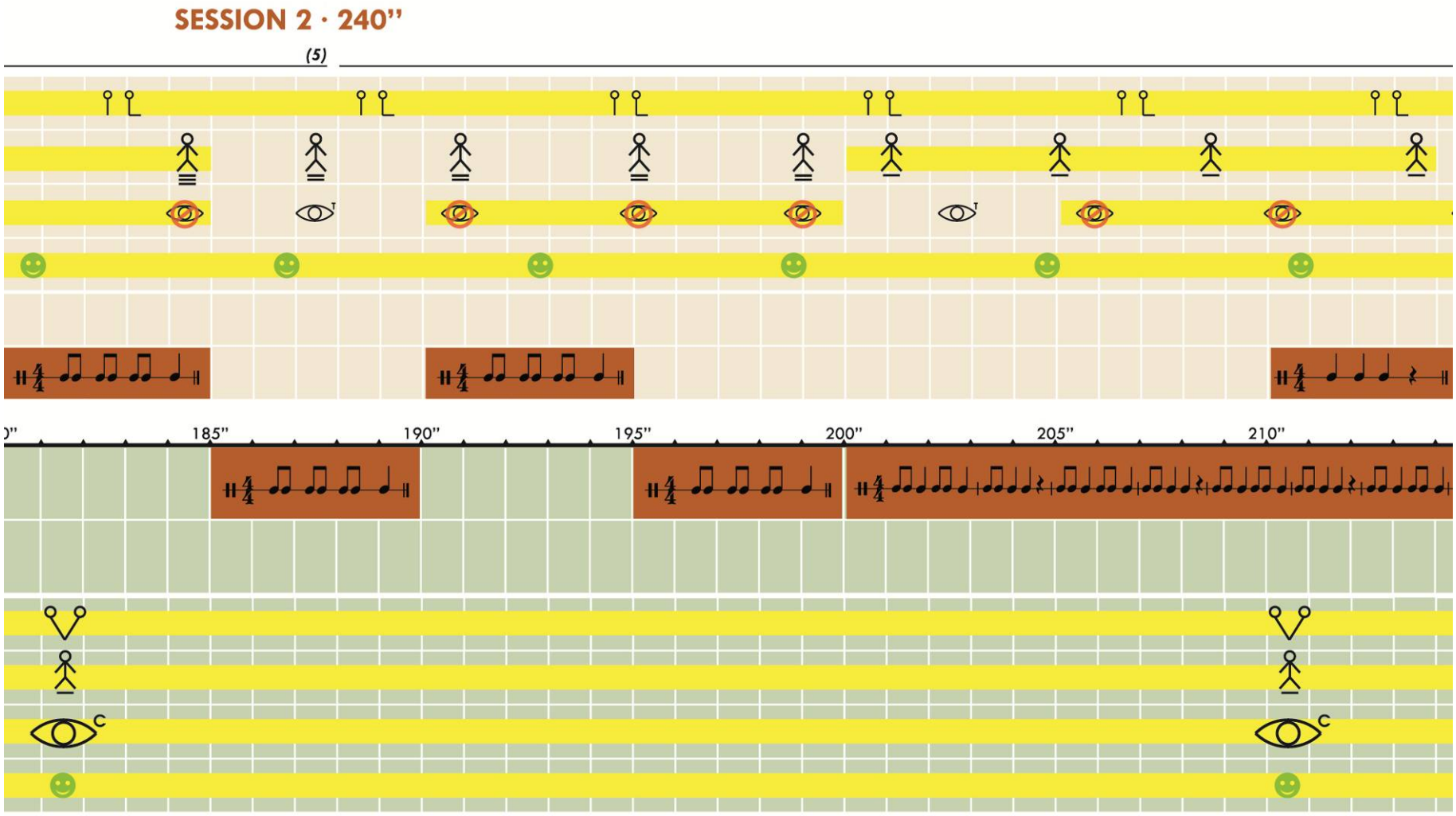

SESSION 2 · 240”
(3)
(4)
uh!
80”
85”
90”
95”
100”
105”
110”
C

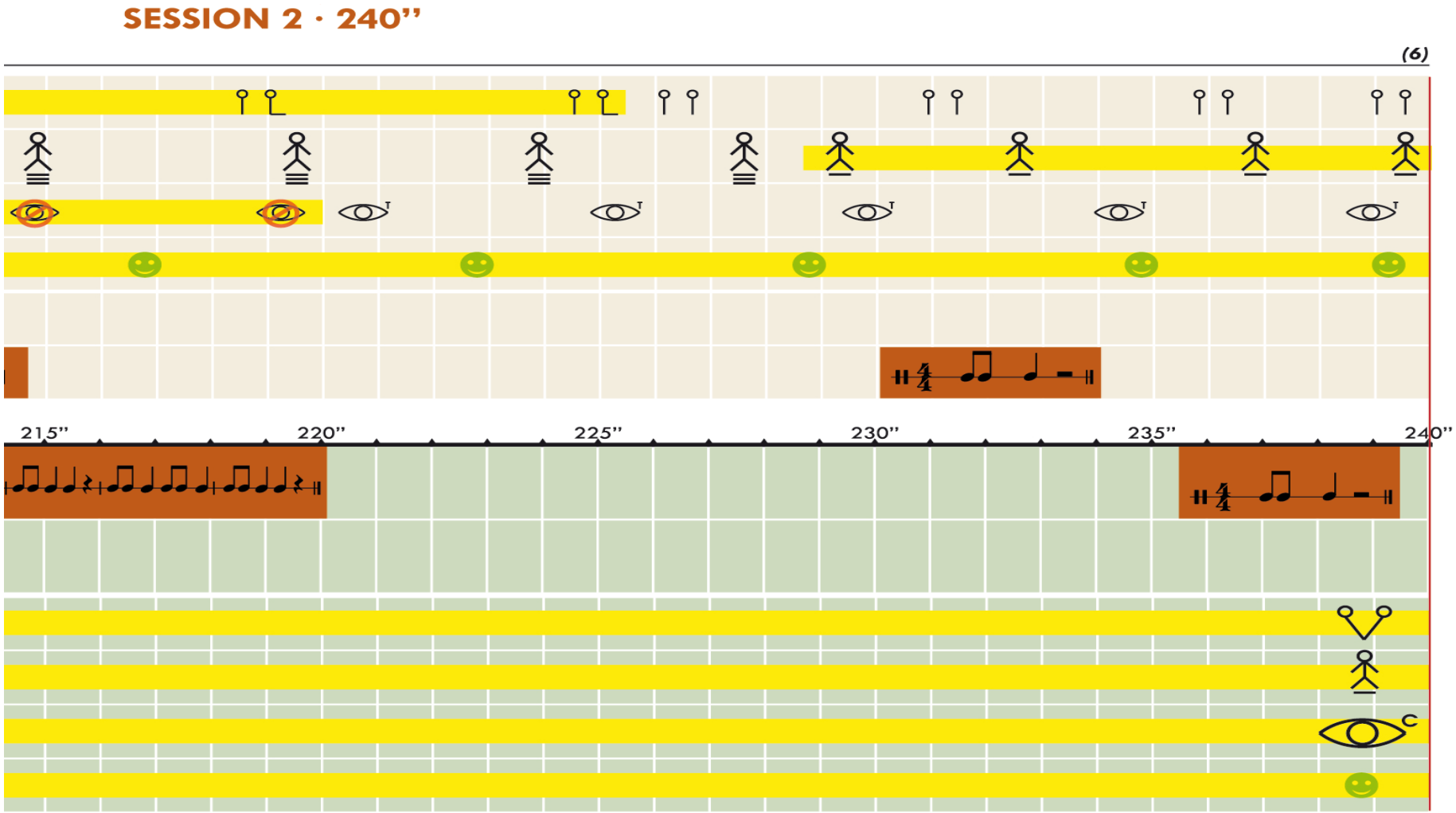
SESSION 2 · 240”

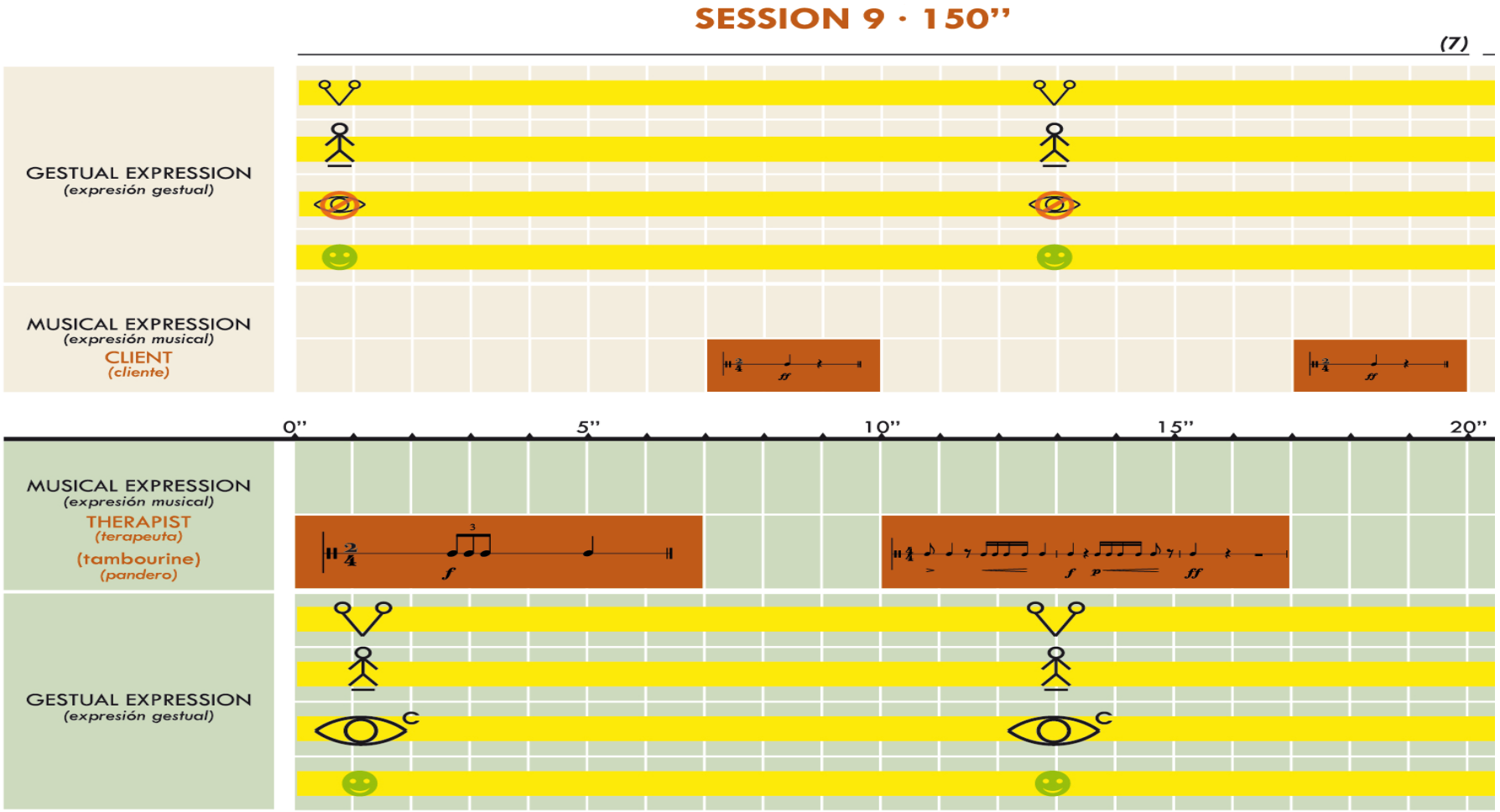


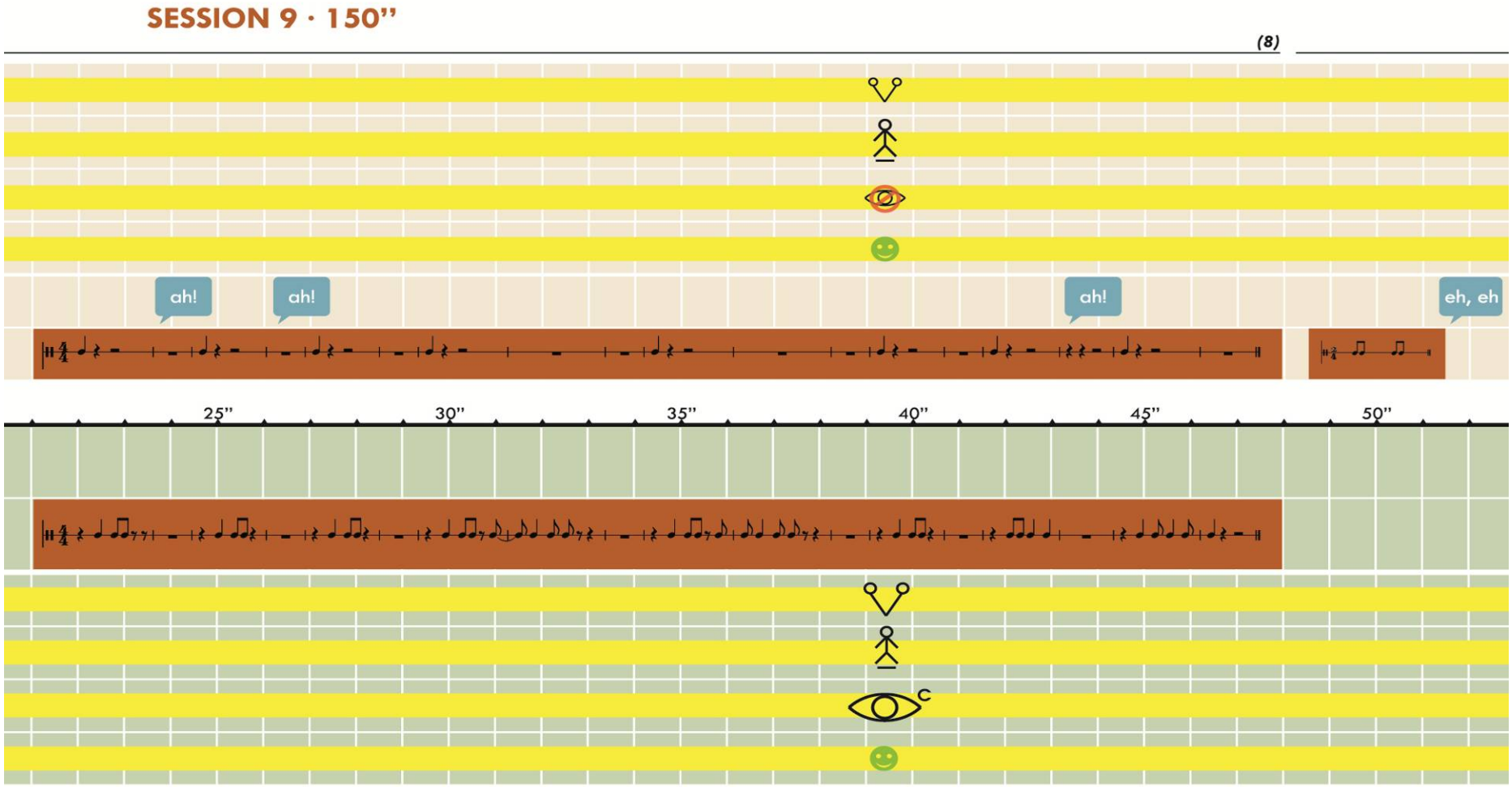
SESSION 2 · 240''

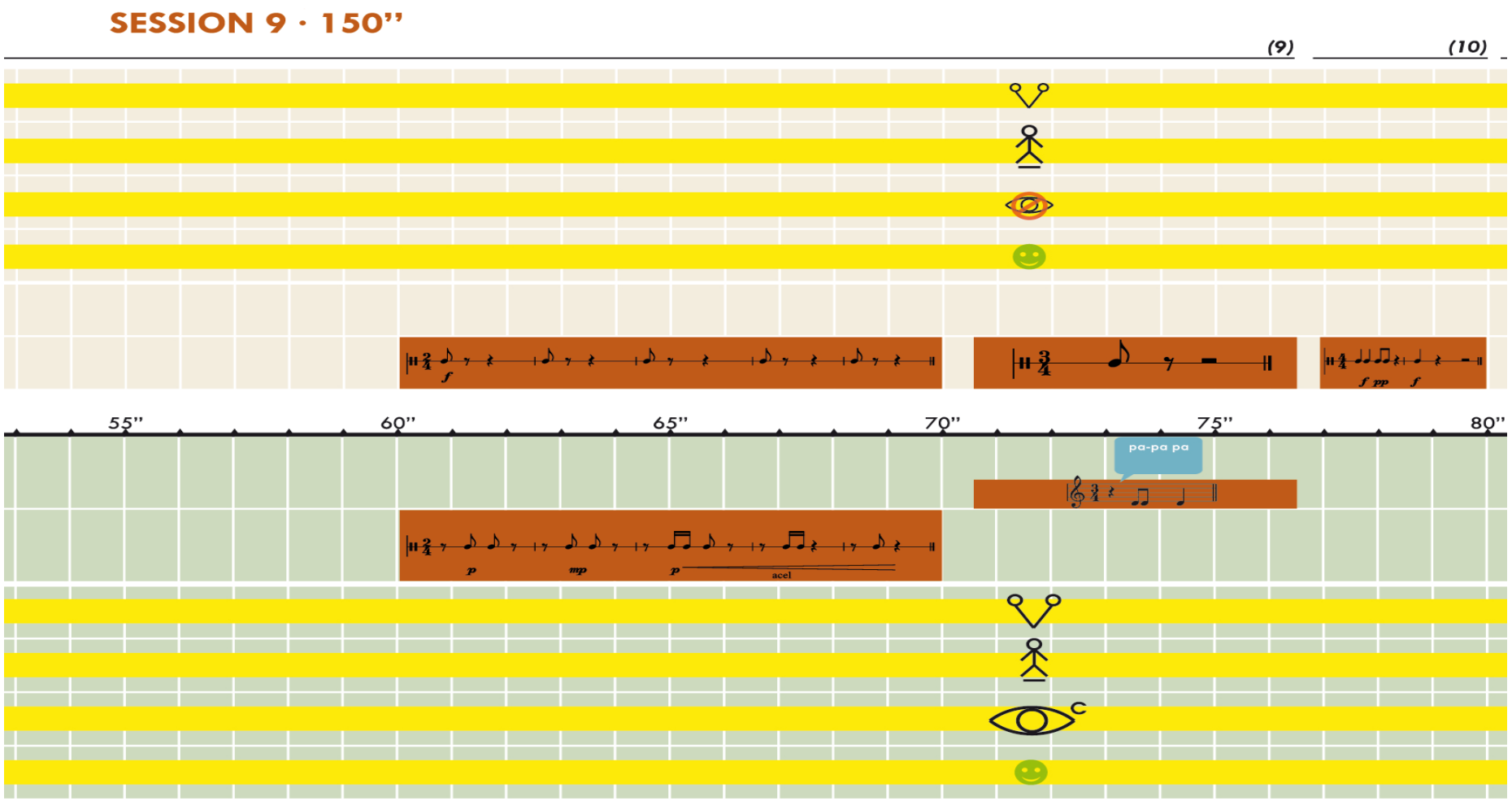


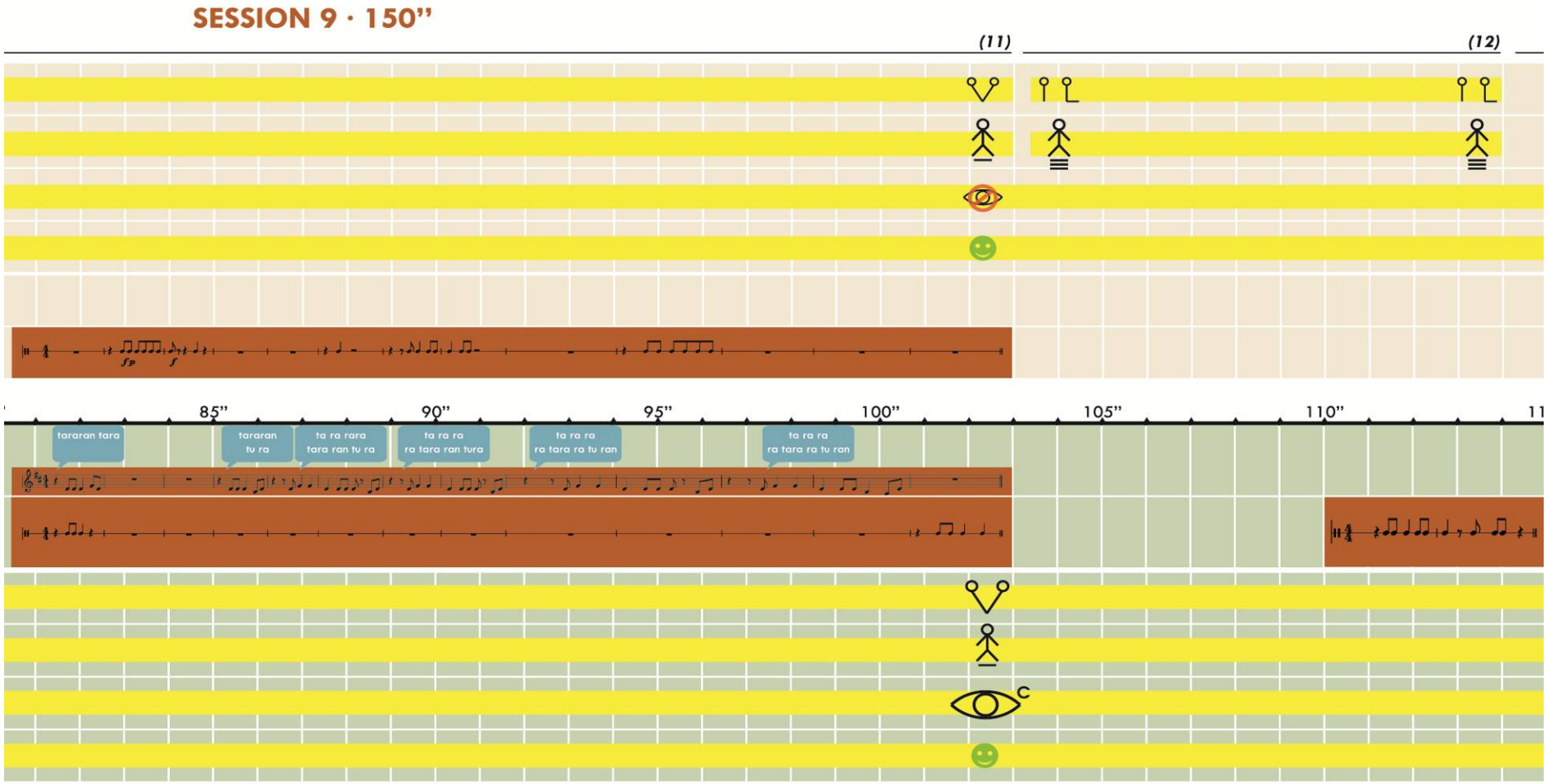

SESSION 2 · 240''
(5)
185''
190''
195''
200''
205''
210''
C
C

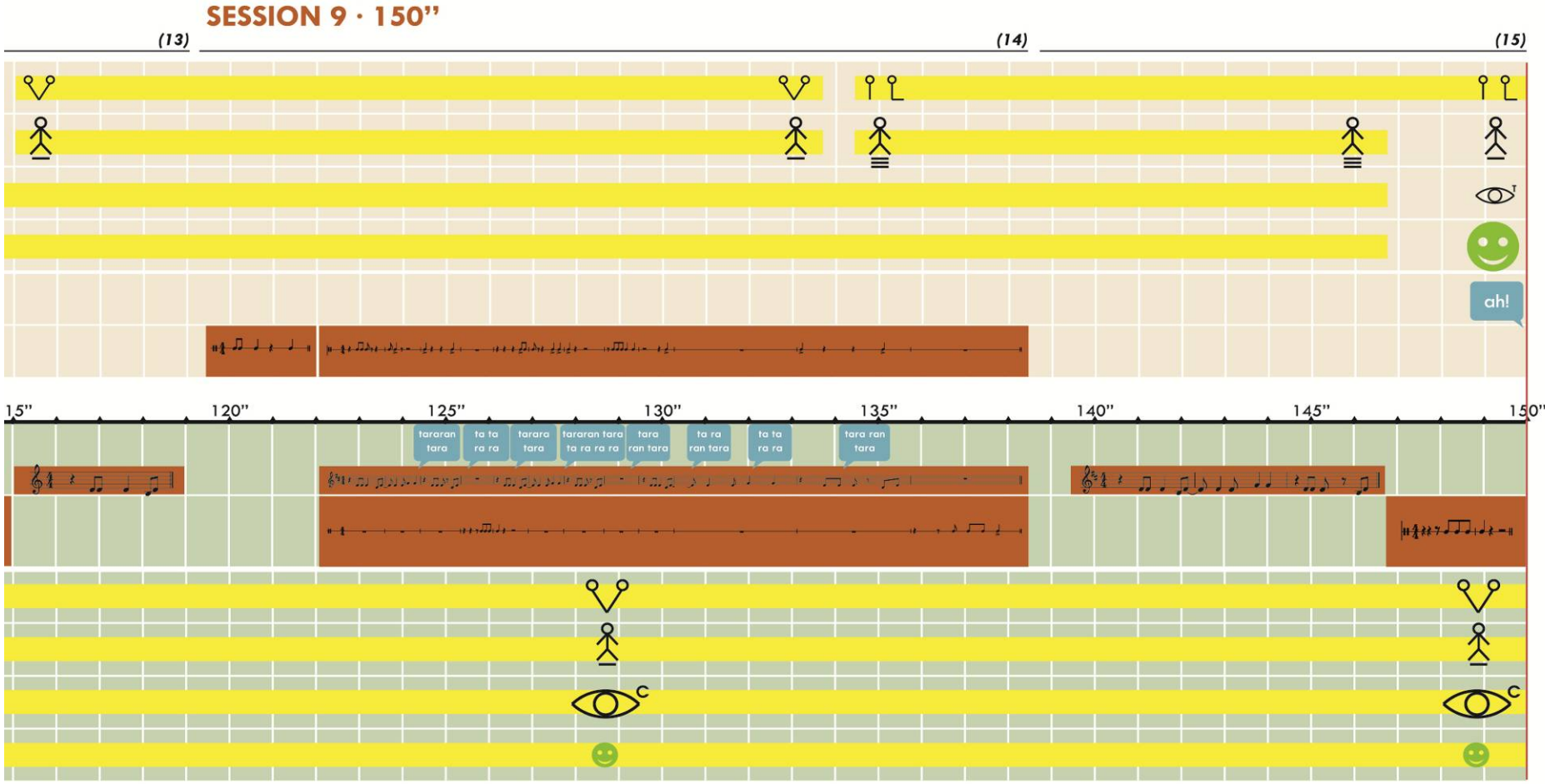

SESSION 2 · 240”
(6)
215”
220”
225”
230”
235”
240”

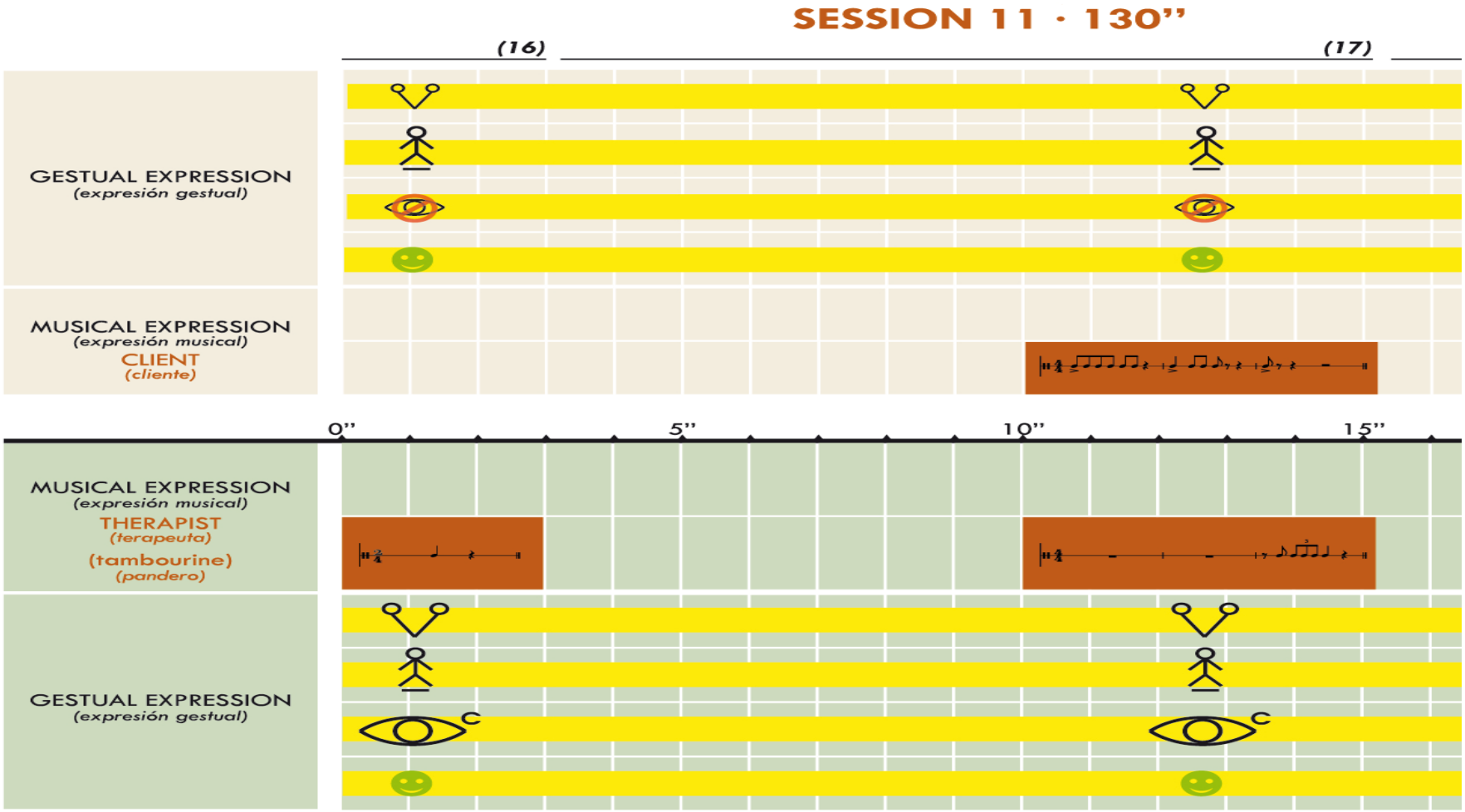

SESSION 9 · 150''
(7)
GESTUAL EXPRESSION
(expresión gestual)
MUSICAL EXPRESSION
(expresión musical)
CLIENT
(cliente)
0''
5''
10''
15''
20''
MUSICAL EXPRESSION
(expresión musical)
THERAPIST
(terapeuta)
(tambourine)
(pandero)
GESTUAL EXPRESSION
(expresión gestual)

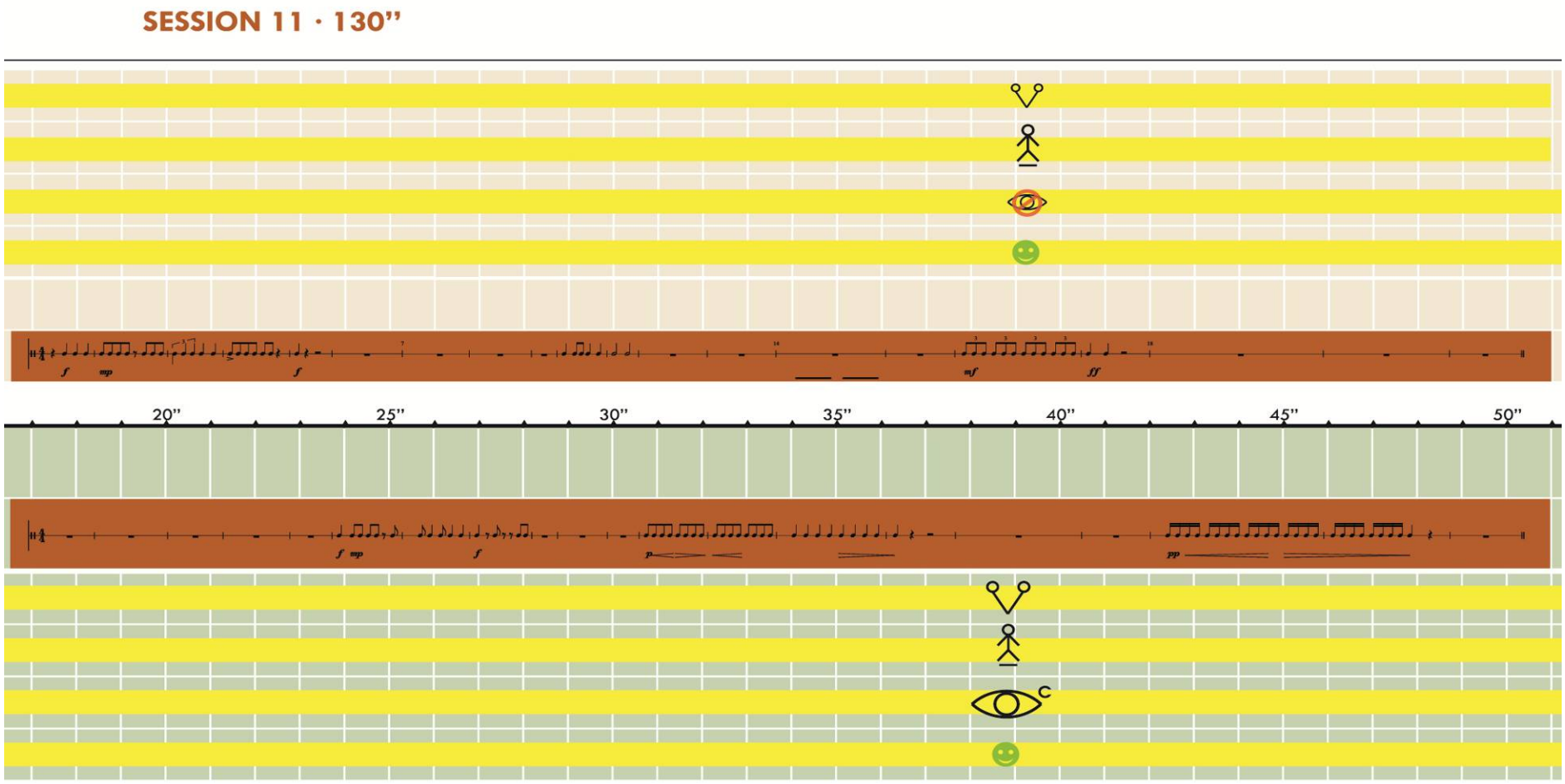

SESSION 9 · 150''
(8)
ah!
ah!
ah!
eh, eh
25''
30''
35''
40''
45''
50''
C

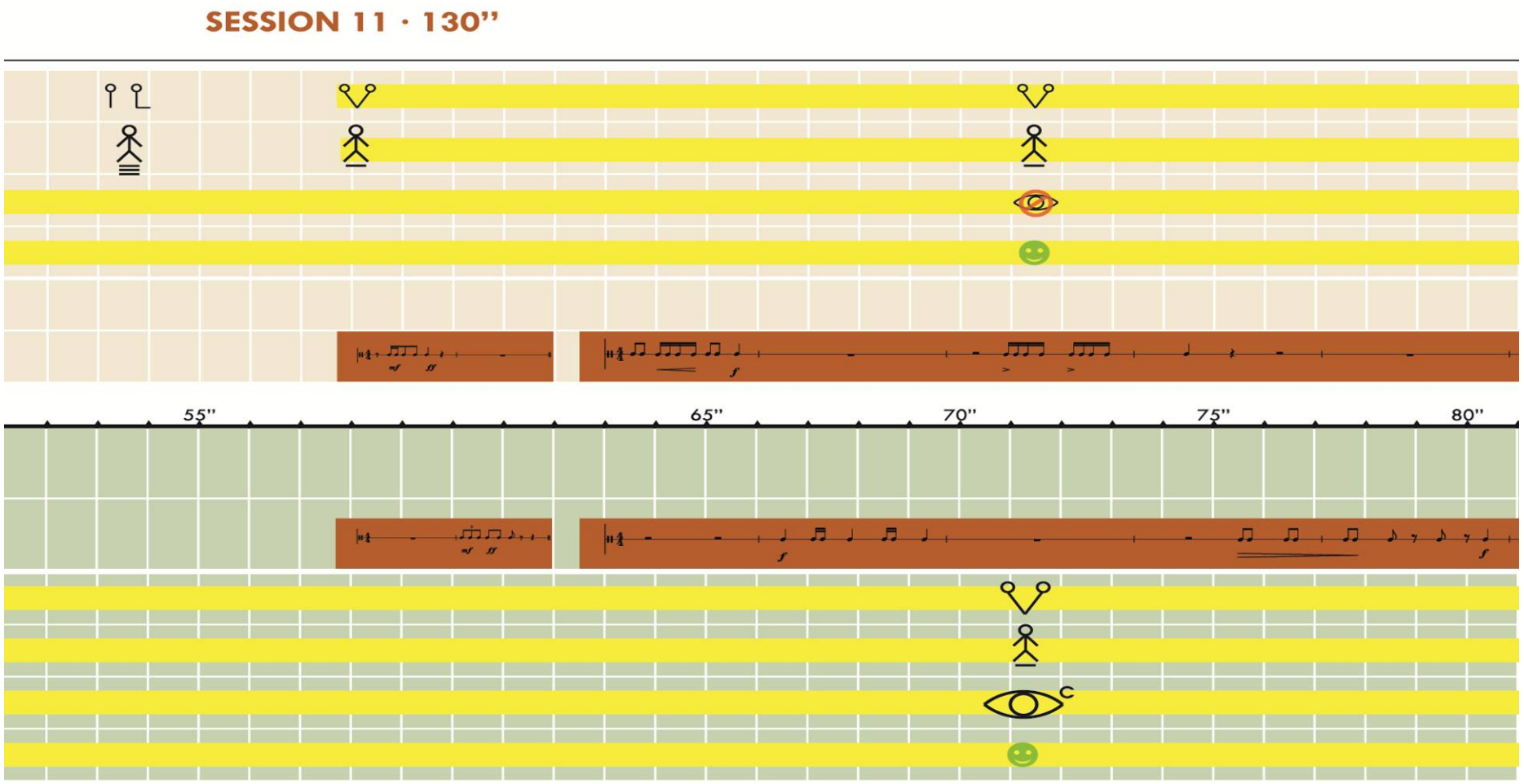

SESSION 9 · 150”
(9)
(10)
55”
60”
65”
70”
75”
80”
pa-pa pa
p
mp
p
acel
C


SESSION 9 · 150"
(11)
(12)
85"
90"
95"
100"
105"
110"
tararan tara
tararan tu ra
ta ra rara tara ran tu ra
ta ra ra ra tara ran tura
ta ra ra ra tara ra tu ran
ta ra ra ra tara ra tu ran
C

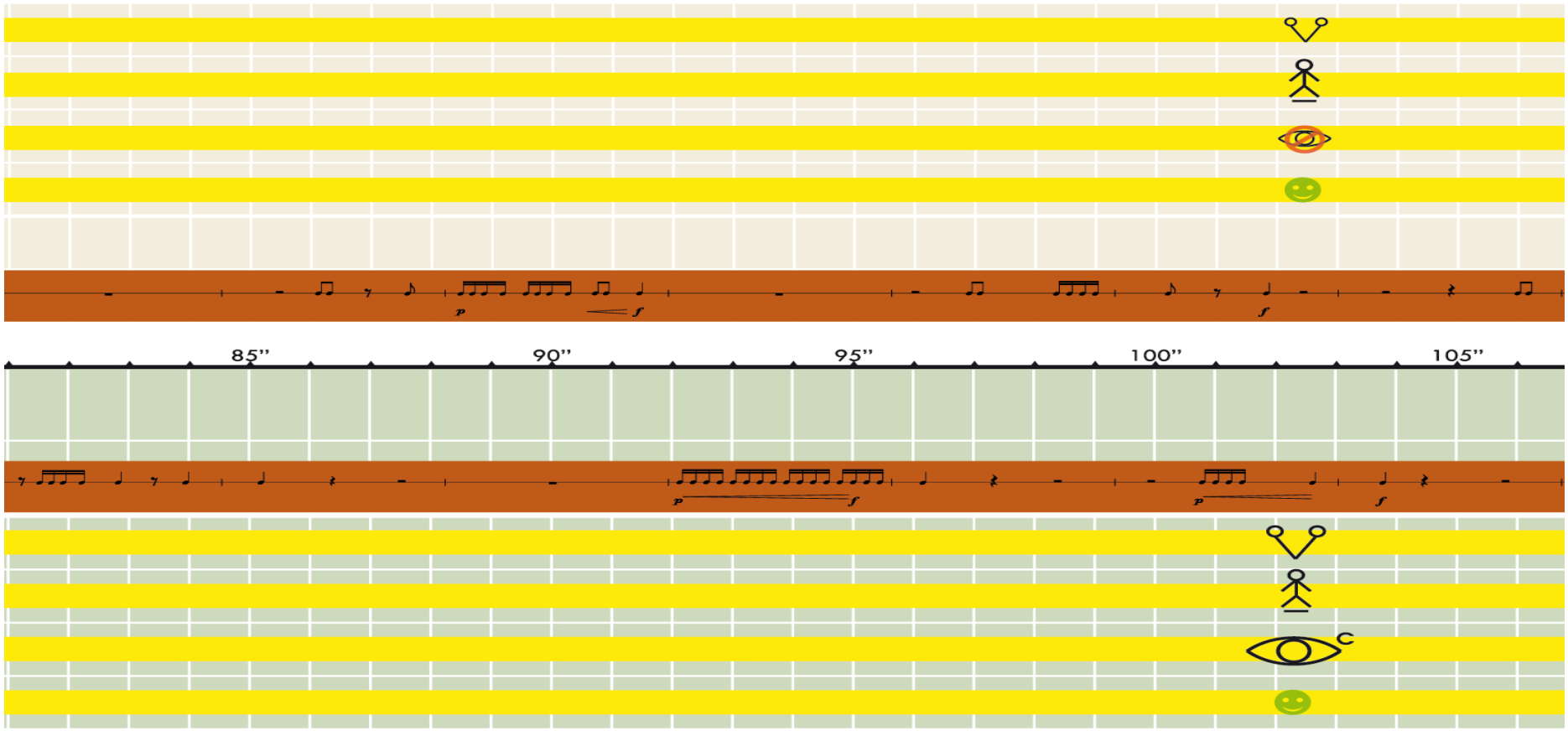

SESSION 9 · 150"
(13)
(14)
(15)
ah!
15"
120"
125"
130"
135"
140"
145"
150"
tararan tara
ta ta ra ra
tarara tara
tararan tara ta ra ra ra
tara ran tara
ta ra ran tara
ta ta ra ra
tara ran tara
C
C

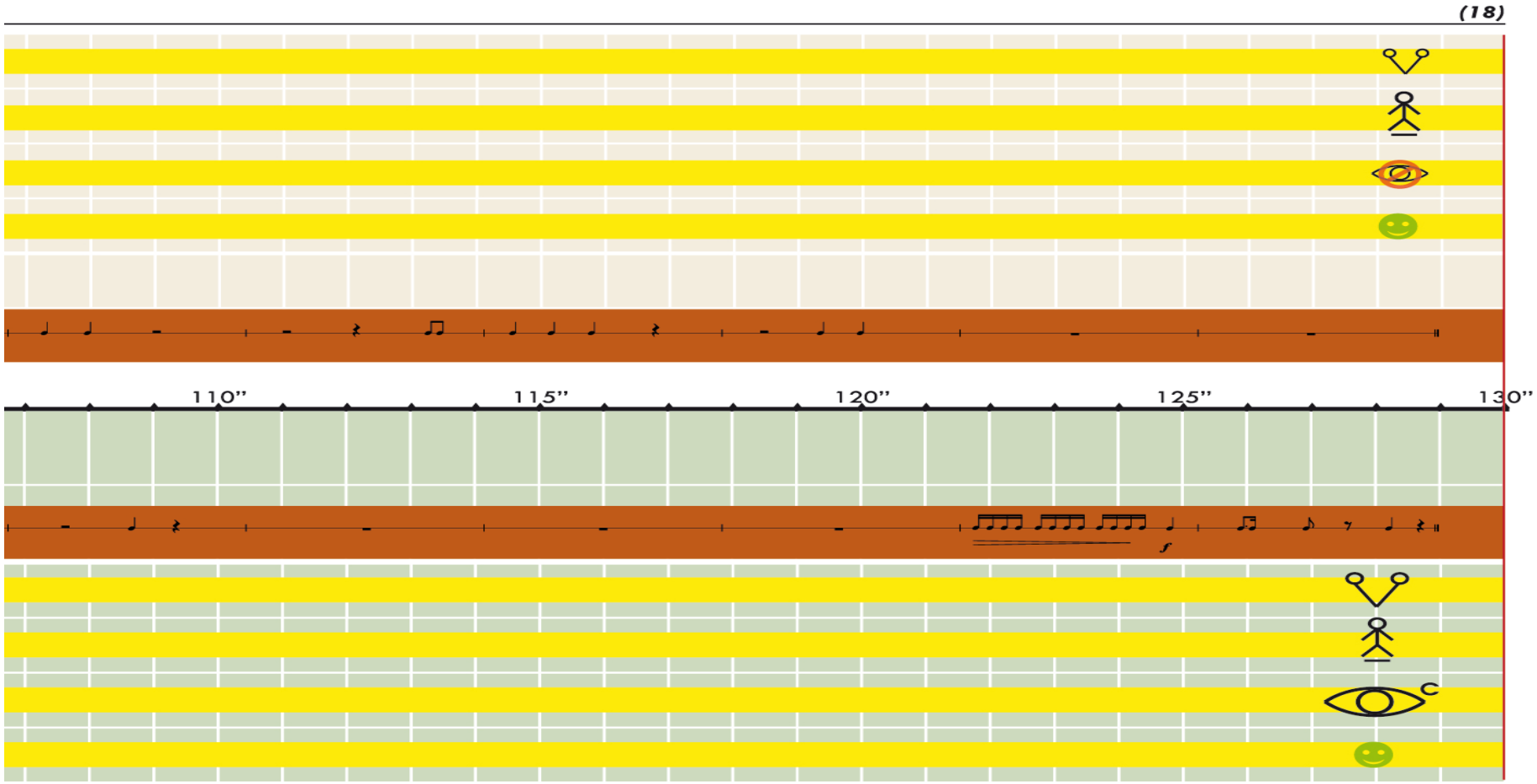

SESSION 11 · 130''
(16)
(17)
GESTUAL EXPRESSION
(expresión gestual)
MUSICAL EXPRESSION
(expresión musical)
CLIENT
(cliente)
0''
5''
10''
15''
MUSICAL EXPRESSION
(expresión musical)
THERAPIST
(terapeuta)
(tambourine)
(pandero)
GESTUAL EXPRESSION
(expresión gestual)

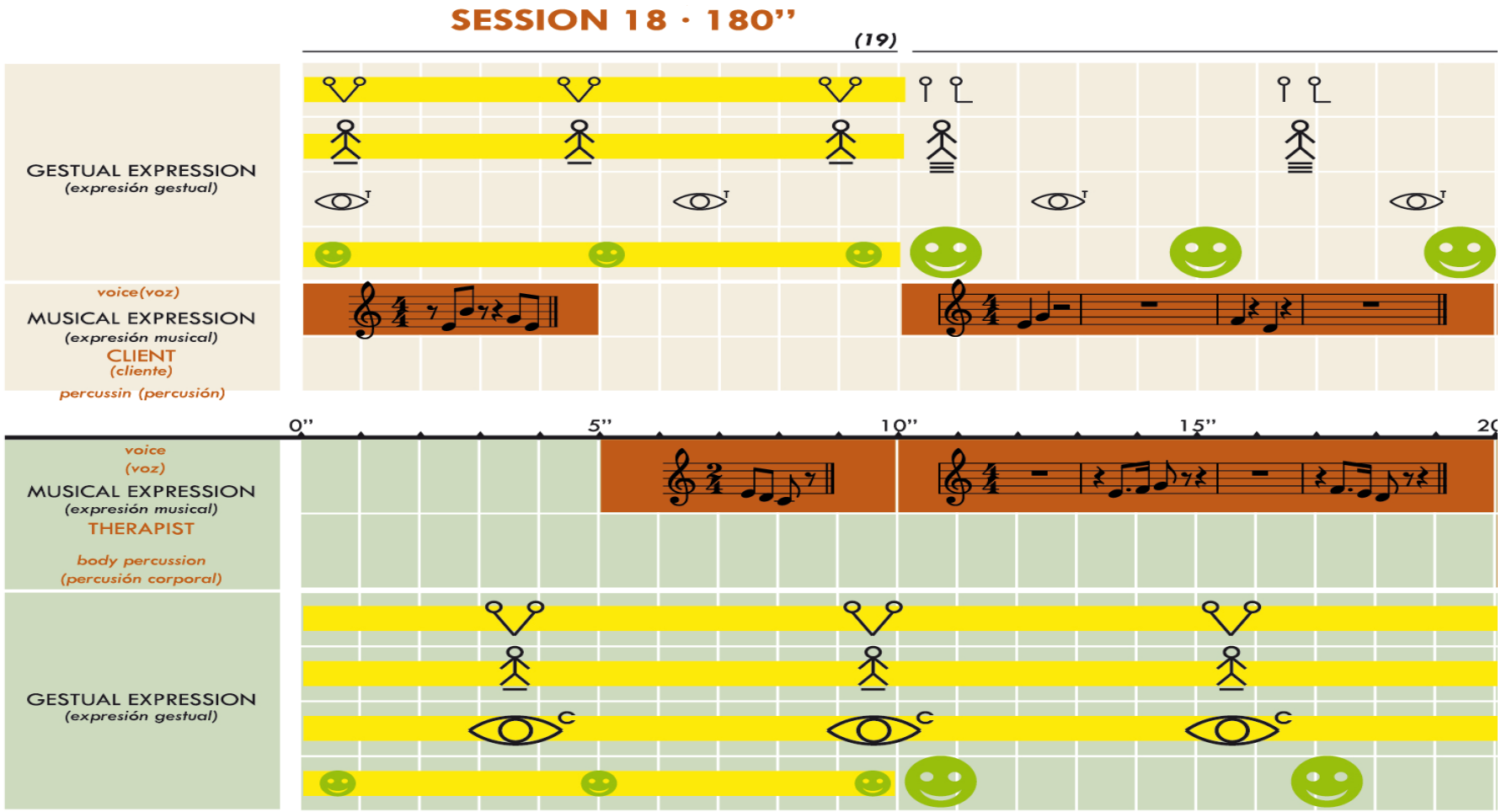

SESSION 11 · 130"
20"
25"
30"
35"
40"
45"
50"
C

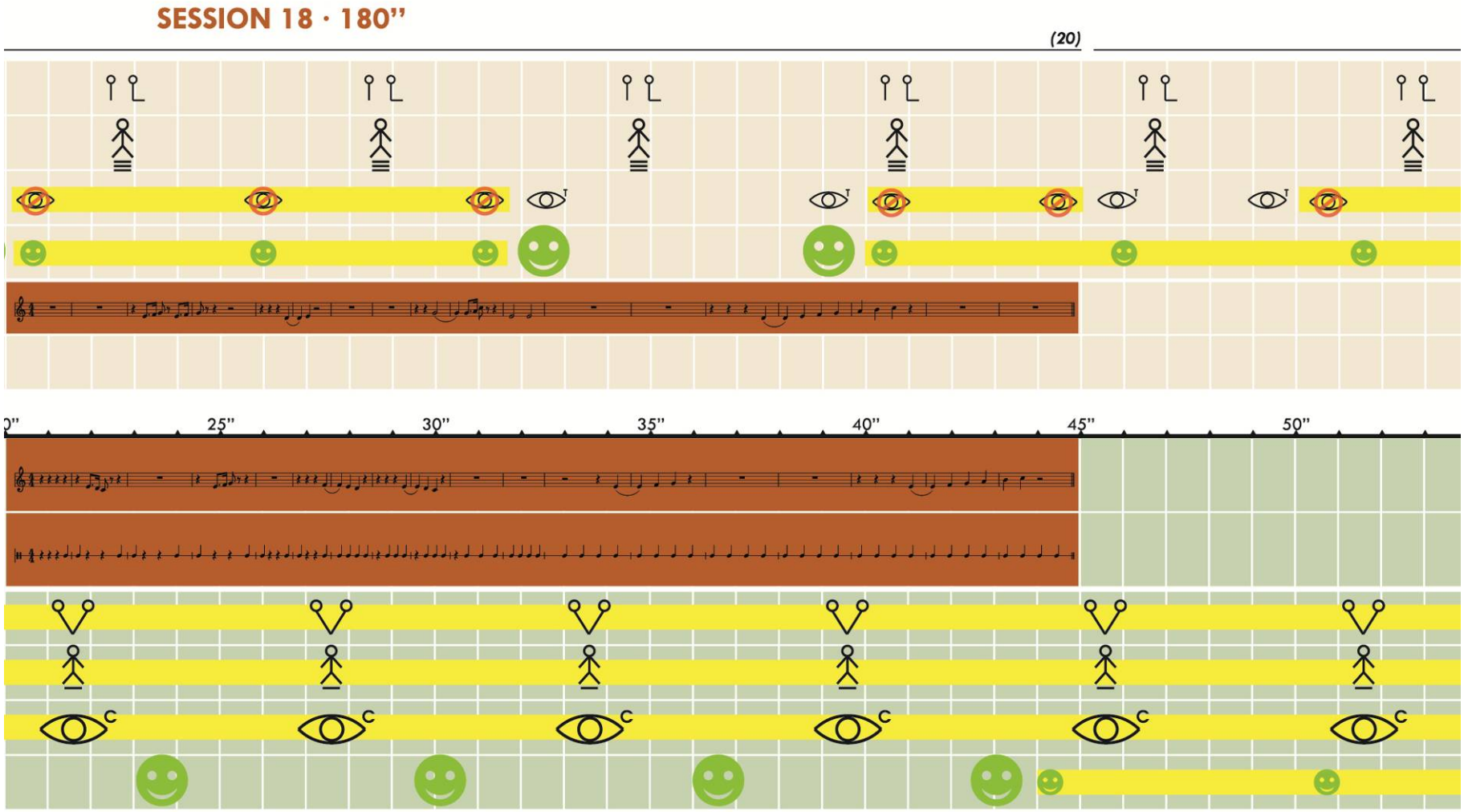

SESSION 11 · 130”
55”
65”
70”
75”
80”
C

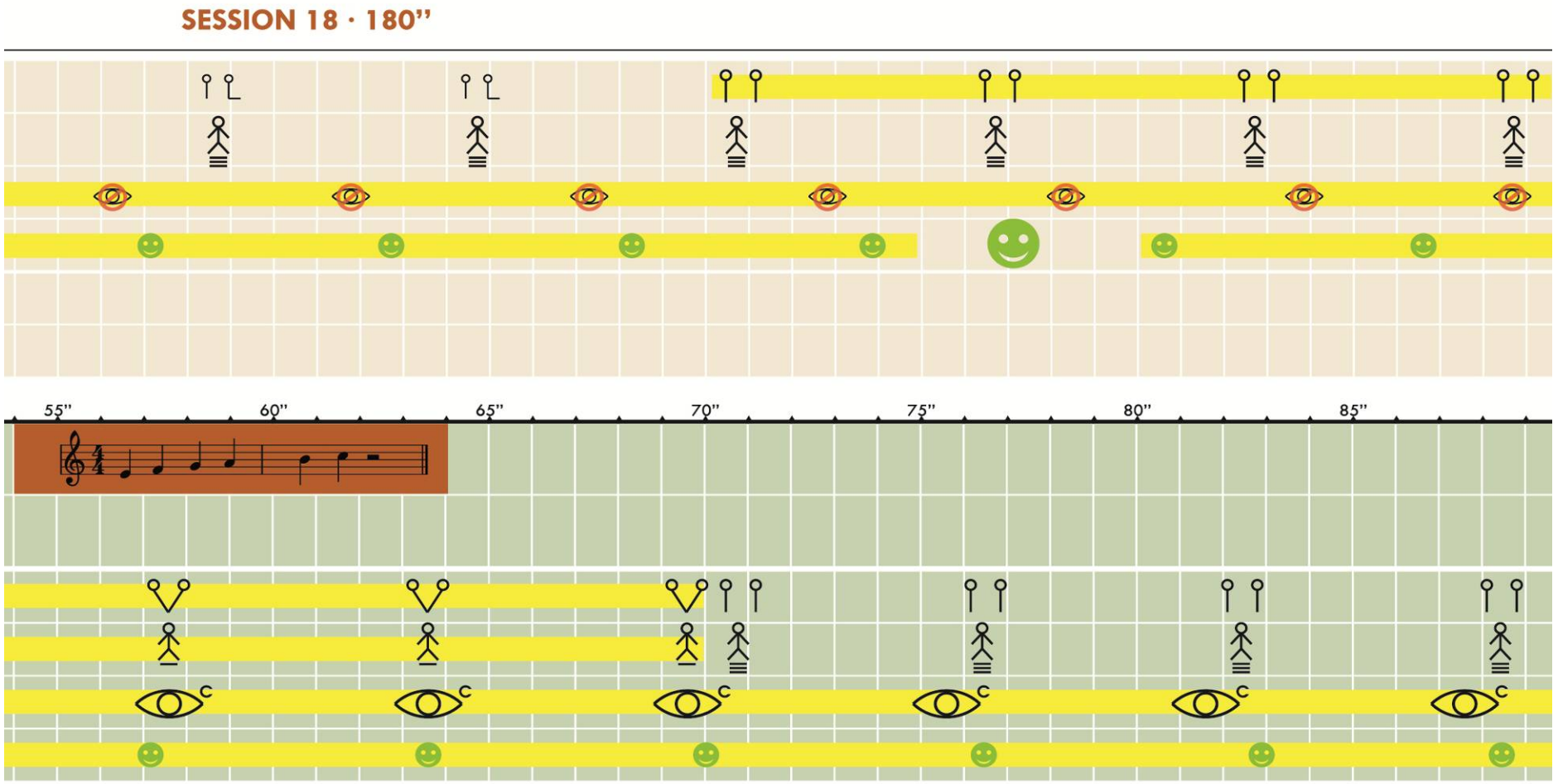
SESSION 11 · 130''

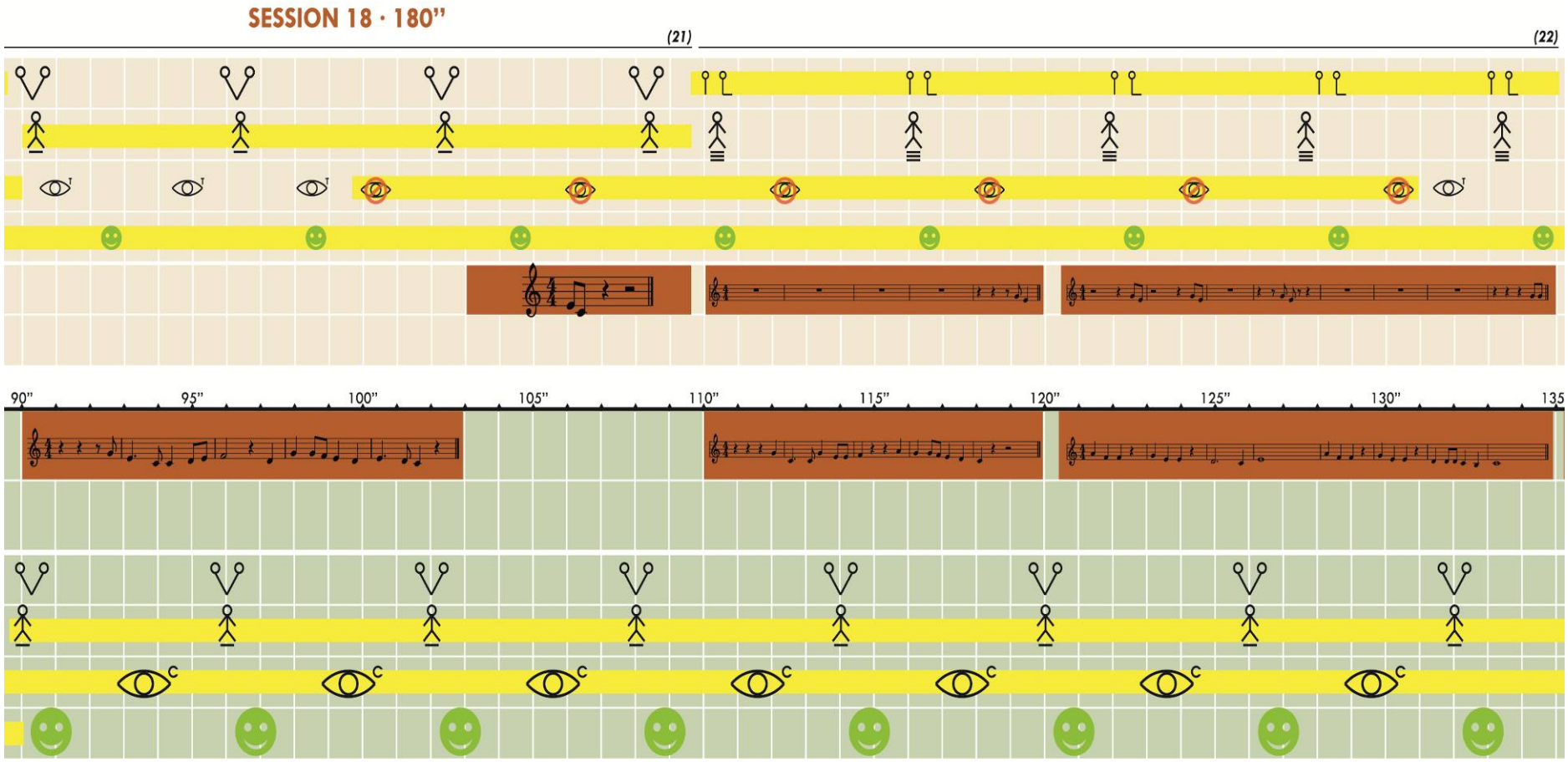


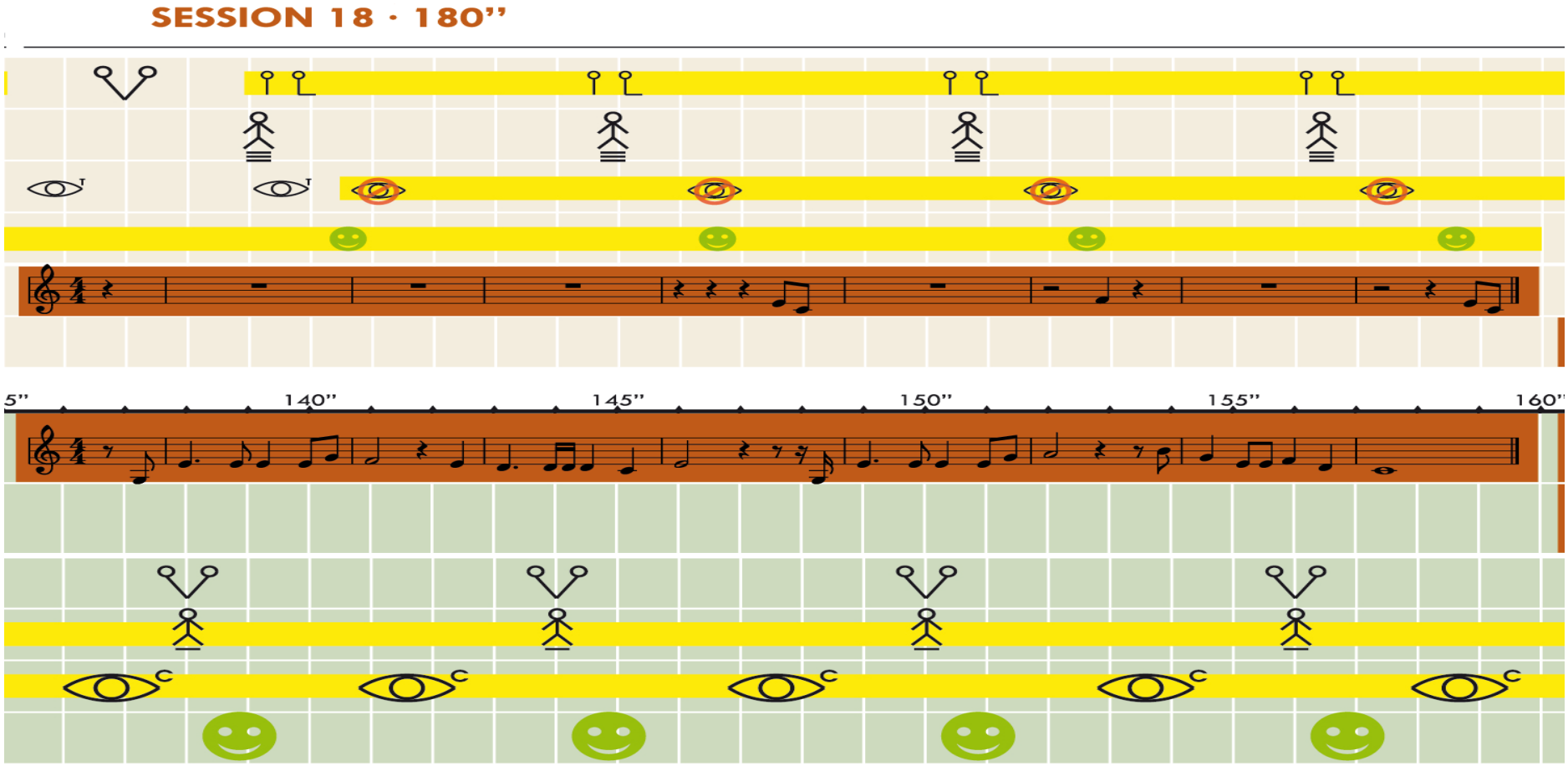

SESSION 11 · 130”
(18)
110”
115”
120”
125”
130”

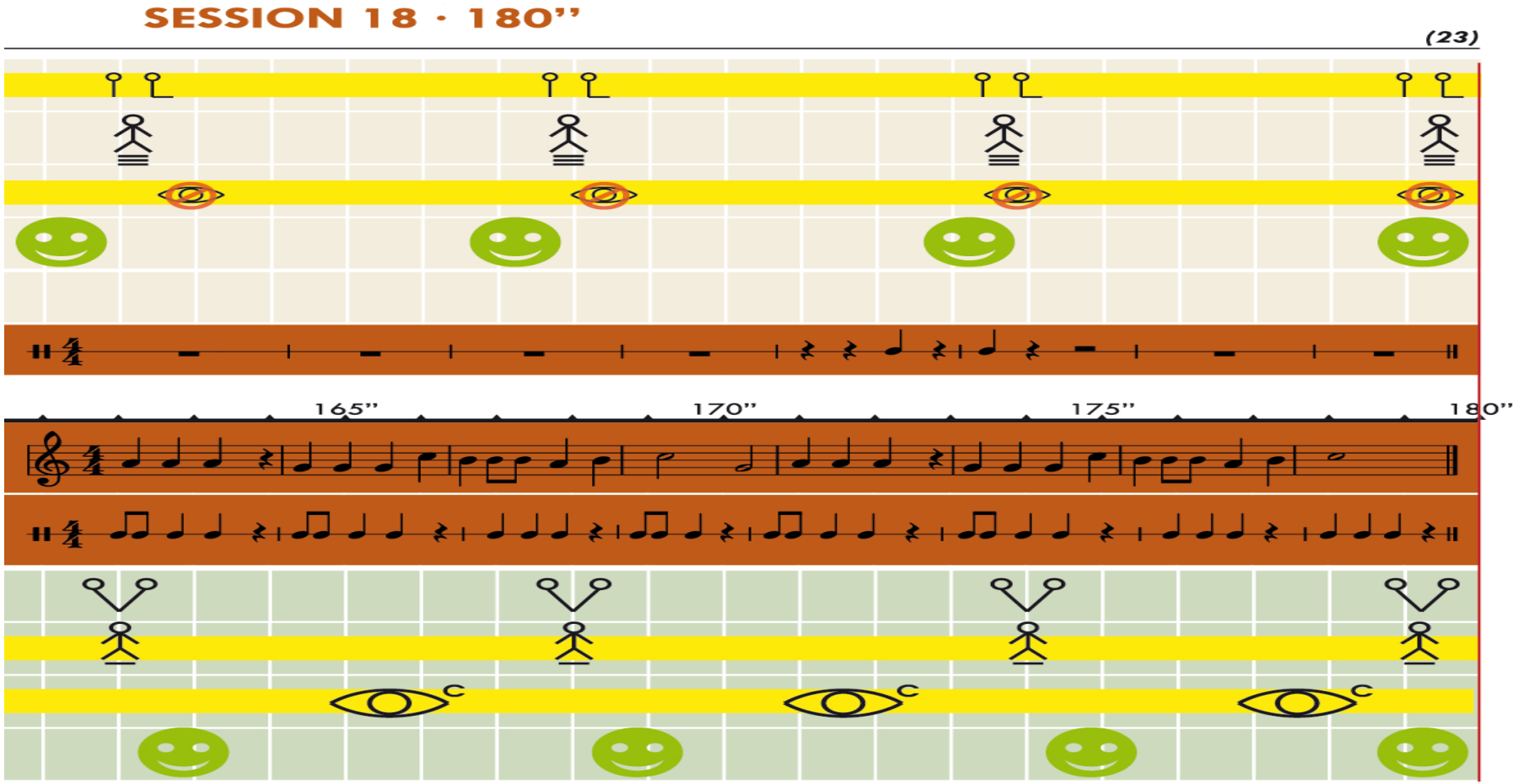

SESSION 18 · 180''
(19)
GESTUAL EXPRESSION
(expresión gestual)
voice(voz)
MUSICAL EXPRESSION
(expresión musical)
CLIENT
(cliente)
percussin (percusión)
0''
5''
10''
15''
voice
(voz)
MUSICAL EXPRESSION
(expresión musical)
THERAPIST
body percussion
(percusión corporal)
GESTUAL EXPRESSION
(expresión gestual)


SESSION 18 · 180"
(20)
25"
30"
35"
40"
45"
50"


SESSION 18 · 180''
55''
60''
65''
70''
75''
80''
85''
C


SESSION 18 · 180"
(21)
(22)
90"
95"
100"
105"
110"
115"
120"
125"
130"
135


SESSION 18 · 180”
5”
140”
145”
150”
155”
160”


SESSION 18 · 180''
(23)
165''
170''
175''
180''