Journal of Applied Research in Intellectual Disabilities 2003, **16**, 135–143

Passive Activities: the Effectiveness of Multisensory Environments on the Level of Activity of Individuals with Profound Multiple Disabilities

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Accepted for publication *1 March 2003*

Background The use of multisensory environments (MSEs) is perceived to be important for individuals with profound and multiple disabilities, although there is limited research on the efficacy of the procedures. After a search of the literature, numerous positive outcomes of MSEs were described. Our research aimed to determine whether the use of an MSE, when applied to increase the level of alertness and interaction, actually leads to this effect.

Methods A total of 15 facilities in the Netherlands and Belgium agreed to participate in the investigation. Information was gathered on the use of MSE by 177 individuals. For 62 persons, an increase of level of activity was the only stated goal. We randomly selected 20 persons out of this group for observation, using momentary time sampling as a means to relate multisensory experiences to the level of alertness and interaction.

Results The results of our study show that in general there is little evidence for an increase in activity levels as a result of MSE. There is, however, a relation between the level of activity and contextual variables. In particular, people with profound multiple disabilities have strong responses towards stimuli provided by members of staff (touching, talking to the person).

Conclusions In general, the living unit is as good a place as the MSE for promoting alertness and interactions. The influence of materials on the level of activity is limited.

Keywords: day services, effectiveness of activities, multisensory environment, profound multiple disability

Introduction

A multisensory environment (MSE) is an environment designed to stimulate the senses through light, sound, touch and smell. Essentially, it aims to create a feeling of safety, and to provide novel sensations, with stimulation under the user's control. This particular environment was first created in the Netherlands and given the name of 'Snoezelen'. The term is a neologism coined by its creators Hulshegge and Verheul (1987) and is a contraction of the words 'snuffelen' and 'doezelen', referring to the explorative and relaxing elements in the use of multisensory environments. In the type found in the Netherlands and several other North European countries (for example Belgium and Germany), the MSE contains a collection of devices or objects such as ball pools, bubble tubes, optic fibre tail lights and musical effects in one place. The MSE is advertised as a leisure activity, almost always at a set time during the week and usually by a group of people. The environment created can vary in size and in cost, large-scale settings can cost up to half a million Euros.

Developed in the 1980s, MSEs were initially used in the Netherlands by people with severe or profound intellectual disabilities and profound multiple disabilities. Since the beginning of the 1990s, when other options for activities became available for individuals with severe intellectual disabilities, their use has been concentrated on individuals with profound intellectual or profound multiple disabilities, and they have been seen as having particular value for people with these needs. In the Netherlands, a strict distinction is made between the category 'individuals with profound intellectual

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disabilities' and the category 'individuals with profound multiple disabilities'. This last category consists of individuals with profound intellectual and physical disabilities. Additionally, it is estimated that more than half of this population is likely to have a cerebral visual impairment and around 15% have hearing impairments (Inspectie voor de Gezondheidszorg 2000). As a result of the severity and extent of their disabilities, they have difficulty in maintaining their awareness of environmental events. Moreover, their ways of communication are idiosyncratic. People with profound multiple disabilities also have an overall risk of developing medical complications relating to, for example, seizure disorders (Guess *et al*. 1988) or gastro-oesophageal reflux disease (Böhmer *et al*. 1999).

The popularity of the use of MSEs for individuals with profound multiple disabilities can be explained by the fact that it is very difficult to give adequate support to this category of persons. Resources to provide tailor-made individual activities are often lacking, and the MSE is considered to be an appropriate activity for all with profound disabilities. Indeed, in many facilities in the Netherlands, use of the MSE is virtually the only activity offered to these people (Vlaskamp & Nakken 1999; Koedoot 2000).

Notwithstanding its popularity and widespread use for individuals with profound multiple disabilities, little evidence exists regarding the efficacy of the MSE. The proliferation of MSEs deserves investigation as their provision is not resource free. There has been limited and inconclusive research on the effectiveness of MSEs in general (Hogg *et al*. 2000) or for individuals with profound multiple disabilities in particular. Participant numbers in the studies dealing with the effectiveness of MSEs for individuals with severe or profound intellectual and multiple disabilities ranged from 1 (Wohlfahrt 1991) to 27 (Martin *et al*. 1998). The principal concern of the studies has been the relationship between outcome issues and needs-based evaluation of MSE facilities. The studies by Houghton *et al*. (1998), Cuvo *et al*. (2001) and Lindsay *et al*. (2001) are the only empirical evaluations that showed a statistically significant increase in a limited number of skills in a limited number of people.

The intended effects of MSEs are frequently mentioned in the literature and are numerous. MSE is presumed to facilitate mental and physical relaxation, reduction of challenging behaviour, increased awareness, environmental exploration, enjoyment, social skills, choices and feelings of restoration and refreshment in their participants (Long & Haig 1992; Hogg *et al*. 2001). The effect that is claimed frequently is relaxation. The occurrence of this effect is generally explained by the introduction of specific material in the MSE to create a certain atmosphere (e.g. Gallaher & Balson 1994; Long & Haig 1992; Pagliano 1999). Reduction of challenging behaviour is also a frequently claimed effect and some studies show that non-contingent sensory stimulation of an appropriate kind is effective in reducing challenging behaviour (Hutchinson & Haggar 1994; Shapiro *et al*. 1997; Cuvo *et al*. 2001). Increasing the level of activity of a person with a profound intellectual or a profound multiple disability is another claimed effect, one which is explained by the selective use of stimuli (e.g. Pagliano 1999; Cuvo *et al*. 2001) or by the atmosphere that is created by the MSE (e.g. Long & Haig 1992; Melberg & Jansson 1994; Hirstwood & Smith 1996), or by a higher level of concentration produced by the specific environment (Wohlfahrt 1991; Ashby *et al*. 1995). Although the essence of MSEs is essentially a specific material environment, the relationship between the participant and the support staff created within the MSE is seen as an additional benefit (Kewin 1994; Terry & Hong 1998). Compared with a normal living situation, more staff members are needed for an MSE. Although the intention behind the MSE is that respect is shown for the participant's personal space, materials are provided only with the participant's approval, and creating a sense of security is an essential factor, staff are needed to ensure that these effects occur. Individuals with profound multiple disabilities are not only provided with more stimulus by using specific material, more frequent personal interactions may occur in this specific environment. A distinction should therefore be made between an increase in the level of alertness and the level of interaction. An increase in the level of alertness is evidenced by more self-directed responses or responses directed at material, for example, the touching of material, the listening to one's own vocalizations, or the turning of the head towards the lights from an optic fibre tail. In contrast, an increase in the level of interaction is evidenced by responses directed at other people, for example, making eye-contact with other participants in the MSE or touching support staff.

Although increased levels of interaction and alertness are frequently mentioned in the literature as an effect, these results should be interpreted with caution because of the methodological weaknesses in most studies (Hogg *et al*. 2001). Moreover there is no research that shows that these effects are obtained in individuals with profound multiple disabilities. For these individuals in particular, who are dependent on others and whose disabilities are such that they are frequently passive, any activity which increases alertness or interaction is very important. This study investigates whether the use of MSEs resulted in increased alertness or interaction among persons with profound multiple disabilities.

Method

Subjects

A total of 19 facilities in the Netherlands and the Flemish speaking part of Belgium were randomly selected and approached for this study, of which 15 agreed to participate. Three of the four facilities which did not co-operate did so because of practical problems related to the process of de-institutionalization; one did not respond at all. The facilities which participated used MSE as an activity for people with profound multiple disabilities and had a fully equipped MSE at their disposal.

Key workers at the facilities were asked to select 10–15 persons to participate in the research. The criteria were: 18 years or older, profound multiple disabilities and at least weekly use of the MSE. A total of 177 individuals with profound multiple disabilities were selected by staff, 75 of them female and 102 male. Two to three key workers per facility were included in the study. All staff members were qualified, were familiar with the person with profound multiple disabilities, and had been employed by the facility for more than one year.

Procedure

The procedure for data collection was similar for each participating facility. An interview consisting of two questions was used to gather information from staff on the use of the MSE by all 177 individuals. First, staff were asked to identify the reasons for using the MSE for the particular person in question. Second, if staff stated that the MSE was used to 'increase the level of activity', they were asked to identify the stimuli that were used to attain this goal.

After the interviews, a random selection of five of the 15 facilities was made. In each facility we took a sample of four participants who had 'increasing the level of activity' or 'being active' as their only stated MSE goal. The intended research sample was therefore 20 of the 62 participants for whom 'being active' was the goal. During the research, one of the selected participants moved to another facility, leaving a final sample of 19, 11 female and eight male. Their average age was 28 years, with a range from 18 to 41 years.

Momentary time sampling (MTS) was used as a means to record the level of interaction and alertness (Powell *et al*. 1975; Powell *et al*. 1977; Saudargas & Zanolli 1990; Murphy & Harrop 1994). This method records the behaviour of both the participant and the staff member in detail.

Observational categories were initially chosen by combining categories used by Green *et al*. (1994) and the behaviour state codes of Guess and Siegel-Causey (1995). The sleep states of the Guess and Siegel-Causey codes were combined into one category because the distinction between these codes was not applicable to our research. As we wanted to distinguish between an increase in alertness and an increase in interaction, the awake states of the Guess and Siegel-Causey codes were split into 'self-directed' (increase in alertness) and 'directed at the environment' (increase in interaction). The use of the preliminary observational protocol during the practice observations using video showed that it was also necessary to make a distinction between sensory and motor activity in the awake states, as individuals with profound multiple disabilities are sometimes incapable of showing motor reactions. The final observation categories used are shown in Table 1.

Three observations were conducted per participant, two in the MSE environment and one in their normal living environment. The first observation was considered as a probe session in which the two researchers assessed their level of agreement on the categories that they observed. Therefore, only the second MSE observations were used in the study.

The MSE session lasted approximately 30 min during which the behaviour of the participant was observed every 30 s by two researchers who sat in the room without interacting with participants or each other. In addition to the observational categories, a number of contextual variables were also scored every 30 s (see Kewin 1994; Bozic 1997). These variables were the material available in the room, electronic equipment that was switched on or off, the number of participants in the MSE, the number of staff members in the MSE and the behaviour of staff (e.g. talking to the person, changing the person's position).

In order to be able to relate an increase in level of activity to specific aspects of the MSE, participants were also observed in their normal living environment (NLE) during a time which direct support personnel reported as comparable to the observed MSE session. For example, if the MSE was made available between 11 and 12 in the morning (i.e. just before lunch), the observations in the NLE occurred during a similar period. If a person always had physiotherapy before going to the MSE, that fact was taken into account when selecting the time and day for the NLE observation. In this way, a control observation period of 30 min was selected for every individual, using the same measurement methods. The researchers were trained before the

Table 1 Items observation list

A. Asleep-inactive-not alert
Eyes closed, no apparently purposeful body movements, no vocalization
B. Awake-inactive-not alert
Eyes open with no apparent eye contact with external stimuli, no apparently purposeful body movements, no vocalizations except possible stereotypic sounds
C. Active- self-directed
Eyes open, some active visual, auditory, tactile or olfactory orientation toward self (e.g. observing own clothing, listening to own vocalizations, touching own body or clothing) uses self-stimulatory or stereotypical motor movements (e.g. head-weaving, rocking, mouthing hands)
D. Sensory active-directed at environment
1-Person attempts to engage/interact using visual, auditory or tactile modes, directed at material or other non-personal stimuli from environment (e.g. attentive to sounds from bubble tube or smell from aroma therapy)
2-Person attempts to engage/interact using visual, auditory or tactile modes, directed at people (making eye contact with professional support person or with other participants)
E. Sensory and motor active-directed at environment
1-Person attempts to engage/interact using visual, auditory or tactile or motor modes, directed at material or other non-personal stimuli from environment (e.g. turns head towards stimuli, tries to move in ball pool)
2-Person attempts to engage/interact using visual, auditory or tactile modes directed at people (touching support personnel or other participants; using voice to attract attention from other people)

actual observations took place to enable them to observe reliable together. The training ended when an interobserver agreement of 80% or more was reached during three consecutive sessions. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements and disagreements, multiplied by 100%. An agreement was defined as 'the two observers record the same category for the behaviour of the participant'. A disagreement was defined as 'the two observers record different categories for the behaviour of the participant'. Each observation in the MSE was preceded by a probe session to make sure the interobserver agreement of 80% or more was reached to ensure against observer drift during the study.

Results of the interviews

Staff stated that an increase in the level of interaction and alertness was the main goal to be attained for 99 of the 177 individuals with profound multiple disabilities (see Table 2). 'Being active' was the only goal mentioned for 62 of these 99. This goal was mentioned in combination with other goals for the remaining 37.

Staff members reported that the materials chosen as a means to increase the level of alertness and interaction were visual stimuli (e.g. line lights, black-lights) in almost 66% of these 99 cases, auditory stimuli (e.g. music boxes, sound-producing toys) came second in 65%, kinaesthetic stimuli (especially the waterbed) in 54%, tactile stimuli in 54% and olfactory stimuli in 12%. For most (89%), a combination of more than one type of stimulus was chosen, meaning that different sensory systems were being addressed. Two types of stimuli were chosen in 42% of the cases, with visual and auditory stimuli as the most popular combination (13%). Three types of stimuli were used in 36% of the cases, with the combination of visual, auditory and kinaesthetic as the most frequent combination (12%). Four and five different stimuli were

Table 2 Intended effect of MSE on individuals with profound multiple disabilities

Intended effect	*Number of people*
Being active	62
Being active, relaxation	26
Being active, having contact	4
Being active, relaxation, contact	5
Being active, relaxation, minimizing challenging behaviour	1
Being active, change of posture	1
Relaxation	45
Relaxation, having contact	16
Contact	9
Fun	6
Fun and relaxation	1
Change of posture	1
Total	177

chosen in 8 and 3% of the cases, respectively, with the combinations of visual, auditory, tactile, and kinaesthetic used in 7% and the combination of visual, auditory, tactile, kinaesthetic and olfactory used in 3% of the cases.

Results of the observations

All the 19 people were observed in two different environments: MSE and NLE. Including the person who was being observed, there were between two and seven individuals

Table 3 Number (and per cent) of observation intervals in which each participant is observed in each of seven categories of activity in MSE and NLE

	MSE				*NLE*			
Participant	*Alert (D1 + E1)*	*Interaction (D2 + E2)*	*Self-directed (C)*	*Inactive (A + B)*	*Alert (D1 + E1)*	*Interaction (D2 + E2)*	*Self-directed (C)*	*Inactive (A + B)*
1	9 (15%)	2 (3%)	42 (69%)	8 (13%)	3 (5%)	0 (0%)	6 (10%)	52 (85%)
2	10 (16%)	40 (66%)	11 (18%)	0 (0%)	11 (18%)	5 (8%)	45 (74%)	0 (0%)
3	30 (49%)	5 (8%)	21 (34%)	5 (8%)	2 (3%)	4 (7%)	55 (90%)	0 (0%)
4	17 (28%)	8 (13%)	34 (56%)	2 (3%)	15 (25%)	0 (0%)	43 (70%)	3 (5%)
5	46 (75%)	0 (0%)	3 (5%)	12 (20%)	40 (66%)	11 (18%)	4 (7%)	6 (10%)
6	60 (98%)	1 (2%)	0 (0%)	0 (0%)	32 (52%)	0 (0%)	9 (15%)	20 (33%)
7	60 (98%)	1 (2%)	0 (0%)	0 (0%)	40 (66%)	0 (0%)	21 (34%)	0 (0%)
8	0 (0%)	0 (0%)	0 (0%)	61 (100%)	16 (26%)	0 (0%)	41 (67%)	4 (7%)
9	18 (30%)	0 (0%)	39 (64%)	4 (7%)	16 (26%)	15 (25%)	30 (49%)	0 (0%)
10	34 (56%)	15 (25%)	8 (13%)	4 (7%)	21 (34%)	2 (3%)	9 (15%)	29 (48%)
11	11 (18%)	2 (3%)	12 (20%)	36 (59%)	3 (5%)	0 (0%)	7 (11%)	51 (84%)
12	17 (28%)	1 (2%)	37 (61%)	6 (10%)	51 (84%)	3 (5%)	7 (11%)	0 (0%)
13	45 (74%)	2 (3%)	7 (11%)	7 (11%)	39 (64%)	20 (33%)	2 (3%)	0 (0%)
14	61 (100%)	0 (0%)	0 (0%)	0 (0%)	52 (85%)	0 (0%)	0 (0%)	9 (15%)
15	47 (77%)	14 (23%)	0 (0%)	0 (0%)	50 (82%)	7 (11%)	4 (7%)	0 (0%)
16	12 (20%)	9 (15%)	40 (66%)	0 (0%)	15 (25%)	32 (52%)	14 (23%)	0 (0%)
17	47 (77%)	6 (10%)	8 (13%)	0 (0%)	27 (44%)	6 (10%)	28 (46%)	0 (0%)
18	53 (87%)	8 (13%)	0 (0%)	0 (0%)	42 (69%)	19 (31%)	0 (0%)	0 (0%)
19	45 (74%)	0 (0%)	1 (2%)	15 (25%)	54 (89%)	4 (7%)	3 (5%)	0 (0%)
Total	622 (54%)	114 (10%)	263 (23%)	160 (14%)	529 (46%)	128 (11%)	328 (28%)	174 (15%)

with disabilities in the MSE room with one or two staff members and between three and 10 individuals with disabilities in the NLE with two or three staff members.

Differences in level of activity between the MSE and the NLE

The results of the observations of activity level are set out in Table 3. As a group, the 19 people with profound multiple disabilities showed a similar level of activity in both MSE and NLE. People were active, i.e. alert or initiating (categories D1,2 and E1,2) for approximately three fifths of the time. They were alert and directed at material 54% of the time in the MSE and 46% of the time in the NLE, and they were engaged in interactions for 10% of the time in the MSI and 11% of the time in the NLE. They were alert and self-directed in those situations 23 and 28% of the time, respectively. They were also passive for approximately the same period of time in both situations, MSE 14% and NLE 15%. Apart from one exception there were no significant differences between settings using paired sample *t*-test for any of the main observation categories or combinations of them. There was only a significant difference found in the E1 category (interaction with materials) ($t(18) = -3.13$, $P = 0.006$), with higher levels found in the MSE.

Although group data were comparable, Table 3 does show substantial individual differences. For example individuals 2, 3, 6 and 17 were more active (higher scores on D and E categories) in the MSE than in the NLE, but 8, 9, 12 and 16 were more active in the NLE. Some individuals, for example 5, 15 and 18, seemed to be as active (or as passive) in both situations.

Increase in level of activity in relation to contextual variables

The differences between individuals shown in Table 3 cannot be explained by differences in context. In both situations (MSE and NLE), environmental stimulation was similar across individuals. In all MSE observations, most material was presented continuously. In all NLE observations, there was little variation in context. Stimuli which varied in occurrence (non-continuous stimuli) were:

- Specific stimuli from staff: talking to the person, giving the person a massage, etc.
- Non-specific stimuli from staff: talking to another person or in general, walking within the person's visual field, etc.
- Specific material: material in the hands of the person, an object at close range.
- Other participant: voluntary or involuntary touching of the person, making noises at close range.
- Specific material in combination with person: playing together with material, holding an object for a person at close range so that he/she can touch that object.

The relationship between activity level and these non-continuous stimuli is shown in Table 4.

Thirty-five per cent of the alert categories (D1 and E1) in the MSE occurred in the presence of non-continuous stimuli compared with 14% in the NLE. In both environments, materials accounted for about a third of these percentages.

The interaction categories (D2 and E2) occurred almost exclusively in the presence of non-continuous stimuli offered by staff in both MSE (96%) and NLE (97%). Non-continuous stimuli occurred more frequently overall

Table 4 Relating behaviour to non-continuous stimuli and level of alertness or interaction in MSE and NLE

	Staff-specific	*Staff non-specific*	*Material*	*Participant*	*Staff + material*	*Total*
MSE						
Alert (D1 + E1) $n = 622$	38 (6%)	45 (7%)	67 (11%)	0 (0%)	70 (11%)	220 (35%)
Interaction (D2 + E2) $n = 114$	81 (71%)	22 (19%)	0 (0%)	0 (0%)	6 (5%)	109 (96%)
Self-directed (C) $n = 263$	39 (15%)	34 (13%)	12 (5%)	0 (0%)	2 (1%)	87 (33%)
Inactive (A + B) $n = 160$	34 (21%)	9 (6%)	0 (0%)	0 (0%)	0 (0%)	43 (27%)
Total	192	110	79	0	78	459
NLE						
Alert (D1 + E1) $n = 529$	15 (3%)	19 (4%)	29 (5%)	0 (0%)	8 (2%)	71 (14%)
Interaction (D2 + E2) $n = 128$	34 (27%)	88 (69%)	0 (0%)	1 (1%)	1 (1%)	124 (97%)
Self-directed (C) $n = 328$	5 (2%)	6 (2%)	2 (1%)	0 (0%)	0 (0%)	13 (4%)
Inactive (A + B) $n = 174$	0 (0%)	4 (1%)	1 (1%)	1 (1%)	1 (1%)	7 (4%)
Total	54	117	32	2	10	215

in the MSE ($n = 459$) than in the NLE ($n = 215$). They were associated more with self-directed activity (C) and passivity (A and B) in the MSE.

Conclusion

A review of the literature concluded that the majority of the studies had found a wide range of positive outcomes for people with intellectual disabilities when MSEs and non-MSEs are compared, albeit with no generalization, to the immediate post-MSE setting (Hogg *et al*. 2001). We expected 'relaxation' and 'enjoyment' to be the main goal for most individuals with profound multiple disabilities, as this is often mentioned by practitioners in the field. Much to our surprise, an increase of activity level was most frequently mentioned as a reason for the using of MSEs with individuals with profound multiple disabilities.

Although support staff clearly indicated in the interviews that specific material is used to lead to the desired effect, in practice specific material was used only rarely. In nearly all situations, staff used the entire battery of electrical equipment, and all material of this kind in the MSE was switched on during sessions. Staff indicated the use of more than four stimuli at the same time applicable in only 11% of the cases, but in the observations more than four stimuli were offered 97% of the time. No explanation can be offered for the differences in what was said in the interviews and what was actually performed in the MSE.

Based on our observations, we can conclude that there is no general evidence for an increase in level of activity as a result of the use of MSEs. For the group as a whole, both NLE and MSE were comparable. Increase in the level of alertness was more often observed than an increase in the level of interaction. Category E1 (sensory and motor activity directed at material) was seen more frequently in the MSE than in the NLE. There were substantial individual differences. Some participants were more active in the MSE than in the NLE, for some there seemed to be no difference, and some participants were more passive in the MSE than in the NLE.

There was little variation within the MSE. Most individuals were put in the room and stayed in the same position throughout the whole session. In the NLE, we also observed little variation. As differences between individuals could not be explained by the general context, we looked at a number of non-continuous stimuli. These non-continuous stimuli were offered twice as often in the MSE than in the NLE. In both settings, non-continuous stimuli were usually associated with alertness or interaction. Stimuli offered by staff were more effective than stimuli offered by material only, pointing to the importance of staff mediation in both settings.

Discussion

The present study investigated the effects of the MSE on the level of interaction and alertness in 19 participants with profound multiple disabilities. It should be noted that the sample size was limited and that the conclusions should therefore be treated with caution. Also, key workers were asked to select 10–15 individuals for the research, which may have skewed the results in some way unknown to us.

We used momentary time sampling (MTS) as a means to record the level of observed interaction and alertness. Conducting observations is a common method in this type of research, but other methods to identify an increase in level of alertness and interaction may provide a more accurate indication of increased or decreased activity level. Physical indicators such as galvanic skin response (GSR) or heart rate measurements could be used as alternative or complementary measurements. However, according to Hogg *et al*. (2001) these physiological measures should also be treated with caution and should not be taken to be authoritative.

This study showed that the use of MSEs is no guarantee that the goals set are actually met. The use of MSEs has been criticised by several authors. Mount and Cavet (1995) stress that the use of MSEs 'may divert the attention of staff from recognizing the potential for sensory stimulation in everyday environments, and can provide an unstimulating and incomprehensible setting for people with learning difficulties' (p. 54). In his critical discussion, Orr (1993) questioned the grandiose claims that are being made about the efficacy of stimulation programs using MSEs. Orr stated his suspicion as he believed that the features of the room itself are not the agents for bringing about improvements in visual and other perception. Our data are consisted with this point of view. Moreover, in our study, the MSE sometimes even promoted passivity as some individuals appeared to be enduring stimuli rather than responding to them, perhaps in order to cut themselves off from an environment experienced as overwhelming.

Our study seems to suggest that, in general, the living unit is as good (or as bad) a place as the MSE for promoting alertness and interactions. If the MSE is not particularly effective (while being relatively expensive), more and other means are required to increase the levels of interaction and alertness within the group under discussion. One option may be to change to being more selective in the stimuli that are offered. For example Lindsay *et al*. (2001)

suggest that further research should consider partialing out music as a separate variable in order to judge its individual benefits. In contrast with the original idea of Hulshegge and Verheul (1987), most MSEs in the Netherlands do not consist of separate rooms each put to a distinctive use, but are designed as one room with an abundance of stimuli.

Nevertheless, it is unwise to state categorically that providing individuals with profound multiple disabilities with a clutter of sensory stimuli is injurious. There were, after all, some individuals with profound multiple disabilities who only seemed to be alert when strong, almost overwhelming stimuli were presented. In addition to a more specific use of rooms and material, attention should be paid to the approach taken. Pagliano (1998) argues in favour of an open-minded approach, and defines an MSE as '. . . a dedicated space or room for relaxation and/or work, where stimulation can be controlled, manipulated, intensified, reduced, presented in isolation or combination, packaged for active or passive interaction, and temporally matched to fit the perceived motivation, interests, leisure, relaxation, therapeutic and/or sociological forms' (p. 107). Such an open-minded approach may lead to different results at the level of interaction and alertness of people with profound multiple disabilities. Research into the outcomes of different approaches is necessary, as well as research into preference assessment. It is very important to know which sensory modalities the individual with profound multiple disabilities is able to use, and/or what his/her preferred sensory modalities are. Efforts must be made to establish what the individual brings to the situation in terms of personality and sensitivities (Hogg *et al*. 2001). Although one might expect staff to have this kind of information before offering the MSE, the chances are that stimuli are 'believed' to be appropriate and are offered without assessing the individual's abilities and preferences first. Assessment of the individually preferred intensity and frequency of stimuli offered is also necessary. Although a notable body of literature has emerged concerning preference assessment for individuals with profound or profound multiple disabilities (e.g. Fisher *et al*. 1992; Kennedy & Haring 1993; Smith *et al*. 1995; Bambara *et al*. 1994; Lancioni *et al*. 1996), its impact in practice is limited. Instruments need to be developed in order to make preference assessment possible. More research is also needed regarding the influence of contextual variables, assessment stimuli, selection response and format (Lohrmann-O'Rourke & Browder 1998). As was stated before, only a limited amount of empirical research has been conducted into the effectiveness of the use of MSEs for individuals with profound multiple disabilities. There is an obvious need for more research in view of the high cost of purchasing and maintaining these materials, but most importantly because individuals have a right to have tailor-made activities and stimuli offered to them. A more active attitude on the part of facilities and professionals is necessary, as individuals with profound multiple disabilities need the presence of others to maintain or gain interest in the world that surrounds them, a world that is rightfully theirs as human beings.

Acknowledgements

We would like to thank Dr Rita Zijlstra for her assistance in preparing the last version of this article.

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