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The underlying meaning of stimuli: Impact on engagement of persons with dementia

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Abstract

In a previous article, we discussed a theoretical framework asserting that a combination of stimulus attributes, person attributes and environmental attributes as well as interactions among these affect engagement with stimuli by persons with dementia (Cohen-Mansfield et al., in press). Based on this framework, we tested the impact on engagement of the personal meaning of stimuli, specifically examining work-like stimuli, stimuli based on the person's identity, and gender role based activities. We hypothesized that having such meanings will render stimuli more engaging than stimuli without these meanings. Participants were 193 residents of 7 Maryland nursing homes. All participants had a diagnosis of dementia. Results confirmed the hypotheses, demonstrating that the meaning of the stimulus impacts engagement shown by persons with dementia. Interventions that involve objects or tasks with meaning specific to the person with dementia will be more likely to engage that person. Future research could explore more identity roles as well as other mechanisms affecting engagement.

Keywords

engagement; dementia; nursing home; work-like stimuli; self-identity

1. Introduction

Nursing home residents with dementia most often spend their time without any activity and with minimum stimulation (Cohen-Mansfield et al., 1992; Burgio et al., 1994), which can magnify the apathy, boredom, depression, loneliness, and behavior problems that often accompany the progression of dementia (Buettner et al., 1996; Engelman, Altus, & Mathews, 1999).

Engagement, defined as the act of being occupied or involved with an external stimulus (Cohen-Mansfield, Dakheel-Ali, & Marx, in press), has been linked to decreased boredom (Baker et al., 2001), positive emotions (Baker et al., 2001; Schreiner et al., 2005), alertness (Baker et al., 2001), interest (Cohen-Mansfield et al., 2007), and to decreases in agitation/problem behaviors

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in this population (Buettner, 1999; Cohen-Mansfield et al., 2007; Cohen-Mansfield and Werner, 1997). Involvement in meaningful social activities and the presence of a supportive social environment can have positive effects on quality of life and functional ability (Gonzalez-Salvador et al., 2000; Morgan & Stewart, 1997).

The state of inactivity and lack of stimulation for nursing home residents is due both to the inability of the person with dementia to pursue and access activities and to the small number of activities and stimuli offered in nursing homes. A lack of understanding of what engages nursing home residents is one of the factors contributing to the practice of simply leaving them sitting in a room, or putting them in front of a television without regard to the program being shown.

In response to this situation, we have undertaken a study in which we have examined factors affecting engagement with specific stimuli by persons with dementia. We have developed a framework concerning the mechanisms of interactions between persons with cognitive impairment and setting characteristics, as well as the factors that are associated with interest and negative and positive feelings in engagement (Cohen-Mansfield et al., in press). This theoretical framework asserts that engagement with a stimulus is affected by stimulus attributes, person attributes, and environmental attributes as well as the interactions among these. Engagement influences affect, which then affects the presentation of behavior problems (see Figure 1). Although the stimulus attributes that may affect engagement have not been studied systematically, these may include the degree to which the stimulus has social qualities, the degree to which it is manipulative, or the degree to which it represents a work role. In this paper, we focus on one subset of this theoretical framework, the impact of the meaning of stimuli and the interaction between person attributes and stimuli attributes on engagement. Specifically, we compare stimuli that represent a work role, stimuli that relate to the person's role identity, and stimuli that are considered to relate to gender-based roles, and examine the impact of these on engagement in persons with dementia.

Even though research on engagement of nursing home residents with dementia is a relatively new area of investigation, there are several studies on the topic (e.g., Buettner, 1999; Mayers and Griffin, 1998; Orsulic-Jeras et al., 2000). In a study of ten nursing home residents with dementia who displayed wandering behaviors, researchers observed participants' interaction with available objects during unstructured periods of the day and described differences in activity preferences by stage of dementia (Lucero et al., 2001). The researchers concluded that product development aimed at persons in middle stages of dementia should focus on familiar activities, whereas products for later stage dementia should concentrate on a single familiar action and could include manipulative boards or differently textured items to touch. However, studies on engagement of persons with dementia generally do not address the issue of the meaning of the stimulus and its effect on engagement. The few related studies have focused on self-identity roles and are described below.

The self-identity construct used here refers to the identification with roles that people have assumed throughout their lifetimes. In continuing our prior work on this topic (Cohen-Mansfield, Golander, & Arnheim, 2000; Cohen-Mansfield, Parpura-Gill, & Golander, 2006a; Cohen-Mansfield, Parpura-Gill, & Golander, 2006b), four types of role were explored, namely occupational role (which occupation was most important for the person), family role (e.g., whether a role of parent, child, spouse, or sibling was most important), leisure time role (e.g., hobby related role), and attribute, i.e., something about one's identity that was important to the person, such as place of birth or a specific acquaintance. Role-identity salience was determined based on a review of answers to the Self-Identity Questionnaire (SIQ; Cohen-Mansfield et al., 2006a) by 2 informants: participant and family member or responsible party. The role-based intervention was designed so that it was directly related to the content or context

of the role identity, and was appropriate for the participant's abilities. Even though the importance of past identity roles, such as hobbies and occupations, may decrease over time due to dementia, activities that focus on these roles may result in increased interest during times of agitation (Cohen-Mansfield et al., 2000; Cohen-Mansfield et al., 2006a). For instance, "papers to grade" could serve as an intervention for a person who had been a teacher. Similarly, a video of a baseball game or baseball memorabilia could be engaging for a person who had been a longtime baseball enthusiast. In a study of 93 nursing home and adult day care participants with dementia, interventions based on past identity roles resulted in participants manifesting greater interest, pleasure, and involvement than regular activities provided at the facility (Cohen-Mansfield et al., 2006a).

In examining the meaning of stimuli, we rely on a vast philosophical and psychological literature on the importance of meaning and the search for meaning throughout people's lives (e.g., Frankl, 1946). For example, Fry (2000) found that personal meaning, religiosity, and spirituality contributed more to explaining well-being of older adults than demographic and health variables. Basting (2002) concluded that the self is "forged on a continuum of memory and creativity that exists in a social context. Therefore, the person suffering from memory loss might suffer the gradual depletion of his or her personal control over identity, but not a total loss of self." This suggests that identification with forgotten roles and relationships can still be triggered by appropriate stimuli. Indeed, Cohen-Mansfield, Parpura-Gill, and Golander (2006) found that when participants with dementia were presented with interventions tailored to their self-identity they were more involved than were control group participants with regular activities. Other studies have also found evidence for the persistence of self-identity in persons with dementia, although it may depend on interactions with others that allow this identity to be expressed (Golander & Raz, 1996; Li & Orleans, 2002; Small, Geldart, Gutman, & Clarke-Scott, 1998; Sabat & Harre, 1992; Tappen, Williams, Fishman, & Touhy, 1999).

In the present study, three types of meaning were examined: self identity, work/helping others, and gender identity through gender related activities. Only the self-identity stimuli were individualized. We included work related activities (as compared to non-work related activities) because we feel that these provide the person with dementia an opportunity to feel like an active participant in society. Additionally, when we presented each work related activity, we asked participants if they would complete the role activities "for us", thereby providing a second meaning (altruistic) to the task. We also included activities based on the past role identities of the participants in order to allow a particular identity to provide meaning for the person. Finally, we included gender-based activities which are simply those activities associated with gender roles (e.g., life-like baby dolls for women). Even though gender-based activities do not provide specific meaning, these were included as these may be related to prior activities and gender roles and may reinforce a person's sense of identity through a more generalized rather than particular identity.

Specific hypotheses examined in the present study are:

1. Work related stimuli, because of their inherent meaning, will result in more engagement than non-work related stimuli.
2. Based on the findings of Lucero et al. (2001), we anticipate that the higher levels of engagement with work stimuli will be more pronounced in persons with moderate rather than with severe dementia.
3. Stimuli that are individualized on the basis of the person's identity will result in more engagement and better quality of engagement than other stimuli.
4. Gender role based activities will result in more engagement when gender of the person is matched with a gender-associated activity.

2. Methods

2.1 Participants

Participants were 193 residents of 7 Maryland nursing homes. All participants had a diagnosis of dementia. 151 participants were female (78%), and age averaged 86 years, ranging from 60 to 101 years. The majority of participants were Caucasian (81%), and most were widowed (65%). ADL performance, which was obtained through the Minimum Data Set (MDS; Morris et al., 1991), averaged 3.6 (SD 1.0, range 1–5; Scale: 1- ‘independent’ to 5- ‘complete dependence’). Cognitive functioning, as assessed via the Mini-Mental State Examination (MMSE; Folstein, et al., 1975), averaged 7.2 (SD 6.3, range 0–23). Participants had an average of 6.7 medical diagnoses.

2.2. Assessments

2.2.1. Background assessment—Data pertaining to background variables were retrieved from the residents’ charts at the nursing homes by a trained research assistant, and included information about gender, age, marital status, medical information (medical conditions from which the resident suffers; a list of medications taken), and performance of activities of daily living (ADL; from the Minimum Data Set (MDS); Morris et al., 1991). ADL performance was assessed for 10 activities (bed mobility, transferring, locomotion on the unit, dressing, eating, toilet use, personal hygiene, bathing, and bowel incontinence) utilizing a scale from 1 to 5, with 5 representing maximum dependence; a mean ADL score was calculated for each participant. All participants had a diagnosis of a major degenerative disease of late life such as: Dementia - probable Alzheimer’s disease; Dementia - possible Alzheimer’s disease; Dementia - with the presence of vascular disorder (e.g., multi-infarct dementia); Dementia - with a diagnosis of Parkinson’s disease; and Dementia - unknown etiology (i.e., cognitive impairment in an alert person that fits none of the categories above). The Mini-Mental State Examination (MMSE; Folstein et al., 1975) was administered to each participant by a research assistant trained in standardized administration and scoring procedures.

2.2.2. Self-identity—Whenever possible, we interviewed the resident and conducted a telephone interview with the closest living relative of the resident to determine what roles were important and enjoyable to the resident before the onset of dementia, as well as what activities are currently enjoyed. The Self-Identity Questionnaire (SIQ; Cohen-Mansfield et al., 2000) was used for this purpose. This assessment examines four types of role-identity: professional, family-role, leisure activities, and personal attributes. Using the SIQ, we were able to prioritize role identities with respect to both the past and present (e.g., an identity that was very important in both the past and present would receive a higher priority than one that was important in only one timeframe). When there was a discrepancy among informants, we considered the participant’s level of cognitive functioning. We tailored our interventions according to the data obtained through the SIQ, such as the particular job that was important to the participant, the particular family member who is the most important to the participant, specific activities/hobbies the participant enjoyed, etc.

2.2.3. Observational Assessment of Engagement (OME)—OME data were recorded through direct observations using specially designed software installed on a handheld computer, the Palm One Zire 31™. Following our introduction of the engagement stimulus, we recorded whenever the participant refused the engagement stimulus (through words or actions) as well as whether or not the participant asked for additional help and/or modeling of the stimulus. Specific outcome variables on the OME are described below: **Attention** to the stimulus during an engagement trial was measured on this 4-point scale: not attentive, somewhat attentive, attentive, and very attentive. Attention could be gauged in such ways: the amount of attention the person was visibly paying to a stimulus during the session (e.g., eye

movements, manipulating or holding the stimulus, talking about the stimulus), and whether the person was following instructions provided (e.g., how to build with the blocks). Attention could also include physical manifestations without visual contact (e.g., stroking a cat, even if looking away). Level of attention observed during most of the trial and the highest attention level during the trial were recorded. Based on high correlations suggesting that these measures capture a single construct (Cohen-Mansfield et al., in press), these ratings were averaged to form a single attention variable.

Attitude to the stimulus during an engagement trial was measured on a 7-point scale: very negative, negative, somewhat negative, neutral, somewhat positive, positive, and very positive. Attitude was typically determined by gauging the amount of excitement and/or expressiveness toward the stimulus (e.g., smiling, frowning, energy, excitement in voice). We recorded attitude to the stimulus seen during most of the trial as well as the highest rating of attitude observed during the trial. Based on high correlations suggesting these measures also capture a single construct (Cohen-Mansfield et al., in press), these ratings were averaged to form a single attitude variable.

Duration referred to the amount of the time that the participant was engaged with the stimulus. This measure started after presentation of the engagement stimulus and ended at 15 minutes, or whenever the study participant was no longer engaged with the stimulus (i.e., the study participant was no longer observed to exhibit attention behaviors for 30 seconds). Duration was measured in seconds.

Inter-rater reliability of the OME was assessed by comparing ratings of the engagement measures recorded by 6 dyads of research assistants' during 44 engagement sessions with nursing home residents. Intra-class correlation (alpha values) averaged 0.78 for the engagement outcome variables.

2.3. Procedure

Informed consent was obtained for all study participants from their relatives or other responsible parties. Additional information on the informed consent process is available elsewhere (Cohen-Mansfield et al., 1988). Our main criterion for inclusion was a diagnosis of dementia (derived from either the medical chart or the attending physician) based on DSM-IV criteria and the Report of the NINCDS-ADRDA. The criteria for exclusion were:

- The resident had an accompanying diagnosis of bipolar disorder or schizophrenia.
- The resident had no dexterity movement in either hand.
- The resident could not be seated in a chair or wheelchair.
- The resident was younger than 60 years of age.

Once consent was obtained for eligible participants, background information was obtained from each participant's chart in the nursing home. In addition, the MMSE was administered to each participant.

Each study participant was presented with engagement stimuli in random order over a period of three weeks. The stimuli were conceptualized as fitting the following categories: **work related stimuli**—stamping envelopes, a sorting task (either cards or envelopes); **non-work related stimuli**—an expanding sphere, music, a large print magazine, a wallet/purse, a fabric book, an activity pillow; **feminine activities**—folding towels, arranging flowers; **gender neutral stimuli**—stamping envelopes, a sorting task (the same as work related stimuli); **self identity stimuli**—2 activities were specifically designed to match the participant's past identity, and **comparison stimuli**—(all stimuli listed above as well as the following additional

stimuli: real looking doll, stuffed animal, childish doll, tetherball, squeeze ball, respite video, coloring, building blocks, robotic animal, wood puzzle. With the exception of the self-identity stimuli, all stimuli were standardized across study participants. Our rationale for using the same stimuli across study participants, rather than individualizing work stimuli, is that we wanted to simulate a busy nursing home unit where the staff would only have time to present a given stimulus and then move on to the next resident. The self-identity stimuli were matched to each participant's past identity with respect to the most salient past or present identity identified. Previously described in Cohen-Mansfield, Golander, and Arnhem (2000), the four possible role identities were 1) occupational or professional, 2) family, e.g., spouse or children, 3) leisure activities or hobbies enjoyed, and 4) personal attribute of which the participant was proud, e.g., traits, accomplishments, acquisitions, and group memberships. Self-identity stimuli therefore varied across study participants, such that a book ledger could be given to a former accountant, or fabric samples could be presented to a former seamstress.

Each stimulus was presented twice during the study (but not on the same day); once with an explanation and demonstration of how the stimulus should be used, and once without such modeling. This was done in order to assess the impact of presentation method (results on this aspect are presented in Cohen-Mansfield et al., under review) and to get a more robust estimate of the impact of each stimulus. Presenters asked if the participant would like to engage in the activity --and, in the case of work related activities, if they would help the research assistant -- and then left the room. Presenters asked for help with the work-related activities in order to give the work a context and therefore a motivation for performance. That motivation, helping the research assistant, provides additional meaning to the work assignment. If a study participant asked questions or needed more modeling of the engagement stimulus, the research assistant provided these before leaving and recorded this on the OME (occurring on 2.5% of presentations). If the participant refused the engagement stimulus, the research assistant removed it and left the room, and this information was recorded on the OME. Engagement trials took place between 9:30 am–12:30 pm and between 2 pm–5:30 pm, as these are the times that residents are not usually occupied with care activities at the nursing home (e.g., meals in the dining room, bathing). Individual engagement trials were separated by a washout period of at least 5 minutes. The order of stimulus presentation was randomized for each participant.

A second research assistant, who remained unobtrusive, observed the participant's reaction and engagement with the stimulus via the OME, entering the data directly onto a Palm Pilot Zire31TM. As described earlier, the OME included items measuring the participant's attention to the stimulus during engagement, attitude toward the stimulus, and duration of engagement. Each trial lasted a minimum of 3 minutes. If the participant showed no interest in the stimulus after 3 minutes, the trial was terminated and the first research assistant retrieved the engagement stimulus. If the participant became engaged with the stimulus, the trial lasted throughout the extent of the participant's engagement – up to a cutoff time of 15 minutes. When it appeared to the research assistant that the study participant was no longer engaged (for those trials that lasted more than 3 minutes), the research assistant continued to observe the study participant, ending the trial after 30 seconds if the study participant showed no further engagement. The research assistants were blind to the study hypotheses.

2.4. Analytic approach

Dependent measures were duration, attention, and attitude. When a study participant refused a stimulus, we coded duration as 0 seconds and scored both the attention and attitude variables as missing for that trial for the purpose of analysis. Mean results for each group of stimuli were calculated for each person (e.g., the mean engagement time across all work stimuli). Paired t-tests were used to compare the differences in responses to work vs. nonwork and to stimuli based on self-identity to those not based on self identity. In order to examine the impact of

gender based activities, a two way analysis of variance (ANOVA) was used where the between group factor was males vs. females, and the within person factor was female gender based activities vs. gender neutral activities. Another two way ANOVA was used to examine whether the impact of work role is different for persons with different levels of cognitive functioning. In order to maximize the power of the analysis, cognitive functioning was divided at the median of the sample: MMSE=6. All statistical analyses were performed using SPSS software.

3. Results

3.1. Work vs. non-work

Results of our analysis confirmed hypothesis 1, i.e., work related stimuli would result in more engagement than non-work stimuli. Stimuli that related to office work (stamping envelopes a sorting task) showed significantly longer engagement duration ($t_{(192)} = 5.77, P \leq 0.001$) and more attention ($t_{(185)} = 5.15, P \leq 0.0001$) than the non-work items (e.g. music, reading magazines) (Table 1). The analysis pertaining to attitude was not significant.

In order to examine the second hypothesis, based on the findings of Lucero et al. (2001), that the higher engagement observed with work stimuli will be more pronounced in persons with moderate rather than severe dementia, we conducted a two-way ANOVA, with work vs. non-work stimuli as a within person factor and level of cognitive functioning as a between subject factor (severe dementia = $MMSE \leq 6$) moderate dementia = $MMSE > 6$). The interaction term between work vs. non-work stimuli and level of cognitive functioning was significant for both engagement duration and attention ($F_{(1,186)} = 14.75, P \leq 0.001$; $F_{(1,179)} = 11.83, P \leq 0.001$, respectively). Both groups paid more attention and were engaged for a longer duration with the work stimuli, and the difference between work and non-work stimuli was significantly more pronounced among those with moderate dementia in comparison to those with severe dementia (see Table 2 and Figure 2). Results of the analysis with attitude were not significant.

3.2. Self identity

Table 3 is organized around the four possible role identities, and shows the most common self-identities reported for the sample and the stimuli provided on the basis of these self-identities. We calculated a mean for each of the response measures to the two interventions specifically designed to match the participant's self-identity. The most salient self-identity for these residents was the family identity (reported for 87% of the residents), followed by the leisure identity (62%). Analysis revealed a positive relationship between the self-identity stimuli and engagement duration, attention, and attitude ($t_{(192)} = 8.05, P \leq 0.001$; $t_{(182)} = 7.74, P \leq 0.001$; $t_{(182)} = 7.22, P \leq 0.001$; respectively, see Table 4).

3.3. Gender based roles

With regard to attitude, there was a significant interaction effect ($F_{(1,180)} = 6.57, P \leq 0.05$), where females showed a preference for feminine activities and males showed a more favorable attitude towards the neutral stimuli (Table 5). Trends were seen for the other measures, but none of these test statistics reached significance.

4. Discussion

Results of the present study demonstrate that the meaning of the stimuli impacts engagement of persons with dementia. Our finding that items relating to office or household work increased engagement may be due to a lifetime of exposure to these tasks. For example, many people have folded towels in their life, but not all have played with dolls or an expanding sphere. Willingness to assist in a project, i.e., serving in a philanthropic/altruistic role, may also have contributed to the higher levels of engagement in work-related interventions as these

interventions involved a specific task and a clearly-defined end time (such as stamping envelopes until all are completed) compared to holding a baby doll or manipulating an activity pillow, neither of which have a definite endpoint. Furthermore, we believe that the desire to make oneself useful is a very important dimension of meaning finding and is thus an important aspect of the work stimulus. These work-related activities may also have seemed more acceptable or age-appropriate to participants. Interestingly, these work experiences affected length of engagement and attention, i.e., devotion to work, but were not particularly pleasant. Therefore participants' attitude to the work stimuli was not more (or less) favorable than to the non-work related stimuli.

In terms of the three types of meaning examined, the individualized self-identity stimuli seemed to be the most potent, based on a comparison of the means for the three types for all measures of engagement. They are also the most individualized. Work role stimuli affected duration and attention, and gender roles affected attitude. More specifically, interventions designed to tap into past experiences, interests, and hobbies resulted in increased engagement, which may demonstrate partial retention of former identity roles after the onset of dementia. This supports the findings of previous studies (Cohen-Mansfield et al. 2006a,b). Taken together with the finding that women displayed a more favorable attitude toward the female gender based activities and males showed a more favorable attitude toward the neutral activities, this study provides evidence of the importance of the personal meaning of stimuli for persons with dementia. This remains true even for persons with severe cognitive impairment

It has been shown that social interaction is a very potent intervention for some types of agitation and can serve as an effective stimulus (Cohen-Mansfield and Werner, 1997). However, social interaction is often impossible for nursing home staff to provide due to time constraints. For clinical purposes, it is vital for staff members to understand the engagement value of different stimuli and, in turn, how to match stimuli to persons so that these can be used at times when the staff members are not available for substantial social contact. This study demonstrated that, when stimuli have meaning for the older person, they are more likely to engage the person, even with a minimum of social interaction.

The impact of stimuli is evident across levels of cognitive functioning – and in our study there was a large proportion of participants with severe dementia. However, the impact of the meaning of the work related stimuli was nevertheless greater in those with moderate dementia in comparison to those with severe dementia. Despite an overall greater responsiveness to stimuli of persons with relatively higher levels of cognitive function, there was no interaction for the self identity stimuli, suggesting that these stimuli retain a similarly strong impact across levels of cognitive impairment. This may occur because the self identity stimuli are less demanding than work related stimuli, or because the self identity stimuli are more familiar and in general, more potent.

The main limitation of the study is the relatively short duration of the actual engagement with stimuli, as it typically lasted a much shorter length than the fifteen minute maximum. Despite the short duration, we believe that the experience was clinically significant, because it interrupted the long duration of inactivity, and was often accompanied by positive attitude, indicative of a positive affect. Additionally, this is seen as a basic research study of an applied issue; that is, the goal is to identify the parameters which are more engaging for this population. Once those parameters (such as the meaning of a stimulus) are identified, future research needs to examine ways to lengthen the period of engagement, such as utilization of multiple stimuli, repetition of stimuli, or introduction of other elements or paradigms such as groups.

The exclusion criterion that residents must be able to be comfortably seated in a wheelchair was due to the fact that most stimuli were placed in front of the resident, within the usual visual

field and within easy reach for stimulus manipulation. This standard procedure assured easy notice and physical access could be more difficult to achieve with a person who cannot be seated in a chair or wheelchair. Future research should examine whether the same results are obtained with bedbound participants.

In future articles, we intend to describe the relationships between engagement and specific setting characteristics, stimulus attributes, person attributes, and stimulus-person interactions. Research is also needed to explore more identity roles as well as the mechanisms behind engagement. For example, the impact of past or present importance of self-identity on the response to related stimuli should be examined, as well as the relative utility of different past roles (e.g., family vs. work) for current engagement, and the equivalence of different stimuli that address the same role. It may also behoove researchers to compare the efficacy of standard work tasks to individualized work tasks. In addition, future research needs to explore how long stimuli are likely to maintain engagement, which stimuli result in the longest periods of engagement, which can be presented repeatedly, and for how many times, before the person with dementia no longer engages with the stimulus or rejects it.

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References

- Baker R, Bell S, Baker E, Gibson S, Holloway J, Pearce R, Dowling Z, Thomas P, Assey J, Wareing L. A randomized controlled trial of the effects of multi-sensory stimulation (MSS) for people with dementia. *British Journal of Clinical Psychology* 2001;40:81–96. [PubMed: 11317951]
- Basting AD. Looking back from loss: Views of the self in Alzheimer's disease. *Journal of Aging Studies* 2002;17:87–99.
- Buettner LL. Simple pleasures: A multilevel sensorimotor intervention for nursing home residents with dementia. *American Journal of Alzheimer's Disease* 1999;14(1):41–52.
- Buettner L, Lundegren H, Lago D, Farrell P, Smith R. Therapeutic recreation as an intervention for persons with dementia and agitation: An efficacy study. *American Journal of Alzheimer's Disease and Other Dementias* 1996;11(5):4–12.
- Burgio LD, Scilley K, Hardin JM, Janosky J, Bonino P, Slater SC, Engberg R. Studying disruptive vocalization and contextual factors in the nursing home using computer-assisted real-time observation. *Journal of Gerontology: Psychological Sciences* 1994;49(5):P230–P239.
- Cohen-Mansfield J, Dakheel-Ali M, Marx MS. Engagement in persons with dementia: The concept and its measurement. *American Journal of Geriatric Psychiatry*. in press.
- Cohen-Mansfield J, Golander H, Arnhem G. Self-identity in older persons suffering from dementia: Preliminary results. *Social Science & Medicine* 2000;51:381–394. [PubMed: 10855925]
- Cohen-Mansfield J, Kerin P, Pawlson LG, Lipson S, Holdridge K. Informed consent for research in the nursing home: Processes and issues. *The Gerontologist* 1988;28:355–359. [PubMed: 3396916]
- Cohen-Mansfield J, Libin A, Marx MS. Non-pharmacological treatment of agitation: A controlled trial of systematic individualized intervention. *Journals of Gerontology: Medical Sciences* 2007;62(8):908–916.
- Cohen-Mansfield J, Marx MS, Dakheel-Ali M, Regier NG, Thein K. Can persons with dementia be engaged with stimuli? under review.
- Cohen-Mansfield J, Marx M, Werner P. Observational data on time use and behavior problems in the nursing home. *The Journal of Applied Gerontology* 1992;11(1):111–121.
- Cohen-Mansfield J, Parpura-Gill A, Golander H. Salience of self-identity roles in persons with dementia: Differences in perceptions among elderly persons, family members and caregivers. *Social Science & Medicine* 2006a;62:745–757. [PubMed: 16040178]

- Cohen-Mansfield J, Parpura-Gill A, Golander H. Utilization of self-identity roles for designing interventions for persons with dementia. *Journals of Gerontology: Psychological Sciences* 2006b; 61B(4):202–212.
- Cohen-Mansfield J, Thein K, Dakheel-Ali M, Marx MS. Effects of presentation and setting on engagement in persons with dementia. under review.
- Cohen-Mansfield J, Werner P. Management of verbally disruptive behaviors in nursing home residents. *Journal of Gerontology: Medical Sciences* 1997;52A(6):M369–M377.
- Engelman K, Altus DE, Mathews RM. Increasing engagement in daily activities by older adults with dementia. *Journal of Applied Behavior Analysis* 1999;32(1):107–110.
- Folstein MF, Folstein SE, McHugh PR. Mini-Mental State: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research* 1975;12:189–198. [PubMed: 1202204]
- Frankl, VE. *Man's search for meaning: An Introduction to Logo Therapy*. New York: Simon and Schuster; 1946.
- Fry PS. Religious involvement, spirituality and personal meaning for life: Existential predictors of psychological wellbeing in community-residing and institutional care elders. *Aging and Mental Health* 2000;4(4):375–387.
- Golander H, Raz A. The mask of “demented residents” in a nursing home. *Ageing & Society* 1996;16:269–285.
- Gonzalez-Salvador T, Lyketsos CG, Baker A, Hovanec L, Roques C, Brandt J, Steele C. Quality of life in dementia patients in long term care. *International Journal of Geriatric Psychiatry* 2000;15(2):181–9. [PubMed: 10679850]
- Li R, Orleans M. Personhood in a world of forgetfulness: An ethnography of the self-process among Alzheimer's patients. *Journal of Aging & Identity* 2002;7:227–244.
- Lucero M, Pearson R, Hutchinson S, Leger-Krall S, Rinalducci E. Products for Alzheimer's self-stimulatory wanderers. *American Journal of Alzheimer's Disease and Other Dementias* 2001;16(1):43–50. [PubMed: 11416947]
- Mayers K, Griffin M. The play project - Use of stimulus objects with demented patients. *Journal of Gerontological Nursing* 1998;16(1):32–36. [PubMed: 2299131]
- Morgan DG, Stewart NJ. The importance of the social environment in dementia care. *Western Journal of Nursing Research* 1997;19(6):740–761.
- Morris, J.; Hawes, C.; Murphy, K.; Nonemaker, S.; Phillips, C.; Fries, B.; Mor, V., editors. *Resident Assessment Instrument Training Manual and Resource Guide*. Natick, MA: Eliot Press; 1991.
- Orsulic-Jeras S, Judge KS, Camp CJ. Montessori-based activities for long-term care residents with advanced dementia: Effects on engagement and affect. *The Gerontologist* 2000;40(1):107–111. [PubMed: 10750318]
- Sabat SR, Harre R. Construction and deconstruction of self in Alzheimer's disease. *Aging and Society* 1992;12:443–461.
- Schreiner AS, Yamamoto E, Shiotani H. Positive affect among nursing home residents with Alzheimer's dementia: The effect of recreational activity. *Aging and Mental Health* 2005;9(2):129–134. [PubMed: 15804629]
- Small JA, Geldart K, Gutman G, Clarke Scott M. The discourse of self in dementia. *Ageing & Society* 1998;18:291–316.
- Tappen RM, Williams C, Fishman S, Touhy T. Persistence of self in advanced Alzheimer's disease. *Image-Journal of Nursing Scholarship* 1999;31(2):121–125.

Figure 1.
The Comprehensive Process Model of Engagement

Figure 2. Engagement duration and attitude as a function of work versus non-work stimuli for moderate and severe levels of dementia

Table 1

The comparison of engagement to work vs. non-work stimuli (n = 193).

Dependent variable	Means (sd)		t (df)
	Work ^a	Non-work ^b	
Engagement duration (sec)	182.38 (199.30)	113.54 (103.80)	t ₍₁₉₂₎ =5.77 ***
Attention	2.43 (.93)	2.18 (0.61)	t ₍₁₈₅₎ =5.15 ***
Attitude	4.77 (.53)	4.79 (0.37)	t ₍₁₈₅₎ =0.46
Refusal	.19 (.26)	.22 (.24)	t ₍₁₉₂₎ =1.39

P ≤ 0.001

^a stamping envelopes and sorting envelopes

^b expanding sphere, music, large print magazine, wallet/purse, fabric book, activity pillow

Table 2

The relationship between engagement type of stimulus, and level of cognitive functioning.

Engagement	Moderate dementia n=94		Severe Dementia n=94		F (df)	F (df)	F (df)
	Means (sd)		Means (sd)		Dementia	Activity	Interaction term
	Work	Nonwork	Work	Nonwork			
Engagement duration (sec)	238.7 (220.46)	124.47 (111.26)	125.55 (159.97)	101.49 (97.24)	F _(1,186) =12.42**	F _(1,186) =34.69***	F _(1,186) =14.75***
Attention	2.81 (0.85)	2.39 (0.58)	2.04 (0.84)	1.95 (0.55)	F _(1,179) =40.27***	F _(1,179) =28.12***	F _(1,179) =11.83***
Attitude	4.91 (0.56)	4.88 (0.35)	4.63 (0.46)	4.68 (0.37)	F _(1,179) =18.90***	F _(1,179) =.12	F _(1,179) =1.56
Refusal	.27 (.29)	.31 (.25)	.11 (.21)	.11 (.18)	F _(1,186) =32.20***	F _(1,186) =2.02	F _(1,186) =2.02

*** $P \leq 0.001$

** Nonwork stimuli included expanding sphere, music, large print magazine, wallet/purse, fabric book, activity pillow

** Natalie, please check that this result is discussed in the discussion section

* It looks like it is mentioned in the third paragraph

Table 3

Stimuli used for the self-identity presentations organized the salient self-identity role.

Interventions	Frequency
Family identity	164 (87%)
Family video/DVD	102
Family photos	42
Baby video	8
Family audio tape	5
Substitute family video	5
Other (family tree activity, decorating a birthday card for a family member)	2
Occupational identity	77 (41%)
Office work (Labeling filing, typing)	16
Books/other reading materials/educational materials	14
Video/DVD (based on identity)	10
Medical office work (e.g. scheduling appointments, EKG printout)	9
Housework (e.g. drying cutlery, setting a table)	8
Cooking/eating (cooking video, bags of spices, drinking tea)	7
Building and repair materials (e.g. model airplane/car, fixing a clock)	5
Salesperson task	3
Religious activity (e.g. reading or listening to bible)	2
Counting money	2
Gardening	1
Leisure activity identity	117 (62%)
Video/DVD (e.g. exercise, baby watching)	19
Bible/religious activity	13
Books/other reading material/educational materials	12
Music/dancing	11
Beauty material/fashion magazines	10
Sewing/knitting/embroidery	10
Gardening	8
Eating (e.g. food, ice cream)	8
Arts and crafts (e.g. painting, clay, beading)	6
Musical instrument	4
Cooking/eating (cooking video, bags of spices)	3
Collection (e.g. coins, buttons)	3
Housework (e.g. drying cutlery, setting a table)	2
Games (e.g. Mah jong, puzzle)	2
Family photos	1
Building and repair materials	1
Other (real cat, girl scouts activity, sport equipment, storytelling)	4

Interventions	Frequency
Achievement identity	21 (11%)
Beauty material/fashion magazines	9
Bible/religious activity	3
College brochure/diploma	2
Community service task	2
Family video	1
Arts and crafts	1
Video/DVD (based on identity)	1
One-on-one discussion	1
Office work	1

Note: each participant was presented with two stimuli.

Table 4

The comparison of levels of engagement to stimuli based on self identity roles as compared to other stimuli. (n = 193)

Dependent variable	Means (sd)		$t_{(df)}$
	Stimuli based on self identity role	Comparison stimuli	
Engagement duration (sec)	234.84 (201.68)	138.35 (111.76)	$t_{(192)}=8.05^{***}$
Attention	2.62 (0.77)	2.28 (0.60)	$t_{(182)}=7.74^{***}$
Attitude	5.07 (0.49)	4.84 (0.37)	$t_{(182)}=7.22^{***}$
Refusal	.17 (.26)	.23 (.24)	$t_{(185)}=4.12^{***}$

 $P \leq 0.001$

Comparison stimuli include: real looking doll, stuffed animal, childish doll, expanding sphere, music, tetherball, squeeze ball, large print magazine, fabric book, respite video, wallet/purse, activity pillow, stamping envelopes, coloring, folding towels, flower arrangement, building blocks, robotic animal, sorting, wood puzzle

Table 5

The comparison of engagement with feminine activities to that with gender neutral activities by gender.

Dependent variable	Females mean (sd) n=151		Male means (sd) n=42		F _(df) Gender	F _(df) Activity	F _(df) Interaction
	Feminine	Neutral	Feminine	Neutral			
Engagement duration (sec)	180.82 (196.44)	187.15 (205.87)	118.4 (173.33)	165.26 (174.83)	F _(1,191) =1.85	F _(1,191) =3.48	F _(1,191) =2.02
Attention	2.47 (0.88)	2.47 (0.94)	2.22 (0.90)	2.33 (0.88)	F _(1,180) =1.54	F _(1,180) =1.1	F _(1,180) =1.03
Attitude	4.86 (0.53)	4.79 (0.49)	4.67 (0.42)	4.80 (0.49)	F _(1,180) =1.23	F _(1,180) =0.64	F _(1,180) =6.57*
Refusal	.20 (.27)	.19 (.26)	.21 (.27)	.20 (.28)	F _(1,191) =.02	F _(1,191) =0.20	F _(1,191) =.02

* $P \leq 0.05$

Feminine activities: folding towels, arranging flowers; Gender neutral stimuli: stamping envelopes, a sorting task