

Colour applied to TEACCH and Snoezelen rooms and therapies

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How can colour be used in therapy rooms and in therapies? Colour is known to have influence in human behaviour, through the interaction between colour wavelengths and sensory stimuli in the environment, subconsciously influencing the human mind [1]. A therapeutic space requires specific characteristics regarding the exercises to perform in such space as well as the participants involved. Colour is also considered as an ‘international language’ allowing people to express their preferences, their choices, and their emotions [1]. Throughout the research we have attempted to answer the following questions: How can colour, introduced in games, equipment, objects, images and projections, be used as a teaching tool in a TEACCH room, as opposed to a Snoezelen room? How does a therapist work on specific skills with autistic children in a structured therapy environment such as TEACCH, in comparison to a non-directive therapy environment such as Soezelen? Research results indicate that colour is used in diverse ways in both environments, being the major differences the way in which it is introduced to the children, the objectives it aims, as well as the use of light in connection with the equipment.

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Introduction

As a part of an investigation about the design of therapy rooms in schools, it seemed necessary to understand how different therapy rooms work, regarding the activity intended, how colour is applied in the room, and its importance in the therapy.

We have selected TEACCH and Snoezelen therapy rooms for their different methodology use, being TEACCH a structured teaching space and Snoezelen a multi-sensory space with a non-directive approach. Despite the methodology differences, we found they complement each other when planned to work with autistic children, as one works on structure and routines and the other one on the sensory stimulation. Snoezelen, like sensorial integration, music therapy, hydrotherapy, etc., is a part of therapies non-integrated in global program, such as TEACCH, but still applied to enhance competences [2]. Furthermore, the therapy rooms were considered for this study for allowing a wide range of therapies to be performed in both spaces, for example, speech, physical, psychomotricity, and occupational therapy, etc.

We have compared how colour is applied and used in both rooms, exercises and therapies, attempting to clarify how colour teaching, learning and experimenting might be used as a tool for autistic children in such environments.

A brief description is presented about the components of the therapies, differences and similarities, such as room characteristics, work systems, colours used in rooms, and how therapists present colour in equipment and exercises to the children during experimenting sessions.

We then compared the results on how therapists use the rooms, and how colour is used in each therapy and space.

The methodology used for this paper was a research-based on mix literacy reviews, TEACCH and Snoezelen rooms observation and interviews to 12 therapists in different areas of practice, such as speech, physical, music, occupational therapists, clinical psychologist, among others. Having them all previous experience in, either Snoezelen or TEACCH therapy rooms.

In this study we have focused our attention in Autism Spectrum Disorder.

Although neither room is exclusive to autistic people, this group is one of the most beneficial to execute therapies, or different activities in such spaces.

Theory

Autism Spectrum Disorder refers to a complex development disorder that affects the brain, varying in severity degrees, that can result in cognitive impairments or handicaps when performing any activities [3], according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-V, 2013, [4]) Autistic people show difficulties regarding three different areas of development: communication, social interaction and behaviour. Although some autistic people develop speech and function at a high level, some present difficulties understanding the context of the conversation, interacting with people, exhibit 'weird' or repetitive behaviours, obsessive interests and react badly to routine changes [5].

TEACCH (Treatment and Education of Autistic and Related Communications Handicapped Children) is a structured teaching methodology, developed by Eric Schopler and collaborators, in the 70's, in North Carolina, United States of America [6].

"TEACCH is an evidence-based service, training, and research program for individuals of all ages and skill levels with autism spectrum disorders." [7 p170].

This methodology works in structured spaces, with individual's necessities, according to the severity of the disorder, helping teachers and parents to increase the child capacities exploring the strengths in autistic children: visual processing, memorizing routines and special interests. It uses not only structured spaces, physical space organization, but also limits the distraction focus, eliminating excess information in the work room. The structured approach is a work system, previously planned according

to the goals for each child, depending on their abilities and difficulties. It is also used in exercises, routines and activity schedules, as it helps children to remain focused and reduces anxiety [2].

TEACCH rooms are divided into seven different sections (with visible boundaries and clear areas): learning 1:1, working, transition, group, computer, play, and meal areas. In each area the participant is invited to perform exercises individually, or in a group, with or without the therapist's help, depending on the exercise, as this methodology aims for participant's independence and autonomy. The user follows a schedule where all the activities are represented with images, generally using PECS (Pictures Exchange Communication System). The user should also respect the plan or the order presented in the schedule, executing one activity at a time, finishing the activity before moving on to the next one [2].

As a key point it uses visual support to introduce daily routines, to increase comprehension and to stimulate conversation, through the use of symbols, images, colours, numbers, etc. The visual support can be introduced through personalized cards, as in PECS, set for each student depending on the abilities one has to communicate.

TEACCH aims to empower the child with strategies, through structuring space, materials and activities, so the child learns how to work independently in a non-structured space, for example, outside the classroom [2].

Snoezelen derives from the words *Snuffelen*, which mean to smell and explore, and *Doezelen* which mean to relax, it is a non-directive approach therapy, developed by Jan Hulsegge and Ad Verheul, in Netherlands, in the 70's, while working with severely disabled people. The founders of Snoezelen, who considered the therapy as a sensory-stimulating environment experience, began experimenting to improve life quality on the patients at the mental institution they worked in. This therapy relies on the stimulation of the sensorial 'department', working with different senses, the most commonly visual, tactile, auditory, olfactory, gustatory, and also vestibular (working on the balance of the user) and proprioceptive (that represents how the person engages with the surroundings and the knowledge one has of the strength needed to execute some activity). Not only does this provide the stimulation of the participants senses, but also allows the person to experience it in a safe, attractive and comfortable environment [8].

Snoezelen is a process of "controlled sensory stimulation in a non-threatening secure environment involving all sensory systems. (...) commonly utilized for individuals with severe sensory impairments, autism, severe development and/or learning disabilities, etc." [9 p880].

By empowering the user with the control of the environment it aims to achieve certain goals, such as, promoting interaction between user and therapist through physical contact while performing certain exercises, allowing the user to explore and engage with he's senses and the surroundings, encouraging dialogue and vocalisations, while working on self confidence, concentration and communication [8, 10].

Multisensory spaces, such as a Snoezelen room, are prepared for the person to relax, work different senses, explore, and execute some exercises, but not having to follow orders, or a strict routine. The therapist remains in the room during the session, suggesting activities based on a plan previously decided for the participants needs although the participant has the power to cease the activity at will.

A Snoezelen room can be used for a vast group of people, being the most common, adults or children with learning, social and communication disabilities, or sensory deprivation, autism spectrum disorder, different syndromes, etc. This allows for the rooms to be used as part of education therapy [11], by teachers, parents, caregivers and therapists [12].

AAP (American Academy of Pediatrics) recommends evaluation of the competences and difficulties the child presents, determining a functional profile, which will establish the therapeutic intervention needed for each case. The therapy approach should stimulate: cognition, socialisation, communication, behaviour, autonomy, play and academic competences [2].

Colour and light in TEACCH and Snoezelen

"Colour is an international language through which people can share their emotions in an intuitive manner that may be nonverbal but is nonetheless widely understood." [1 p213].

Colours can be used by autistic people to communicate personal preferences, imply understanding of the exercise requested, distinguish objects belonging to different people, or to stimulate conversation when applied to images. This is extremely important for autistic people who are prone to have difficulties in communication, and have better results when using visual aids, such as images. Colour is used as a tool, even when the main goal is not to learn about a specific colour.

Different colours can be observed in both physical space and in material or equipment used to perform the exercises in such therapies. The colour choice will depend on the purpose of the room and the objectives requested for the therapy space. Colour can be considered as a part of the healing process, increasing or maintaining the sense of well-being [13]. The perception of the colours that surround us have effect not only in visual department, but also carry emotional, symbolic, synesthetic and physiological content [14], hence the importance of colour when designing spaces for therapies.

TEACCH rooms do not often present highly pattern or overly bright colours as a palette choice for walls, ceilings and floor, as their effort is to keep the participant engaged and focused on the activity [10]. In the rooms observed, we found the use of neutral or light colours, such as white, beige, light green, light blue and light pink, for walls, being some of the space dividers (booths) in light brown (natural wood colours) or white, where participants execute their activities, avoiding visual contact with other participants, as exemplified in Figures 1 and 2.



Figure 1 (left): TEACCH room in school EB1/JI Senhora das Oliveiras, Darque, Portugal.

Figure 2 (right): booth detail, in APPDA, Lisbon, Portugal.

Other colours in the room are mostly applied to schedule boards created for the students to learn their routines, some materials the students use in exercises and in some equipment, such as tables, chairs, pillows, etc. The students are invited to participate in the colour choice of their preference for routine schedules, Figure 3. Fiona de Vos [15] mentions the importance of the participation of target groups in colour choice, for example, to understand their preferences and engaging them in the activity.

TEACCH therapy also produces a wide range of exercises using colour. Those work as part of cognitive teaching [2], they can teach how to differentiate colours, shapes, objects, images (PECS), letters, numbers, etc., using those exercises therapists can also teach cause and effect, rules (i.e. Red to stop, green to go), to identify the activity proposed in the image, or to promote conversation. There are

no limitations according to colour choice; any colour can be used, depending on the exercise and goals the therapist aims for.



Figure 3: Routine schedule applied on the wall (left), schedules with user's pictures (middle) and, detail using PECS and photos to identify the activity (right), by author, APPDA, Lisbon, Portugal.



Figure 4: TEACCH exercises (left) differentiate colours and shapes, (right) matching objects with images, pictures from Psychopedagogue Silvana Lima.

As for colour in Snoezelen rooms, initially they were presented in three different colour schemes: white room, which was entirely painted in white, equipment included, was later considered to be non suitable as it resembles hospital facilities and can increase the feelings of stress and anxiety [16]; black room, with walls, ceiling and floor painted in black, using neon colours in some equipment and UV lighting to illuminate the room, it is very strong for visual stimulation, but can be limited for other activities; or activity room, with a variety of colours, such as yellow, red, orange, blue, green, etc., both painted on the walls and applied to furnishings and equipment, it is mainly used for stimulation and preferably for younger users. These rooms would be presented according to the target group, or the requirements of the therapists. Nowadays the colour scheme varies, although white rooms, considered being the most eclectic, using beige, or off-white colours are the majority, as they allow projection in most surfaces (walls, ceiling and floor). Regarding the observation, we have registered Snoezelen rooms with walls and ceilings painted in beige, or light blue, having two of the observed rooms a black ceiling to visually lower them, and light brown wooden pavements. The choice for the material on the floor was based on how it feels (wooden pavements are soft and warm to touch), how easily it is cleaned and to promote another stimulating surface, as it vibrates while some of the equipment is working, stimulating several senses at the same time. The therapist must, however, consider the amount of stimulus the

participant is receiving in each session, reducing or increasing the number of stimulus according to the plan for each individual. The control of the amount of stimulus presented at the same time in Snoezelen, has been reported to produce positive behavioural and humour alteration in participants with dementia, for example, increasing the focus, engaging them with the surroundings, and reducing anxiety [17].

Colour experiencing in an interior space is distinct from other colour uses, as it completely involves us, even without us realising it [18]. In both spaces we have observed the use of neutral colours, having the therapists mentioned that the room colour was comfortable, safe, and non-distracting, allowing the users to remain focused on the activities.

"Colour can help connect people with their surroundings. (...) By using colour to link groups of structural components, spatial elements, and furnishings made of the same materials or performing the same function, colour becomes an element of organization, and consequently enhances the 'readability' of spaces." [19 p74-75].

One of the major differences observed in Snoezelen rooms, is the use of coloured light in equipments, instead of white 'natural' light, such as in TEACCH rooms. That does not influence the activity performed in the room, as users and therapists control the amount of light during sessions.

In Snoezelen room the visual stimulus is worked with different equipment that uses light and colour to illuminate the space, ranging from 8 different colours: white, yellow, red, orange, green, blue, violet and pink. These colours can be found in equipment such as optical fibers, lighted water columns, wall panels, pillows, etc. Although the lighted equipment present in the room is limited to 8 colours, the projector in the room can exhibit any image, offering a vast range of colours depending on the user's preferences and the aim of the exercise.



Figure 5: Remote control with numbers and colour reference, from Snoezelen Multisensory Environments.



Figure 6: 'Pictures from Forbrain Snoezelen Room, former room illuminated in different colours in violet (left) and in blue and pink (right).

Some of this equipment also works with sound, movement, different temperatures, and other stimuli that let the user perform exercises and stimulate different senses individually or at the same time. Most lighted equipment can be manipulated, by the therapist or the participant, through a remote control, Figure 5, that permit to change colour individually or together, creating different environments, Figure 6, while naming it in different languages (i.e. yellow, amarillo, red, rojo), adding auditory stimuli to the activity.

Results and discussion

Colours are used in both therapies as tools, as helping aids, teaching material and comfort seeking for participants and therapists. The main differences found in both TEACCH and Snoezelen rooms are the use of coloured light in opposition to the use of white light; printed images instead of projected images, although printed images can also be used in Snoezelen combined with equipment using light (for example, a light cube that turns the paper information visible in a darkened room); the use of synesthesia, i.e. color presented through different senses; and colours being used to induce relaxation or stimulation in Snoezelen therapy. Despite Snoezelen not using white (natural) light during therapeutic session it can be introduced to help participant feel safe entering the room, for example.

Some Snoezelen rooms utilize long mirrors on the walls, which can extend the visual effect colour may have, while promoting extra work surface, they should, however, be applied cautiously to minimize distortion or optical illusion that may cause a negative reaction in any patient.

When inquired about colours in the physical space, the therapists were unanimous in identifying neutral or light colors, the dominant colours, as non-intrusive to maintain the focus on the activity, organize space and as creating comfortable and safe environments. They referred the participant's reaction to the room colour to be indifferent or irrelevant, as they found the space to be safe and comfortable. The use of spaces all painted in white was mentioned as something to avoid as it resembles hospital facilities, which could cause aversion in some participants, i.e. refusing to enter the room. Although in TEACCH, some rooms were mainly painted in white, other furniture or visual boundaries were in different colours.

We have compared the most significant differences and similarities in colour use in both therapies and rooms, presented in Table 1.

Miller [18] confirms designers can manipulate colours in the environment to influence users' comfort and wellbeing, referring to neutral and soft colours as a popular choice for rooms where it is intended to keep the focus on the activity and interaction occurring, more than in the surroundings. In spaces such as Snoezelen and TEACCH, where the variety of stimuli is overpowering, the preferable choice for the physical space would be a neutral or soft colour as those on the spaces observed.

As for the colours applied to materials and equipment those were identified as helping tools, even though therapists mentioned not working on colour exercises exclusively, but that colour is a great help to differentiate images and objects, for example.

We also observed that colours have great importance to induce Relaxation or Stimulation, in Snoezelen therapy, being the colours selected for relaxation – white, blue and pink; and the colours mostly chosen for stimulation – yellow, orange, green, red and violet. However, when inquired about colour choice and its use for relaxation and stimulation, the therapists would consider participants colour preference, or depending on the exercise, so they reassured all colours can be used in both situations.

We also asked therapists if there were any colours to avoid when projecting a therapy room for autistic people, having the majority answered that no colours were forbidden, just one therapist mentioning the colour red. However, when asked if red should be avoided in the same situation, 7 therapists agreed. After observation, we have understood that red is a colour often used in both spaces, coming to realize it is a matter of preferences, some autistic people don't like this or that colour, but not one colour in particular.

Colour in Snoezelen	Observation	Colour in TEACCH	Observation
Colour applied to room	Neutral, soft, non-intrusive	Colour applied to room	Neutral, soft, non-intrusive
Purpose of colour in the room	Comfort, safe space	Purpose of colour in the room	Organise space, keep focus on activities
Colour used with light	Optical fibres, water column, wall panels, pillows, projectors, etc.	Colour used with light	Not observed
Colour applied to material	Mattresses, balls, bed, pillows, images, etc.	Colour applied to material	Chairs, balls, exercise materials, schedules, etc.
Light in the room	Coloured light in equipment, leds, optical fibres, and artificial light	Light in the room	White (natural) light and artificial light
Use of light	Artificial white light turned off, coloured light on and off, working as a stimulus.	Use of light	Artificial white light on during exercises
Colour in exercises	Seek attention, teach about colours, work body movement, differentiate objects, relaxation and stimulation, etc.	Colour in exercises	Cognitive learning, teach about colours differences, shapes, sizes, images (PECS), numbers, words, objects, etc.
Duration of exercises using colour	As long as the participant wants	Duration of exercises using colour	Until participant finishes the activity
Exercise presentation with colour	Colour and images projection, objects, equipment	Exercise presentation with colour	Printed images, games, objects, materials

Table 1: Similarities and differences observed in therapy rooms and equipment.

Conclusions

The research was driven by the questions: How can colour, introduced in games, equipment, objects, images and projections, be used as a teaching tool in a TEACCH room, as opposed to a Snoezelen room? How does a therapist work on specific skills with autistic children in a structured therapy environment such as TEACCH, in comparison to a non-directive therapy environment such as Soezelen?

We can conclude that colour is used as teaching, learning and experimenting tool for autistic children in such environments. Either by using games, objects, images (PECS), projection, and other visual tools, therapists are able to communicate, and work on cognition, socialization, behavior, autonomy and academic competences with autistic children using colour as a support, in both rooms.

In Snoezelen, however, coloured light can transform the room in one big 'tool', as the user can interact with the entire surroundings, changing them at will. Colour helps the therapist to get the participant engaged in the activity, to create different environments, stimulating short- and long- term memory, for example. As for TEACCH, being a structured space, it uses colour to organize and divide the different

areas, but also to promote interaction with the users through objects, materials, exercises, much more than the room itself. Hence, both therapies work with colour as a tool, but adopt different strategies.

The colour choices for the physical space rely on neutral and soft colours, non-intrusive, avoiding complex patterns, not to create distraction, in particular in TEACCH rooms, where participants are often concentrated in completing tasks. Painted colour doesn't have much influence in the space, as most therapists acknowledge colour presence in the room, but doesn't consider it as an integrant part of the therapy. All colours are considered suitable by therapists to use in a work space, however, they recommend light neutral colours on walls and ceiling for projection. According to what we have studied, the rooms colour scheme is not chosen randomly, but regarding users or therapists needs. Autistic people can and should participate in colour choice for the routine charts, equipment or images they want to use. Although some colours can be regarded as more appropriate for stimulation or relaxation, all colours are used in a Snoezelen environment, depending on the exercise, and preference of the user.

Colour studies in therapy spaces are initiating, we aim to start discussion on the subject, recommending further investigation, in order to use colour at its best, to benefit therapeutic spaces, and those who depend on them.

Acknowledgements

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