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Luyten, T., Braun, S., van Hooren, S. et al. (1 more author) (2020) How nursing home residents respond to the interactive art installation 'Morgendauw': a pilot study. *Design for Health*, 4 (2). pp. 161-177. ISSN 2473-5132

<https://doi.org/10.1080/24735132.2020.1776045>

This is an Accepted Manuscript of an article published by Taylor & Francis in *Design for Health* on 05 Aug 2020, available online:
<http://www.tandfonline.com/10.1080/24735132.2020.1776045>.

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How nursing home residents respond to the interactive art installation 'Morgendauw'; a pilot study

How nursing home residents respond to the interactive art installation ‘Morgendauw’; a pilot study

Key words: dementia, interactive art, responses, elderly care, experience

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Biographical notes

Tom Luyten is a digital artist, teacher at the Maastricht Academy of Media, Design and Technology and researcher at the CAPHRI School for Public Health and Primary Care at Maastricht University. He is interested in the potential of interactive art as emotion-oriented care technology, specifically in elderly care.

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Susan van Hooren is professor at Zuyd University of applied sciences and Open University of the Netherlands. She is head of the research centre of arts therapies in the Netherlands, known as KenVaK. During her career, she combined practice based research, with teaching activities and clinical work. Her research, supervising, and teaching focus on evaluating arts therapeutic interventions and its working factors, resulting in many publications in high ranking peer reviewed journals and contributions on national and international conferences.

Luc is a professor of Health Services Research in the School of Health and Related Research (ScHARR) at the University of Sheffield. His research is on healthcare innovations using technology, with a focus on long term care. He moved from the Netherlands to Sheffield in

October 2016. In the Netherlands he was director of a large innovation network with about 35 partners in health and social care, industry and academia. In Sheffield he works in the Centre for Assistive Technology and Connected Healthcare, trying to contribute to building an innovation ecosystem here as well. Alongside his work in Sheffield and the Netherlands he directs a research and education programme in India called 'Health in Slums'.

Luc has a special interest in the potential of robotics in health and social care and in the application of digital health technologies to support people with a chronic disease or disability to self manage their health, but his main interest is in assistive technology for people with disabilities.

Luc is president of the Association for the Advancement of Assistive Technology in Europe and editor of the journal Technology and Disability. He is also member of the board of governors of a large elderly care organisation with 25 locations in Eindhoven, the Netherlands.

Abstract

This paper reports the responses of nursing home residents who live in a psychogeriatric ward to the abstract interactive art installation 'Morgendauw', which was specifically designed for this study.

All stakeholders were involved in designing and implementing Morgendauw. The artwork seems able to evoke responses in both the residents and their caregivers, but the amount and duration of the responses observed during the study were limited. 15 interactions over the course of 14 hours were noted and almost all of them were initiated by the nursing home staff, physiotherapy students or visitors (n=12). Interactions lasted for about 3 minutes on average.

Although the nursing home residents initially did not seem to notice the artwork, the threshold of acknowledging and approaching the artwork was quickly overcome when staff nudged or directed the residents' attention towards the artwork. Beyond this point, nursing home residents generally needed little explanation of the interface to interact with the artwork.

The location in which Morgendauw was placed during the study or the characteristics of the installation seemed to create a threshold. Further research should focus on the importance and the effects of context when designing and implementing an interactive art installation in a nursing home environment.

Introduction

When art is present in the living environment of people who live with cognitive problems, it can have beneficial effects. A review by Daykin et al. compared 600 papers and found art can reduce anxiety and depression in people who reside in mental health care (Daykin et al. 2008). Graham et al. describe that people who live with Alzheimers' Disease still have aesthetic judgement, although their condition causes cognitive disruption in most other respects (Graham, Stockinger, and Leder 2013). This research was paraphrased by graphic Designer Stefan Sagmeister as follows: '*Even when we lose our mind, we can still recognise beauty*' (Sagmeister 2016). A recent program by *MOMA* New York, shows that art in a museum context positively changes the mood of both the persons with dementia and their caregivers (Rosenberg, 2009).

Interactive art

An increasingly popular form of art that engages a combination of senses and reveals its aesthetics through interacting with it is called "interactive art". These types of artworks aim to provide an immersive experience that relies on intuition, curiosity and playfulness, rather than cognition.

One way to define interactive art is to oppose it to non-interactive art. An example of non-interactive art is a painting. When a painting is created, the artist is in complete control of the process. He or she lays every brush stroke and decides when the work is finished.

Afterwards, a viewer can interpret it by looking at it from a distance.

In contrast, interactive art transforms a passive viewer into an active participant. Not only does the viewer become part of the artwork, but he/she has a role in the final outcome. Every interaction with an interactive artwork produces a different result. It makes the experience personal and catered to individual abilities. No prior knowledge is needed.

Because of the characteristics of interactive artworks, they seem to have potential to provide nursing home residents with a meaningful experience. Examples of interactive art include “Water Light Graffiti” by Antonin Fourneau (Fourneau 2013)(Fig 1. A), Audience by Random International (Random-International 2008)(Fig. 1. B) or Scattered Light by Jim Campbell (Campbell 2011)(Fig 1. C).

**** Fig 1: Examples of interactive art. ****

Abstract interactive art in elderly care

Just placing an existing interactive artwork in a nursing home residence, without taking the specific cognitive and physical conditions of the people living there into account, would be ill-considered. Previous studies have observed the responses of nursing home residents while interacting with interactive artworks that were explicitly designed with and for nursing home residents (Luyten, Braun, van Hooren, et al. 2018; Luyten, Braun, Jamin, et al. 2018). These artworks (VENSTER, fig 2A, CRDL Fig.2B) translated reminiscence therapy and expressive and therapeutic touch therapy into an interactive environment and object respectively. The results show that these types of artworks evoke responses in nursing home residents and provide (informal) caregivers with new, exciting ways to engage their residents.

Abstract forms of interactive art have yet to be studied in the nursing home environment.

Abstract multi-sensory experiences, such as provided by multi-sensory rooms- and therapy have shown to increase social behaviour, counteract boredom, increase alertness and improve sleep quality in people with dementia (Baker et al. 2001; Sánchez, Marante-Moar, et al. 2016; Sánchez, Maseda, et al. 2016; Sánchez et al. 2013; Todder, Levartovsky, and Dwolatzky 2016). An abstract interactive art installation might provide a similar experience, without the need for a dedicated room, a fixed timeslot or the need for a professional caregiver to be present.

**** Fig 2: The interactive artworks Venster and CRDL. ****

Morgendauw

Morgendauw ('Morning Dew' in English) (Fig 3) is an abstract, interactive artwork. It draws inspiration from multi-sensory rooms and experiences. The artwork was designed to provide short, meaningful interactions to escape the routine of daily life and promote introspection.

Physically, Morgendauw is a black, table-like installation, shaped like the silhouette of a larger-than-life oak leaf. The surface of the leaf consists of touch-reactive LED panels.

Morgendauw shows a constant stream of coloured particles, which resemble a stream of water flowing downhill. The colour, direction and velocity of the particles are influenced by the current weather conditions in one of five pre-programmed cities (Eindhoven, Quebec, Spitsbergen, Tokyo and Kaapstad). Every five minutes a different city is automatically selected.

When the surface of Morgendauw is touched, or an object (e.g. stone) is placed on it, the stream of particles will react and find a way around the hand or object. This results in a change of composition and a distortion in the particle system that will try to find a new balance. This choreography of light is augmented with an ambient soundtrack and subtle nature sounds.

The appearance and interactions of Morgendauw were developed in co-creation with people who work closely with the residents of the nursing home (managers, activity supervisors and caregivers) as early as the initial concept and iterated and tested in dialogue with these stakeholders and the residents themselves (Luyten, Braun, van Hooren, et al. 2017).

In This study we investigated how nursing home residents responded to the abstract interactive art installation 'Morgendauw', which was specifically designed for this study.

**** Fig 3: The interactive installation Morgendauw. ****

Methods

This study was set up and carried out as an explorative observational study. It took place at a nursing home facility in the south of the Netherlands. The installation was located at an indoor public square, where an open and a closed ward intersect. Both facilities house people who suffer from psychogeriatric disorders, often combined with physical limitations.

Design

The installation was observed for two days, from 10 AM to 5 PM in a semi-public square (Fig 4). The square was semi-public because it was freely accessible by caregivers, visitors and residents from other wards at any time. Residents of the closed ward, however, were unable to enter the square without guidance. Morgendauw (Fig 4A) was turned on, its soundscape audible when passing by and five 3D printed rocks were scattered on the surface.

The researcher was seated outside direct view at a nearby table (Fig 4B). A single wide-view video camera (Fig 4C) captured the participants' responses, which allowed repeated display afterwards.

**** Fig 4: Overview of the location, position of Morgendauw, the camera and surroundings. A: the interactive installation Morgendauw, B: position of the researcher, C: position and viewing angle of the camera, D: hallways of the open ward, E: hallways of the closed ward (doors secured by a numeral code) ****

Ethical considerations

The research protocol was approved by the local ethics committee (METC Atrium, Orbis, Zuyd; 14-N-100). The ethical committee approved the spontaneous way participants were selected and included. No actual consent form was completed and this was given an exempt status. All residents, their legal representatives, the professional caregivers and physiotherapy students doing an internship were informed about the upcoming study through an information

letter, two weeks before to the study. They could refuse participation up to and during the study.

Study population

During the time of the study, 22 residents were living in the open ward, another 22 in the closed ward, all of whom were unable to live independently due to a combination of cognitive and physical problems. No prior selection of participants was made. Participants were included in the study as soon as they expressed interest in Morgendauw by approaching or touching the installation during the days this study was carried out.

Data collection

A researcher (TL) was present during each observation. The observer kept his involvement to a minimum. He only interfered when addressed directly by someone to answer questions regarding the installation. Field notes were taken to complement the recordings. Every time a resident, visitor or caregiver expressed interest in Morgendauw by approaching it, touching it or discussing it from a distance, a recording was remotely started. The recording was ended when the person in question stopped interacting with Morgendauw and left. The moment from start to finish is referred to in this article as an “*interaction*”. An interaction is a combination of many responses.

Data analysis

All recorded visible and audible responses were transcribed and coded. When the coding of a response was unclear, two other researchers could be consulted (SB, SvH) to reach consensus.

The framework, based on the results of a literature review on “Participant Responses to Physical, Open-ended Interactive Digital Artworks” (Luyten, Braun, Hooren, et al. 2017) (Figure 5), distinguishes between human-human and human-artwork responses, divided further into verbal, physical and cognitive/emotional responses. Cognitive/emotional

responses were not noted in this study. Interpretation of facial expressions or body language of the participants concerning emotions or cognitive processes is unreliable due to the complexity of some of the residents' cognitive condition and the absence of the voice of the residents themselves. All coded responses were organised in mind maps, using MindJet MindManager © to provide a general overview.

****Fig. 5: An overview of the coding framework.****

Coding of responses

When only one person was involved, and his/her response was directed towards Morgendauw, the response was coded as “human-artwork”. Responses in which two or more people were involved and their responses were directed towards each other were coded as “human-human”. When people simultaneously directed a response towards Morgendauw and each other, it was coded as both human-human and human-artwork.

All understandable verbal feedback, either directed towards Morgendauw or to another person while interacting with Morgendauw, was categorized as “verbal responses”. The same accounts for all distinguishable physical actions/responses. Responses were also placed into one or more corresponding categories of the framework, or got the label ‘open’ if they did not fit an existing category. By clustering similar responses, sub-categories emerged which are specific to Morgendauw. For example, the category *respond according to affordance* holds the subcategories *move rock on Morgendauw* and *pick up/place rock on Morgendauw*.

All actions unrelated to the installation were coded as “not important to this study” and disregarded (e.g. conversation about the upcoming concert).

For each response, an identifier in the form of a letter was added to mark the persons role (e.g: student, caregiver, resident); when two or more people were involved, the identifier of the initiator was put first. If a person displayed two or more types of response at the same time, the response was recorded in all corresponding categories (Supplementary Material 1).

Results

After sending the information letters, no rejection to participate was received. 14 hours of observation, spread over two days, resulted in 42 minutes of recorded responses. 15 interactions took place, involving 23 people (10 residents, three physiotherapy students, four caregivers, one manager, four visitors and one researcher). The average duration of an interaction was 3:18 minutes. The shortest interaction lasted 21 seconds, the longest was 8:44 minutes long. In total, 333 responses were recorded (100%).

The data is presented in tables 1 through 3, showing absolute numbers. Categories and subcategories are arranged in descending order from most to least occurrence. Two numbers between brackets respectively show the number of responses initiated by professional (a caregiver, manager, physiotherapy student or researcher) and the number of responses initiated by a resident.

A general overview of all responses (Tab. 1) shows that **human-artwork** responses make up for 60% (n=199) of all recorded responses. All but one response was **physical** of nature and most of the human-artwork responses were directed towards Morgendauw by a resident (n=127). **Human-human** responses amount for 40% (n=134) of all responses and most of them are initiated by professionals (caregivers, physiotherapy students, managers or a researcher) (n=96). They are predominantly verbal of nature (n=111), while physical responses amount for 17% of all human-human responses (n=23).

**** Tab. 1. An overview of all responses ****

Human-artwork responses

Physical responses

All human-artwork responses are presented in table 2. Most of the physical human-artwork responses involved the 3D printed rocks that were present on the surface of Morgendauw (n=108). People *responded according to the affordances (n=108)* of a rock in a stream of water: they moved (n=45), touched (n=10), flicked (n=16), picked up and placed (n=29) the 3D printed rocks on the surface, thereby blocking and altering the particle flow or touched/caressed the surface of Morgendauw itself (n=8). Most of these responses were carried out by residents (n=60), largely verbally initiated and/or encouraged by a physiotherapy student or caregiver (n=48).

The *open sub-category (n=57)* mostly comprised residents *looking at* the flow of particles on *Morgendauw with focus* (n=50). The mesmerizing characteristic of the particles flowing down and arranging themselves around the rocks seemed to fascinate. Four residents *directed a smile* directly towards Morgendauw while interacting. Lastly the instruction sheet was read five times by visitors and physiotherapy students and Morgendauw was raised or lowered by physiotherapy students on three occasions to accommodate residents.

In the sub-category *Body movement/point/touch* residents got rolled towards Morgendauw by a physiotherapy student or caregiver (n=8) or visitors and residents approached Morgendauw themselves (n=6). Physiotherapy students or caregivers *gestured from a distance* (n=6), explaining something or encouraging someone else. One resident tapped on Morgendauw as if it were a tablet.

**** Tab. 2. Human-artwork responses divided in verbal and physical responses and further categorized in main and sub-categories. ****

Verbal responses

Only one verbal response towards Morgendauw was recorded. It involved a resident counting the cushioning feet on the bottom of one of the 3D printed rocks aloud.

Human-human responses

Verbal responses

All human-human responses are presented in table 3. The larger part of all human-human responses were recorded in the verbal category (n=111). The most prominent sub-category consisted of *asking for instructions or providing instructions* (n=59). Almost all encouragement was given by physiotherapy students and caregivers (n=40), while residents were mostly the ones asking for instructions (n=16).

**** Tab. 3. Number of Human-human responses divided in verbal and physical responses and further categorized in main and sub-categories. ****

The sub-category on *discussions about the (workings of) the work* accounts for 45 of all human-human responses. Residents and personnel equally *comment on the function and concept* of Morgendauw (n=25) and ask or provide each other with opinions about it (n=10). Other sub-categories show some *people commenting on the music* (n=3), *on the visuals* (n=2) and one instance of someone *commenting on the warmth of the Morgendauw* surface (n=1). Finally, physiotherapy students and caregivers *asked* residents *to remember* something connected to the Morgendauw experience (e.g. playing a game of shuffleboard with the rocks) and one resident mentioned the water reminds him to go to the toilet.

Other verbal human-human responses included residents asking for clarity and asking to stop (n=3), or expressing their wonder (n=3). Only one instance of residents and personnel verbally working together was noted (n=1).

Physical responses

Most physical human-human responses consist of *imitating* someone else, *or trying out* Morgendauw together (n=15): Physiotherapy students, caregivers, and one resident provide *example movements* and interactions (n=10), others mimic those movements. Three caregivers and two residents *look at another person* while they are *interacting*, supposedly to learn (n=5). *Interacting with and through the artwork* is made up of four people *smiling at each other* or making *non-verbal contact* (n=4), equally initiated by personnel and residents.

In three instances a *stone* was *handed* to another person, all initiated by caregivers or physiotherapy students (n=3) and lastly one resident *looked amazed* towards personnel (n=1).

Discussion

The aim of the study was to investigate how nursing home residents respond to the abstract interactive art installation Morgendauw. The interactive artwork draws inspiration from multi-sensory rooms and therapy and presents a similar experience, without the limitation of a set time and place and the need of a professional to guide the resident. It was developed in co-creation with all stakeholders in the nursing home and thoroughly tested with nursing home residents.

Overall, residents did not seem to notice Morgendauw. Although the soundscape should have been audible for most people while passing the installation and a constant stream of moving particles was clearly visible, residents as well as staff largely ignored the installation when passing it during their daily routine. Only 15 interactions over the course of 14 hours were noted and almost all of them were initiated by someone of the nursing home staff, physiotherapy students or visitors (n=12). Interactions lasted for about 3 minutes on average.

The one resident who did engage herself on three occasions appeared in a good cognitive state.

When prompted and/or directed, the initial threshold of noticing and approaching the installation was quickly overcome. Beyond this point, residents in general needed little explanation of the interface. The visuals seemed mesmerizing and resulted in a concentrated gaze upon the installation. The physical rocks placed in the abstract water were moved around and the effects it had on the particle system were observed.

The location in which Morgendauw was placed during the study seemed to create a threshold to notice and/or engage with the artwork. It appears that an interactive artwork simply put in a space is ignored by residents with psychogeriatric complaints if the staff does not draw attention to it.

When we compare the way residents and staff initially (did not) respond to Morgendauw with responses we saw when residents interacted with VENSTER (Luyten, Braun, van Hooren, et al. 2018) or compare them with responses noted during the MOMA programme for people who live with dementia (Rosenberg, 2009), it looks like expectations and mental models of the residents need to match with the physical context. In the case of VENSTER, the context was intuitively correct: A (digital) window was placed on an existing wall. This immediately resonated with the existing mental models and expectations of residents and staff about their environment. When we look at the program of MOMA for people who live with dementia, the physical context is also matched these expectations. People enter an actual museum and are prepped and guided by a tour guide. This puts them in a mental state ready to perceive everything in this context as works of art. In contrast, Morgendauw was placed at a location that was primarily associated with quickly passing and providing daily care. The presence of

an abstract work of art in this context was therefore not noticed or interpreted as such and initially largely ignored.

Additionally, the characteristics of the artworks and the general appearance of it might also have communicated wrongly that the artwork was not meant to be touched. Artworks in general are not meant to be touched or interacted with and Morgendauw might have failed to communicate that in this case it was allowed. These results show the importance of context and the relation it has with interaction and perception. From earlier studies we know that an abstract interactive artwork could work in a nursing home environment (Luyten, Braun, van Hooren, et al. 2018). Further research should focus on the importance and the effects of context when designing and implementing an (abstract) interactive art installation in a nursing home environment.

Study limitations

The limited timeframe of the observations (2 days) and the variable availability of staff and residents may have influenced the amount of the recorded responses.

Because of the observation method used (video observation) and the inability of the residents to reflect on their own behaviour no cognitive/emotional responses were recorded.

The duration of individual responses was not measured and the duration of the interaction as a whole was not taken into account when presenting the total number of responses. This might have distorted some results. When someone looked at Morgendauw with focus for instance, this was counted once, regardless of the time that this stare held.

If a resident carried out two or more responses at the same time, these were coded in all corresponding categories. This influenced the total number of responses recorded, possibly over-recording some responses.

Implications for practice

Based on the results of this study, the sounds and visuals of Morgendauw seem to be mesmerizing and promote a moment of interaction. The installation can be used and enjoyed without the need to understand what's going on exactly, much like a multi-sensory room. The interface of Morgendauw is easily understood when shortly explained and/or demonstrated by staff.

When Morgendauw is to be used in daily care, it is crucial that all staff and preferably also visitors are informed about the use and possibilities of the artwork. This study shows that autonomous use of Morgendauw is impossible for most nursing home residents. Some nudging and encouragement to interact is needed. If staff, caregivers or visitors who are guiding a nursing home resident are crucial to the engagement with an interactive artwork, then the extent to which they understand how and when to use the artwork in daily practice is directly linked to the quality of the experience.

Future research and experimentation are needed to understand the exact role of the physical context, artwork characteristics and appearance in creating a threshold to engage with abstract interactive art in the nursing home. A future study should experiment with and study the effects of bringing the museum-context into the nursing home environment as well as provide a multitude of diverse interactive artworks to learn about the differences in responses with regard to the characteristics of varying interactive artworks. Data aggregation could be automated to identify larger trends. By counting the amount of times and duration artworks are being used over time, it can be identified what type of artworks are more successful in this context. Lastly, exploration on which methods could be used to measure the experience of nursing home residents with regard to interactive artworks is needed. The personal experiences of the residents would be the most valuable research outcome.

Conclusion

It appears that an interactive artwork simply put in a space is completely ignored by residents with psychogeriatric complaints if the staff does not draw attention to it. When residents were invited and nudged towards Morgendauw, they expressed interest, understood the interface and interacted with the artwork. However, the installation itself failed to entice nursing home residents to interact.

In order to successfully implement an (abstract) interactive artwork in the nursing home environment, it looks like the expectations and mental models of the residents need to match the physical context. This means the artwork should be adapted to the context or vice versa. More experimentation and research are needed to determine the “sweet spots”.

Staff, caregivers or visitors are crucial to the engagement with an interactive artwork.

Therefore, the extent to which they understand how and when to use the artwork in daily practice is directly linked to the quality of the experience.

- Baker, Roger, Steven Bell, Emma Baker, Jane Holloway, Rebecca Pearce, Zena Dowling, Peter Thomas, Julian Assey, and Lesley-Ann Wareing. 2001. "A randomized controlled trial of the effects of multi-sensory stimulation (MSS) for people with dementia." *British Journal of Clinical Psychology* 40 (1):81-96.
- Campbell, Jim. 2011. "Scattered Light." In. New York.
- Daykin, Norma, Ellie Byrne, Tony Soteriou, and Susan O'Connor. 2008. "The impact of art, design and environment in mental healthcare: a systematic review of the literature." *Journal of the Royal Society for the Promotion of Health* 128 (2):85-94.
- Fourneau, Antonin. 2013. "Water Light Graffiti." In. Paris.
- Graham, Daniel, Simone Stockinger, and Helmut Leder. 2013. "An island of stability: art images and natural scenes—but not natural faces—show consistent esthetic response in Alzheimer's-related dementia." *Frontiers in psychology* 4:107.
- Luyten, Tom, Susy Braun, Susan Van Hooren, and Luc De Witte. 2017. "Participant responses to physical, open-ended interactive digital artworks: a systematic review." *International Journal of Arts and Technology* 10 (2):94-134.
- Luyten, Tom, Susy Braun, Gaston Jamin, Susan van Hooren, and Luc de Witte. 2018. "How nursing home residents with dementia respond to the interactive art installation 'VENSTER': a pilot study." *Disability and Rehabilitation: Assistive Technology* 13 (1):87-94.
- Luyten, Tom, Susy Braun, Susan van Hooren, and Luc de Witte. 2017. "co-design method for creating meaningful art installations for residents of nursing homes." In *Shared*

- insights on co-creation in healthcare*, edited by Tanje van der Laan. Utrecht: U-create.
- . 2018. "How groups of nursing home residents respond to "the CRDL": a pilot study." *Journal of Enabling Technologies* 12 (4):145-54.
- Random-International. 2008. "Audience." In. London.
- Sagmeister, Stefan. 2016. "Why Beauty Matters." In. Namur: Kikk festival.
- Sánchez, Alba, M Pilar Marante-Moar, Carmen Sarabia, Carmen de Labra, Trinidad Lorenzo, Ana Maseda, and José Carlos Millán-Calenti. 2016. "Multisensory stimulation as an intervention strategy for elderly patients with severe dementia: a pilot randomized controlled trial." *American Journal of Alzheimer's Disease & Other Dementias*® 31 (4):341-50.
- Sánchez, Alba, Ana Maseda, M Pilar Marante-Moar, Carmen de Labra, Laura Lorenzo-López, and José Carlos Millán-Calenti. 2016. "Comparing the effects of multisensory stimulation and individualized music sessions on elderly people with severe dementia: a randomized controlled trial." *Journal of Alzheimer's Disease* 52 (1):303-15.
- Sánchez, Alba, José C Millán-Calenti, Laura Lorenzo-López, and Ana Maseda. 2013. "Multisensory stimulation for people with dementia: a review of the literature." *American Journal of Alzheimer's Disease & Other Dementias*® 28 (1):7-14.
- Todder, D, M Levartovsky, and T Dwolatzky. 2016. "Measuring the effect of multi-sensory stimulation in the snoezelen room on sleep quality of Alzheimer patients using actigraph" *Harefuah* 155 (12):727-30.