

Fragrance and Communication

How scent can help multisensory impaired children and be applied to products of the future

Kate Williams, Seven Scent; and Anne Gough, Seashell Trust

The sense of smell has a powerful influence over our emotions, memories and reactions. For children with profound learning and communication difficulties, smell can help them identify people, places and objects. So, given that olfactory information has a direct path to our limbic system, can it be positively harnessed in an educational environment? A new study aims to explore not only how multisensory impaired (MSI) children use their sense of smell, but also whether olfactory cues can improve their understanding, communication and ability to make choices. Here, the authors review the approach, considerations and initial findings of the study—as well as the potential long-term implications for fragranced products of the future.



Kate Williams (Seven Scent) and Anne Gough (Seashell Trust).

A Creative Partnership

The Seashell Trust (www.seashelltrust.org.uk) is a UK-based school which offers specialist provision for children and young people up to the age of 25 with sensory impairments, severe or profound learning difficulties and significant communication difficulties. Working closely with Seven Scent, the fragrance subsidiary of PZ Cussons, the Seashell Trust aims to understand more about the ways that scent can be used effectively as part of the learning process with students. The recent study was devised in order to put a formal structure behind anecdotal and observational evidence of the students using their sense of smell to better understand their environment.

A growing body of research into olfaction and its role in enhancing human cognition provides a valuable basis for the study and can be summarized into a number of suggestions:

- The sense of smell has a direct link to memory and emotions.¹
- The sense of smell underpins much of humans' social interaction and awareness of others.^{2,3}
- People with visual impairments and blindness may develop more acute responses to olfactory information.⁴
- The sense of smell tends to work as a background sense rather than foreground sense, and information gained through smell can be overridden by information from other senses.²

- Odor/scent can be used to add to information received through other senses.²
- Experiments using scents with students with MSI need to be carefully planned and based on smell and function being linked.⁵

When working with children with profound learning difficulties, therefore, it may seem logical to assume that the use of smell—as well as touch and residual vision and hearing—is likely to be helpful. There are, however, a number of hazards which need to be addressed when isolating the influence of olfaction.^{3,5}

- Smells can't be "put away" or "turned off."
- Fragrances that are not integral to the activity may confuse students.
- Some students may be hypersensitive to specific smells.
- Odors tend to be unpredictable (e.g., affected by air currents) and transient.
- Some students with MSI have an impaired sense of smell. This is particularly likely in students with the genetic condition CHARGE syndrome.^a
- All of these concerns were addressed in the planning and implementation of the Seven Scent-led study.

^aCHARGE syndrome comprises coloboma of the eye, heart defects, atresia of the nasal choanae, retardation of growth and/or development, genital and/or urinary abnormalities, and ear abnormalities and deafness.

The experiment, conducted by Seven Scent and the Seashell Trust developed a number of fragrances for use in daily routines to help children make the connection between pictures and what they represented—the fragrances appeared to bridge a gap in understanding.



Familiar staff worked with the children and introduced familiar objects of reference (OR) during their everyday routine; the only change was that certain OR now had a fragrance added.

First Stage Observations

As a first step, time was spent observing 12 children and recording how they made use of smell in the context of their multisensory modes of learning. One student was chosen to work on a one-to-one basis with researchers, with the aim of gaining valuable learnings for the development of a research program for the wider group of students.

Jason had a multisensory impairment affecting his vision, hearing and communication. He had a bilateral sensorineural hearing loss compounded by auditory processing difficulties. His vision was significantly impaired through the condition called Peter's Anomaly; he also had nystagmus and a diagnosis of glaucoma. He was highly motivated by visual stimuli, such as lights, spinning toys and movement, but his initial reaction to everything was to smell it. Jason's communication was limited to the here and now. He had no interest or recognition of pictures and signs and made very few responses to sound. Close observation showed that Jason identified people through their odor and reinforced his understanding of objects, food and drinks using his sense of smell.

Seven Scent developed a number of fragrances that Jason could use in his daily routine to make choices between his favorite drinks. The fragrances were applied

to photographs and Jason began to make the connection between the picture and what it represented. The fragrances appeared to bridge a gap in his understanding. As Jason began to understand what the pictures stood for, some written words were introduced with a fragrance attached. Using the food and drink fragrance was highly motivating and Jason gradually learned to recognize written words of some of his favorite food and drinks.

The results of this two-year study are extremely encouraging; Jason now:

- No longer requires pictures to be fragranced to recognize them
- Uses pictures and words to communicate his wants and needs in different contexts
- Recognizes some words without fragrance
- Can follow handwritten shopping lists independently

Fragranced Objects of Reference

Whilst Jason was recognized as exceptional, the researchers felt that his responses supported the idea that other students with MSI could benefit from using smell. This led to further research designed to explore how it could be used effectively.

It should be noted that the next stage of the study was carried out in the context of a number of important considerations. Firstly, children with MSI are difficult to study systematically due to the interactive effects of different impairments, inconsistencies of behavior and difficulties of knowing what information a child is receiving.⁶ It is also important to protect children who cannot anticipate or understand novel experiences from potential distress. The fragrances used in the study were specifically created with the involvement of a toxicologist to ensure they would be safe for students when they came into contact with the skin, were licked or accidentally ingested. The approach was carefully thought out and child-centered to guarantee the safety and care of the students throughout.

Eight students were chosen for formal observation and a simple study schedule developed. Video filming was used to observe and record the ways in which the group of children made use of smell in the context of their learning timetable and in particular in association with locating a room where that smell would be functional. The study period took place over 18 months and each child was observed and filmed daily—with the exception of absences due to holidays or illness.^b

Familiar staff worked with the children and introduced familiar objects of reference (OR) during their everyday routine. The only change was that certain OR now had a fragrance added. The same fragrance was added to the room destination for the activity represented on the OR. Film was used to record the OR being presented and the student's response each time. The film was then analyzed for possible factors affecting response. Hazards described in previous olfaction research were minimized or avoided:⁵

- Fragrance pens were used to add the scent to the OR to minimize leakage of smell.
- The fragrance in the room was functional and was part of the activity in the room, such as massage.
- Students were carefully observed so that any hypersensitivity or unhappiness would be picked up. None was noted and the evidence suggested that the students enjoyed the scent.

Sensory Theater

A second approach used scent in the creation of a multisensory theater environment where a specialist room housed a computer that linked video images with surround sound and lighting effects to create the overall atmosphere. Although less rigorous in its analysis of results, the project provided valuable initial learnings on how multisensory experiences can be beneficial in allowing students to revisit real life experiences and encourage them to recall events, resulting in communication enabling them to express to others what they did and how they felt.

Three strong themes were chosen with each room designed and fragranced appropriately.

^bFind footage of the authors' research at www.perfumerflavorist.com.

- **Seaside:** Students who had visited the seaside recently used the theater to recall the experience. How did the students respond? When the door was opened for the first time, the smell of the beach was so strong that two of the children who had bare feet on their trip to the sea removed their shoes before entering.
- **Bonfire Night:** This theater housed a party with the smell of fireworks and bonfire. The result: a visually impaired student recognized the smell and sounds upon opening the door and so sat on the floor with his hands over his ears waiting for the fireworks.
- **Christmas:** A pine fragrance was used to enhance the smell of Christmas trees, together with a spicy orange and clove fragrance to create a festive atmosphere. Some of the children really noticed the scents when they were enhanced in this way and showed more interest in the stimuli, often becoming still while smelling and then smiling.

Initial Findings

While this work so far is exploratory, initial observations and analysis suggest that scents may be able to help students engage and maintain interest in an activity. They may also evoke an emotional response from the student. The work to date has provided important learnings on how to use scents to provide additional information as part of each child's development as communicative individuals.

Observations suggest that using scent can help some students to engage with experiences. For some, it has been possible to begin to use olfactory information in conjunction with other sources to support locational learning. For many, it appears to add to enjoyment in a range of situations and in recalling experiences.

The aim is to build on the students' experiences, focusing on using scents in choice-making, which is not

easily available through other channels. The work will concentrate on the students' ability to anticipate and communicate choice, taking that learning and generalizing it to the wider world.

The study not only demonstrates the beneficial results of fragrance in certain therapeutic treatments, it also has broader implications for the industry where fragrance may be used to create products which generate quantifiable emotion, for example, or a mood-altered state. Further research into this complex area may lead to exciting new product developments which fully exploit the power of fragrance.

Address correspondence to Kate Williams, Seven Scent, Lamplight Way, Agecroft Commerce Park, Manchester M27 8UJ, England.

References

1. J Willander and M Larsson, Olfaction and emotion: the case of autobiographical memory. *Memory and Cognition*, **35**(7), 1659–1663 (2007).
2. SM Aglioti and M Pazzaglia, Sounds and scents in (social) action. *Trends in Cognitive Sciences*, **15**(2), 47–55 (2011).
3. U Stockhorst and R Pietrowsky, Olfactory perception, communication and the nose-to-brain pathway. *Physiology and Behaviour*, **83**, 3–11 (2004).
4. M Beaulieu-Lefebvre, FC Schneider, R Kupers and M Ptito, Odor perception and odor awareness in congenital blindness. *Brain Research Bulletin*, **84**(3), 206–209 (2011).
5. D Brown, The sense of smell—the olfactory sense. *DbI Review*, 4–8 (2007).
6. H Murdoch, Early intervention for children who are deaf and blind. *Educational and Child Psychology*, **21**(2), 67–79 (2004).

To purchase a copy of this article or others, visit www.PerfumerFlavorist.com/magazine. 