

# The effectiveness of Snoezelen in reducing stereotyping in adults with intellectual disabilities: a case study of Occupational Therapy intervention in multisensory stimulation rooms

## A eficácia do Snoezelen na redução das estereotipias em adultos com deficiência intelectual: um estudo de caso da intervenção da terapia ocupacional em salas de estimulação multissensorial\*

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**ABSTRACT:** There is little evidence of the effectiveness of intervention in Snoezelen rooms in stereotyping reduction in adults with intellectual disabilities. In this direction, the present study sought to evaluate the relationship between this multisensory stimulation and stereotyping reduction in adults with intellectual disabilities. Through the case study methodology, the behavior of a subject was analyzed before, during and after the multisensory stimulation in Snoezelen rooms for ten biweekly sessions, lasting an hour and a half. Data collection was completed by semi-structured interviews with the formal caregivers of the subject and by the participant and non-participant direct observation with audiovisual recording sessions. After analyzing the data using the WebQDA software, it was concluded that the multisensory stimulation in Snoezelen rooms contributed to reduce stereotyping in the subject being studied, both during its realization and immediately after. Another evidence of this study suggests that there is a reduction in the frequency of stereotyping in the medium term as well as increased interaction and communication between the subject and therapist.

**KEYWORDS:** Stereotyped behavior; Intellectual disability; Occupational Therapy.

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**RESUMO:** Existem escassas evidências sobre a eficácia da intervenção em salas de Snoezelen na redução de estereotipias em adultos com deficiência intelectual. Neste sentido, o presente estudo pretendeu avaliar a relação entre esta estimulação multissensorial e a redução de estereotipias em adultos com deficiência intelectual. Por meio da metodologia de estudo de caso, analisou-se o comportamento de um sujeito antes, durante e após estimulação multissensorial em salas de Snoezelen, durante dez sessões bissemanais, com a duração de 1h30. A recolha de dados foi concretizada por entrevista semiestruturada aos cuidadores formais do sujeito e da observação direta participante e não participante com registo audiovisual das sessões. Após a análise dos dados, com a utilização do software WebQDA, foi possível concluir que a estimulação multissensorial em sala de Snoezelen contribuiu para a redução das estereotipias no sujeito em estudo, durante a sua realização como imediatamente após, num contexto distinto. Outra evidência do presente estudo sugere que existe uma redução

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da frequência de estereotípias a médio prazo bem como o aumento da interação e comunicação do sujeito com o terapeuta.

**DESCRITORES:** Comportamento estereotipado; Deficiência intelectual; Terapia ocupacional.

## INTRODUCTION

Intellectual disability is defined as a global intellectual function below average in terms of a population. This is associated to a deficit in adaptive behavior and changes in at least two of the following areas: communication, self-care, social and interrelation abilities, the use of community means, academic abilities, work, leisure, health and safety<sup>1</sup>.

People with intellectual disability frequently present changes in behavior, such as stereotypical habits, found in 40% of the people in institutions<sup>2</sup>. Stereotypical behaviors are defined as a repetitive, rhythmic and apparently purposeless physical or vocal behavior<sup>3,4</sup>. These are usually associated to physical or vocal actions, but may, at times, be associated to the non-functional manipulation of objects<sup>3,5</sup>.

Physical stereotypes include simple body movements such as rocking the body to and fro, moving arms or fingers about, pulling faces or repeatedly moving parts of the body such as hands, arms, legs and eyes<sup>3,6</sup>. The vocal stereotypes take the form of repetitive vocal sounds, repetitive and obsessive discourse, echolalia, dialogue in "scripting"<sup>\*\*</sup> and laughter with no social aim<sup>3,6</sup>.

There is a consensus in the literature that stereotypical behaviors interfere with the acquisition of new competencies and inhibit the individual's occupational performance<sup>3</sup>, a fundamental aspect of Occupational Therapy. These are also seen as a factor that inhibits social interaction, promotes the stigmatization of these individuals, and in more serious circumstances, may lead to self-aggression<sup>3,7</sup>.

When this type of behavior is found, its reduction becomes a priority for intervention. One of the approaches to intervention with individual with intellectual disability is therapy in Snoezelen, also used with subjects with learning difficulties or emotional disorders<sup>8,9</sup>.

Snoezelen was developed in the Netherlands, in 1975, and aims to promote the exploration of the environment, physical and mental relaxation, feelings of

satisfaction and social competencies<sup>8,9</sup>. It consists of using specific equipment, in a room, allowing for the controlled exploration of the various senses: touch, sight, smell, hearing, balance and muscle<sup>2</sup>. This equipment can promote an active stimulus, developing a behavior in the user in response to the equipment, or a non-active stimulus, in which the user simply receives the stimulus and his/her response shows no change in the environment<sup>11</sup>.

Among such equipment we will find radios, projectors, mirror balls, optical fiber, waterbeds, rubber tubes, aromatherapy oils and swings<sup>9</sup>.

The sessions in such rooms may be run with individuals or with groups and the staff should allow for and encourage the participants' interaction with the equipment used for stimulation<sup>2,11</sup>.

There are studies that show the efficiency of Snoezelen in the improvement of behavior. Evidence shows that the subjects appear to be less aggressive in multisensory stimulation rooms than in other environments. A study by Shapiro, Parush, Green and Roth (1997) on children with moderate to severe intellectual disability found a decrease, in frequency and duration, of the non-adaptive behaviors in the Snoezelen, in comparison to those in the usual playrooms<sup>11</sup>.

Research carried out by Matson et al<sup>9</sup> also shows that the sensory input that is received, during the multisensory stimulation in Snoezelen rooms, allows for a reduction of stereotypical and self-aggressive behaviors, as well as other disruptive behaviors. The study allows one to conclude that, immediately after multisensory stimulation, there appears to be an increase in the involvement of individuals with profound intellectual disability and autism in carrying out the proposed tasks, as well as a decrease in the daily global frequency of defiant behaviors<sup>9</sup>. Another study concludes that individuals prefer certain stimuli to others and that by reaching out to preferential stimuli leads to an alternative that decreases harmful self-stimulation behaviors<sup>12</sup>.

Cuvo et al<sup>2</sup> carried out a study with children with severe intellectual disability, and found a decrease in stereotypical behaviors and the increase of their

\* Adaptability to personal independence and social responsibility demands expected by the cultural group in which the individual is inserted.

\*\* Dialogues in "Scripting": the repetition of dialogues taken from television programs or movies<sup>3,6</sup>.

involvement in Snoezelen room in comparison to that in activity rooms<sup>2</sup>. Other studies in the field show that the use of non-active stimuli can effectively reduce stereotypical and self-aggressive behaviors<sup>13</sup>.

As seen above, existing scientific publications provides evidence of the relationship between therapy in the Snoezelen room and the reduction of stereotypical behaviors. However, these are few in number and point towards the need to take research in the area further, given that stereotypical behaviors are barriers to occupational performance and, therefore, interfere with the quality of life and the independence of these individuals. It is in this context that the research we carried out aims to explore and gain a better understanding of the direct relationship between the multisensory stimulation in Snoezelen rooms and the reduction of stereotypical behaviors in individuals with intellectual disability.

## METHODOLOGICAL PROCEDURES

This case study, which is qualitative and exploratory/descriptive in nature, aims to evaluate the relationship between multisensory stimulation in Snoezelen rooms and the reduction of stereotypical behaviors in adults with intellectual disability. To be more specific, this study aimed to evaluate the reduction of stereotypical behaviors in an individual with intellectual disability during and immediately after multisensory stimulation in a Snoezelen room and to see if such a reduction was still to be found in a different context, outside the room.

The selection of the subject was made among the subjects attended to at the Occupational Activity Center\* of the *Organização de Apoio e Solidariedade para a Integração Social* (OASIS), in Leiria, Portugal. This subject is diagnosed to have intellectual disability and the presence of stereotypical behaviors that hinder his active participation in significant activities. Criteria for exclusion were the presence of an associated physical disability that could make impossible the exploration of the Snoezelen

equipment, and the existence of previous episodes of epilepsy or psychotic bouts\*.

The selected individual is 19 years of age, male, and has been diagnosed with Mosaic Trisomy 21\*\*. The subject lives in the country with his parents and two siblings and attends the Occupational Activity Center at OASIS. In the institution, the participant carries out activities that are strictly occupational in nature, of which 5 were selected for evaluation. By analyzing the individual's files, it became clear that the subject presents stereotypical behaviors that hinder his occupational performance.

In order to carry out the sessions, two rooms of the institution were used: an activity room and a Snoezelen room (Picture 1). The activity room is close to the Snoezelen room and is equipped with a desk and two chairs, has natural and artificial light and has been made soundproof. The Snoezelen room is equipped with an optical fiber rug, a hot waterbed, a mattress with two water columns, a swing, mirrors, projectors and a sound system.

The study was carried out in the course of 11 sessions, which took place twice a week, and lasted 1h:20m, throughout a total of 5 weeks, in the months of April and May 2014. The first session was used to evaluate the participant's behavior in the activity and the Snoezelen rooms and to identify the strictly occupational activities\*\*\* the subject carries out on a daily bases. The rest of the sessions were divided into three moments: during the first 30 minutes we carried out an activity in the activity room (phase 1), during the second 30 minutes we carried out a session of multisensory stimulation in the Snoezelen room (phase 2), and finally, in the last 30 minutes we repeated the initial activity (phase 3). Given that the context plays a role in the individual's behavior, the 3<sup>rd</sup> sessions of activities were carried out in two different contexts. In the first 5 sessions, the participant remained in the Snoezelen room, (with all the stimuli turned off), whereas in the rest of the sessions the subject was taken back to the activity room.

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\*Social answer that aims to promote and provide conditions that contribute to the quality of life of people with disabilities and inabilities, through the performance of occupational activities.

\*\* According to the literature, light and visual stimuli can bring about new epileptic episodes and it is not advisable to submit subjects with a history of delirious or hallucination activity to them<sup>15</sup>.

\*\*\* Mosaic Down Syndrome accounts for 1% of the Down Syndrome cases and is the result of the mitotic disjunction of chromosome 21. These subjects have a mix of cells with 46 and with 47 chromosomes and the clinical outcome is related to the quantity of cells with abnormal chromosome counts<sup>16</sup>.

\*\*\*\* Activities that aim at keeping the person active and engaged, favoring his/her physical, emotional and social well-being<sup>14</sup>.



Figure 1 – Snoezelen room in OASIS

As to the data collection, we carried out a semi-structured interview with the participant's formal caregivers, for a better understanding of the activities to be chosen for the study. We also carried out indirect observation by looking through the subject's individual file and non-participatory direct observation of the audiovisual recording of all the sessions. In order to collect the data, fully informed permission was obtained from the subject's legal tutors and the study was equally authorized by the institution, OASIS.

The data analysis was carried out through the quantitative analysis of content. Based on the principles of social sciences, this was obtained through a structured method of measurement and counting that may be used in the analyses of content, namely of interviews, audio and video. The aim of this form of analysis is to examine a great amount of qualitative information through statistical methods<sup>17</sup>. For the purpose WebQDA software was used, which allowed for the analysis of audiovisual data<sup>18</sup>. In order to reduce possible bias, and so as to validate the findings, we used researcher triangulation. In this case, three different researchers analyzed the captured film stock of every session

and registered the amount of physical stereotypical behaviors observed. For the study, we used the mean of the values found.

## RESULTS/DISCUSSION

With the first session, we concluded the subject presents various stereotypical behaviors that fall within the category of physical stereotyping. Observation revealed, among others, repetitive touching: the forefinger to the chin; the second finger to the temporal zone; the second finger to the zygomatic region; the forefinger to the legs; third finger to the eyebrows; finger tips to the chest region and with the cubital side of one of the hands to the arm in the opposite side. Further to these, the subject pulls faces with no specific purpose, repeatedly opens and closes his mouth and rocks his head to and fro while holding his face with both hands. Still in the first session we were able to conclude that the subject performs more than one of the above mentioned stereotypical motions simultaneously. As for the subject's behavior in the Snoezelen room, there was apparent discomfort when on the waterbed and the swing.

This behavior may be related to a deficit in sensory integration\*, namely in vestibular\*\* and in tactile systems\*\*\*, factors that had previously been identified in his medical history. The inability to integrate vestibular stimuli causes gravitational insecurity that takes to excessive fear of vestibular stimuli, while the changes to tactile stimuli result in the tactile defense in response to excessive emotional stress or of aversion when the individual is touched unexpectedly or when he is subjected to physical contact<sup>19</sup>. Thus, given that the swing and the waterbed stimulate the vestibular and tactile systems, the subject revealed difficulty when using them, having sometimes asked for their interruption. However, as the sessions progressed, it was possible to see improvement in tolerating the waterbed.

Still in the evaluation session, as happened throughout the study, the subject showed a preference for visual stimuli, namely those produced by the water columns (bubbles and lights with changing colors) and that the existence or non-existence of auditory stimuli did not affect his behavior. These results are similar to those presents in the study by Matson, Bamburg e Smalls (2003) that shows a preference for visual stimuli in general, in opposition to auditory stimuli that appear to have no impact in the subjects' behavior<sup>9</sup>.

As for the sessions in this study, as may be observed in Graph 1, the session in which the greatest amount of stereotypical behaviors were observed was session 1, with a percentage of 62,83% in the 1<sup>st</sup> phase and 59,13% in the 3<sup>rd</sup>, while it was in session 7 that the least of such behaviors occurred, reaching 41,02% and 19,83%, in the 1<sup>st</sup> and 3<sup>rd</sup> phases, respectively. Graph 2 reinforces such results, given that the first session presented the highest percentage of stereotypical behaviors, with a value of 56,66%, and session 7 presented the lowest value of 37,42%. Session 6 presented the biggest reduction of stereotypical behaviors that dropped from 54,47% in the 1<sup>st</sup> phase to 18,83% in the 3<sup>rd</sup> phase.

According to Graph 2, in sessions 1,6,7,9 and 5 we will find higher percentages in the frequency of stereotypical behaviors in the 1<sup>st</sup> phases, when in comparison with the 3<sup>rd</sup> phases. On the other hand, in sessions 2, 3, 4, 8 and 10, the percentage of stereotypical behaviors was higher in the 3<sup>rd</sup> phases when compared to the 1<sup>st</sup>.

Still from the analysis of Graph 1, the subject's stereotypical behavior show a greater reduction in the

sessions in which the 3<sup>rd</sup> phase took place in the activity room (sessions 6,7,8 and 9), as happened in the 3<sup>rd</sup> phase of the sessions that took place in the Snoezelen room (sessions 1,2,3 and 4). The same may be seen in Graph 3 in which the mean percentage of the stereotypical behaviors, in such sessions, fell from 52,16% to 43,81%.

Also to be seen in Graph 3, in the first 5 sessions there is an increase in stereotyped behaviors from the 1<sup>st</sup> to the 3<sup>rd</sup> phases, in which the mean percentage increased from 49,19% to 52,16%. In the rest of the sessions the opposite happened, with a decrease in the percentage of the behaviors with stereotypes from 46,7% to 43,81%.

These figures show that there may be a relation between the context in which the activity takes place and the presence of stereotypical behaviors, given that the subject's behavior varied in relation to the place where the activities happened in the third phase of the research. Whenever the activities took place in the Snoezelen room, with the stimuli off, more stereotypical behaviors were found than when they were carried out in the study's initial context. The explanation by be in the interference that the stimulation equipment may have on the subject's attention and concentration on carrying out the activities.

By observing Graph 1, the 1<sup>st</sup> phases of sessions 6,7,8 and 10 show a smaller percentage of stereotypical behaviors in comparison to the 1<sup>st</sup> phase of sessions 1, 2, 3 and 5, except for what was seen in activity 4, in which there was an increase in stereotypical behaviors from the 1<sup>st</sup> phase in session 4 to the 1<sup>st</sup> phase of session 9.

By comparing the 1<sup>st</sup> phase of the 5 initial sessions with the 1<sup>st</sup> phase of the last 5 sessions, and as may be seen in Graph 3, one can observe a decrease in the percentage of the stereotypical behaviors, from 49,19% to 46,07%. As for the 3<sup>rd</sup> phase of the sessions, there is a clear decrease of stereotypical behaviors from sessions 1, 2, 3, 4 and 5 to sessions 6,7,8,9 and 10.

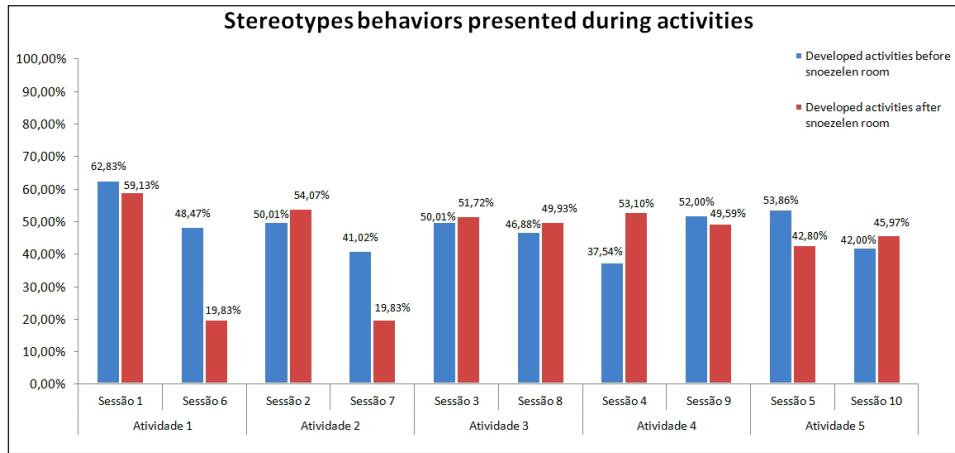
By analyzing Graph 2, there is a 13,38% decrease of stereotypical behaviors from the first to the last session in the study. In the same Graph we may see that after session 4, the pattern of behaviors with no stereotypes remains systematically above that with stereotypes.

\* A process through which the Central nervous System organizes sensory stimuli so as to provide adaptive responses to the environment<sup>20</sup>.

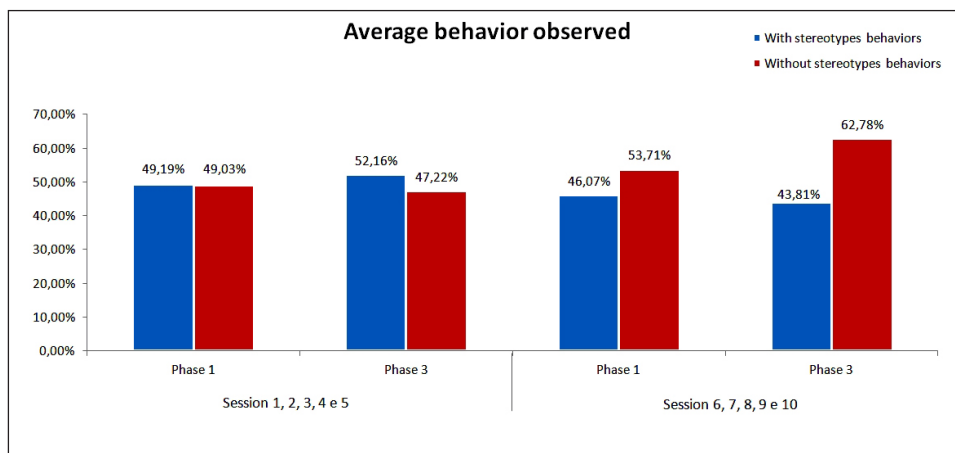
\*\* This system sends information to the central nervous system about the position and movement of the head, the direction of gravity, stabilizes the gaze during movements, controls postural adjustments<sup>20</sup>.

\*\*\* This provides information about external stimuli that come into contact with the skin, temperature, texture, the form and movement of objects over the body. This system, in conjunction with the proprioceptive and vestibular systems, provides the basic sensations for the development of body conscience, fundamental to making adequate responses to the environment<sup>21</sup>.

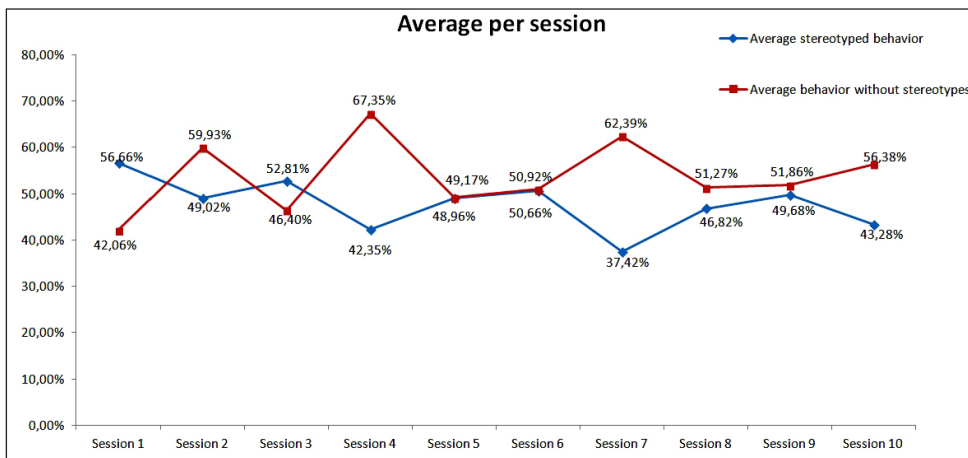
**Graph 1 – Stereotypes behaviors presented during activities**



**Graph 2 – Average behavior observed**



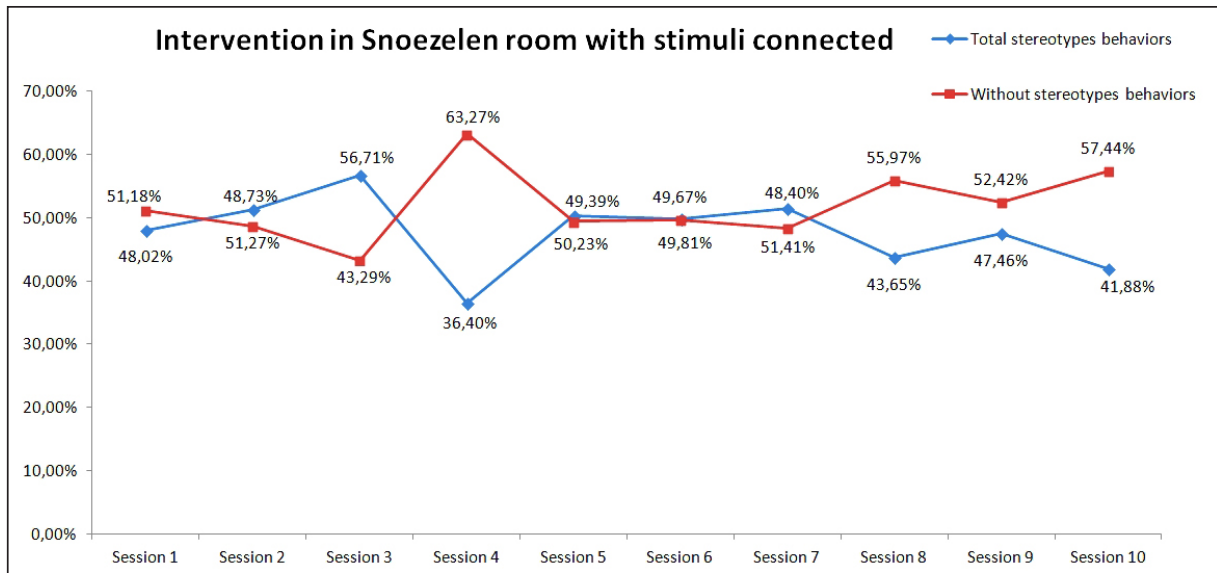
**Graph 3 – Average per session**



Such evidence suggests that multisensory stimulation in Snoezelen rooms, when carried out on a regular basis may lead, in the medium run, to a reduction of stereotypical behaviors in adults with intellectual

disability. The subject's behavior in the Snoezelen room, also reinforces this notion, given that, as may be seen in Graph 4, stereotypical behaviors have a 6,14% decrease from the first to the last session.

**Graph 4 – Intervention in Snoezelen room with stimuli connected**



Despite this, by looking at Graph 1, we may see that in and after session 8 stereotypical behaviors increase in all phases. This may be explained in a change in the intervention protocol, given that, due to the subject's irregular attendance, those sessions had to be had in the course of the same week. This may have had an impact on the subject's behavior and may account for the less encouraging results found in those sessions.

As for the stereotypical behaviors themselves, the study shows that the most frequent behavior was the repetitive touching of the forefinger to the chin region, to be followed by rocking the head while holding the face between the hands and a combination of stereotypical behaviors. Among these, the least frequent was touching the legs, repeatedly touching the chest with the tip of the fingers and repeatedly touching with the second finger on the zygomatic zone.

The stereotypical behavior that was most found in the Snoezelen room was rocking the head while holding the face with both hands, touching the legs with the forefinger, touching the chin region with the forefinger, stroking the eyebrows with the third finger, to be followed by a

combination of stereotypical behaviors. The least frequent ones was repeatedly touching the zygomatic zone with the second finger, pulling faces and repeatedly touching the chest with the fingertips.

The stereotypical behavior of touching the chin region with the forefinger had a gradual decrease throughout the sessions, which was particularly obvious in the 3<sup>rd</sup> phases of the sessions that took place in the activity room.

As for the repetitive touching of the zygomatic zone, this did not occur in the 3<sup>rd</sup> phases of all sessions.

The stereotype of repeatedly touching the chest with the fingertip was only to be found in the 1<sup>st</sup> phase of the first 5 sessions.

The rocking of the head while holding the face in both hands diminished as the sessions progressed, presenting a lower frequency when the 3<sup>rd</sup> phases took place in the activity room. In the Snoezelen room, this happened mainly when the subject interacted with the therapist on the optical fiber rug. Throughout the study, it became clear that this stereotypical behavior happened in particular after the therapist gave positive reinforcement whenever he concluded his tasks satisfactorily.

As for touching the legs, this totally disappeared during activities in sessions 6, 7, 8, 9 and 10. In the Snoezelen room, this was most frequent when interacting on the rug and on the mattress with water columns, it never happened when on the swing, with a gradual decrease to the point of non-existence in session 10.

The stereotypical behavior of opening and closing the mouth had an increase in the 3<sup>rd</sup> phases of sessions 1,2,3,4 and 5, with a decrease in the same phases of sessions 6,7,8,9 and 10.

As for the stereotypical behavior of stroking the eyebrow with the third finger, this had a greater decrease in the 3<sup>rd</sup> phases of sessions 1,2,3,4 and 5; however, there was an increase in sessions 6,7,8,9 and 10. In the Snoezelen room this stereotype happened on all the stimuli, except on the swing, and became more frequent when the therapist stopped interacting with the subject.

The combination of stereotypes came about when the therapist stopped to engage with the subject and there was an increase in the 3<sup>rd</sup> phase of all the sessions.

Finally the stereotypical behavior of repeatedly touching the opposite arm with the cubital side of the hand decreased gradually as the 10 sessions progressed.

Throughout the study, it was also clear that during the activities the subject showed stereotypical behaviors between tasks. However, there was a decrease of such behaviors and the study progressed, having the subject carrying out subsequent activities without this happening.

Another relevant observation is the fact that throughout the study the subject's ability to respond to requests and communication with the therapist improved, as did his own initiative towards verbal and non-verbal communication. In addition, the subject showed an increase in tolerance to physical contact with the therapist and there were moments when the subject himself initiated those very contacts. The same was found in a study by Hutchinson e Hagggar (1991), in support of the notion that multisensory stimulation in Snoezelen rooms stimulates interaction and satisfactory relationships between the client and the facilitator<sup>22</sup>.

It was also seen that the swing and the waterbed, with the lights on, were the equipment on which the least stereotypical behaviors occurred, in opposition, the rug was the equipment that triggered stereotypical behaviors.

These results converge with the theory that stereotypical behaviors provide sensory self-stimulation\*, given that such behaviors are to be found at a lower frequency on equipment that offer less sensory input<sup>23</sup>.

## CONCLUSIONS

The study that we here describe started on a pathway still to be discovered, with limitations that are always related to the population of the study, namely making people, the participant's tutors, aware of the importance of collaborating with the scientific research. The participant's irregular attendance led to changes to the research protocol that was initially established, a situation that did not limit the study, but that made it broader. As usually happens with qualitative research, some findings fell outside what was being analyzed, but these brought about new perspectives on the results of research of multisensory nature.

Future studies similar in nature may explore the reduction of session duration, for these might have been far too long, a situation which may have exhausted the subject. Despite these limitations, we may conclude that multisensory stimulation in the Snoezelen room truly contributed towards the reduction of stereotypical behaviors in the subject under study, both during the sessions in the Snoezelen room and in other contexts, immediately afterwards.

We also observed that, at medium term, there was a reduction of the stereotypical behaviors and an increase in the interaction and the verbal and non-verbal communication with the therapist. These findings led to the hypothesis of this approach being seen and a real form of intervention, in Occupational Therapy, for the given population, in the knowing that given the small sample, the results may not be generalized. Furthermore, it is important to mention other Snoezelen equipment, not used in this study, may lead to different responses from the subject under study.

This said, and even if this was an innovative study given the medium term results that were obtained, this is still an unfinished project, with a range of options to be explored, we firmly believe further research should be carried out on this topic, focusing on a larger sample so as to allow for generalization.

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\* The function of stereotypical behaviors is to substitute sensations that are absent or to increase the sensory modes still had<sup>23</sup>.



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