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The Value of Social Attributes of Stimuli for Promoting Engagement in Persons With Dementia

Jiska Cohen-Mansfield, PhD^{*,†,‡}, Khin Thein, MD^{*}, Maha Dakheel-Ali, MD^{*}, Natalie G. Regier, MS^{*}, and Marcia S. Marx, PhD^{*}

^{*} Research Institute on Aging, Charles E. Smith Life Communities, Rockville, MD

[†] Department of Health Promotion and Herczeg Institute on Aging, Sackler Faculty of Medicine, Tel-Aviv University, Tel Aviv, Israel

[‡] Department of Health Care Sciences, George Washington University Medical Center, Washington, DC

Abstract

The present study examined the impact of different attributes of social stimuli using the stimulus attributes aspect of the Comprehensive Process Model of Engagement (Cohen-Mansfield et al., (2009a) *Am J Geriatr Psychiatry*. 17:299–307). Participants were 193 residents of 7 Maryland nursing homes with a diagnosis of dementia. Stimuli were chosen to represent different levels of the following social attributes: social versus not social, realistic versus not realistic, animated versus nonanimated, human versus nonhuman, and alive versus not alive. Participants had significantly longer engagement, were significantly more attentive, and displayed a significantly more positive attitude with social stimuli than with nonsocial stimuli. Longer durations and higher ratings of attention and attitude were seen with realistic and animated stimuli as compared to their counterparts. Human and live stimuli resulted in significantly more engagement than their counterparts. Giving any social stimulus to the residents is preferable to providing none, and the social attributes of stimuli should be maximized.

Keywords

Dementia; engagement; nursing home; social stimuli; comprehensive process model of engagement

Fifteen years ago, we reported that nursing home residents were unoccupied during 63% of the times at which they were observed (Cohen-Mansfield et al., 1992). Despite ongoing efforts to provide activities for this population, subsequent studies have shown that residents may be engaged in no activity at all for up to 85% or more of the time (Burgio et al., 1994; Logsdon, 2000). This is of significant concern, as inactivity in this population, which often includes a large proportion of older persons with dementia, is known to contribute to low quality of life by increasing boredom, depressed affect, and behavior problems (Cohen-Mansfield and Werner, 1995). Accordingly, engagement with activities is an important parameter in assessing quality of life for nursing home residents. For the purpose of this paper, engagement is defined as the act of being occupied or involved with an external

stimulus and can be affected by personal characteristics, type of stimulus, and environmental characteristics (Cohen-Mansfield et al., 2009a).

Studies have formulated methods for increasing engagement based on analyses of the multitude of factors hypothesized to play a role. Engelman et al. (1999) found significant effects on residents' engagement by providing 30 minute training sessions for Certified Nursing Assistants (CNAs) that focused on providing personal contact, behavior-specific praise, and choice of activities for residents. Although only 5 residents participated in their study, the results are nonetheless important as these authors found that engagement increased from 41% to 81% during morning observations and from 41% to 72% during afternoon observations. At follow-up, 2 weeks later, engagement remained at 83% and 68% during morning and afternoon observations, respectively. Such data clearly support the idea that staff members can have a significant impact on engagement with interventions such as intermittent positive reinforcement.

Bassuk et al. (1999) reported an inverse association between social engagement and cognitive decline that persisted after controlling for other variables such as comorbidities, socioeconomic status, sex, and ethnicity. With evidence supporting a relationship between social activity and cognitive functioning, it could be suggested that social disengagement may further contribute to cognitive decline. Indeed, this hypothesis was examined in the Honolulu-Asia Aging Study, in which levels of social engagement were examined with respect to development of dementia later in life (Saczynski et al., 2006). Although no significant association was found between midlife level of social engagement and risk of dementia, a low level of social engagement in late life was linked with a significantly increased risk. It was not clear, however, whether the onset of dementia itself may have been a contributing factor to the decreased level of engagement.

Also significant is the relationship between social disengagement and depressed affect (Lewinsohn et al., 1991). Indeed, nursing home residents and cognitively impaired persons have been reported to have a high prevalence of depression (Schumacher et al., 1997). Even though this may seem discouraging, these findings also offer hope for intervention by virtue that the contrapositive can be true as well: social engagement has been significantly associated with life satisfaction among cognitively intact older individuals (Jang et al., 2004). The association between social activity and well-being in life (Clemente, 2003; Krishnavelli, 2008) further underscores the importance of social engagement for the older population, particularly in persons with dementia, who may have diminished social ability and often lack strong social networks.

In addition to these more general positive effects, social engagement has also been shown to be of specific benefit to persons with dementia, such as in diminishing verbal agitated behaviors (Cohen-Mansfield and Werner, 1997). In particular, one-on-one social interaction with a research assistant was found to be the most beneficial intervention when compared with a videotape of a family member talking to the resident, music, or to a no intervention condition. Because staff and family are not always available to engage nursing home residents in social contact, researchers and practitioners have examined alternate forms of social contact, such as pet therapy and simulated interaction (Cohen-Mansfield, 2001). These forms of social contact have proven beneficial in the treatment of behavior problems in dementia (Zisselman et al., 1996; Runci et al., 1999; Werner et al., 2000). Camberg et al. (1999) examined the efficacy of Simulated Presence therapy, where participants are presented with an audiotaped telephone conversation with a relative, and found that, overall, this therapy was superior to both usual care and placebo in increasing well-being and reducing negative behaviors. Researchers are beginning to examine the ability of robotic animals to provide companionship and increase quality of life in nursing home residents.

Banks et al. (2008) examined the interactions of residents with Sony's robotic dog "Aibo" and found that both Aibo and a live dog reduced agitation, and both were equally effective in doing so. Similarly, Libin and Cohen-Mansfield (2004) had promising pilot results with both a robotic dog and a plush dog. Through staff interviews and questionnaires, Mackenzie et al. (2006) examined the impact of doll therapy on the lives of nursing home residents with dementia, with the overall impression of care staff being that there were clear benefits of using the dolls. Despite these indicators of beneficial effects, questions remain regarding the determinants of social contact stimuli that are responsible for these outcomes, most notably with regard to the relative effectiveness of real versus simulated social stimuli and the impact of human versus nonhuman social stimuli.

Recently, Cohen-Mansfield et al. (2009a) developed a conceptual framework of engagement of persons with dementia that includes stimulus attributes, personal attributes, and setting characteristics, as well as how combining these impacts engagement. In this article, we present data pertaining to one aspect of the model, stimulus attributes, and focus on the impact of different attributes of social stimuli on the engagement of persons with dementia. In analyzing these different alternative social or simulated social stimuli, we note that they can be organized under the following dimensions of social attributes: real versus nonreal (e.g., a doll that looks like a real baby vs. a doll that is clearly a doll), animated versus nonanimated (e.g., robotic animal vs. doll), human versus nonhuman (e.g., person vs. pet), and alive versus not alive (e.g., pet vs. robotic animal). We hypothesize that higher levels of engagement would be found for nursing home residents with dementia when stimuli were social (vs. nonsocial), realistic (vs. not realistic), animated (vs. nonanimated), human (vs. nonhuman), and alive (vs. not alive).

METHODS

Participants

Participants were 193 residents of 7 Maryland nursing homes. All participants had a diagnosis of dementia. Of them, 151 participants were female (78%), and age averaged 86 years, ranging from 60 to 101 years. The majority of participants were white (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.

Assessments

Background Assessment—Data pertaining to background variables were retrieved from the residents' charts at the nursing homes by a trained research assistant; this 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). Hawes et al. (1995) found that MDS items met a standard for excellent reliability (i.e., intraclass correlation of 0.7 or higher). With regard to the reliability of ADL in the MDS, inter-rater reliabilities for individual MDS-ADL items have been found to exceed 0.90 (Zimmerman et al., 2001, p. 127).

MDS assessment of ADL performance involves 10 activities (bed mobility, transferring, locomotion on the unit, dressing, eating, toilet use, personal hygiene, bathing, and bowel incontinence); 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 who was trained with regard to standardized administration and scoring procedures.

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.

The Observational Measurement of Engagement (OME) (Cohen-Mansfield et al., 2009a) was developed specifically to assess the levels of engagement of persons with intellectual disabilities, and includes several dimensions of engagement, including attention, attitude, duration, and refusal, which are described below. 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). Specific outcome variables on the OME are described below.

Each study participant was presented with 23 predetermined different engagement stimuli over a period of 3 weeks (approximately 4 stimuli per day). Stimuli were categorized as social versus nonsocial, with social stimuli defined as those with which a person could or would be expected to interact with socially, particularly by speaking. Nonsocial stimuli were those which an individual might use to perform an activity or task and interact with in a nonsocial manner. The category of social stimuli included a life-like baby doll, a childish-looking doll (i.e., less real looking), a plush animal, a robotic animal (selling for approximately \$78 from stores such as Toys R'Us), a real dog, a real baby, a respite video (Hall and Hare, 1997; Lund et al., 1995), and one-on-one socializing with a research assistant. The category of nonsocial stimuli included a squeeze ball, tetherball, an expanding sphere, music, a large print magazine, an activity pillow, envelope stamping activity, coloring with markers, folding towels, flower arrangement, building blocks, an envelope sorting task, a fabric book, a wallet or purse, and a puzzle. These stimuli were further categorized for statistical analyses, as will be described in detail in the Results section. In addition, the residents were observed in a control condition, where no stimulus was introduced to the study participant by a research assistant.

Each stimulus was presented twice during the study (but not on the same day). Presenters asked whether the participant would like to engage in the activity and then left the room. If a study participant asked questions or needed more modeling of the engagement stimulus, the research assistant provided these before leaving, and this was recorded on the OME. 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 and 12:30 PM and between 2:00 PM and 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. To minimize effects of extraneous influences, the order of stimulus presentation, the research assistants presenting the stimulus, and the time of day were 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 Zire31. 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 three minutes. If the participant showed no interest in the stimulus after three minutes (e.g., via eye tracking, visual scanning, facial, motoric or verbal feedback, or eye contact), the trial was terminated and the engagement stimulus was retrieved. 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. For those trials lasting more than three minutes, when it appeared to the research assistant that the study participant was no longer engaged (i.e., occupied or involved with a stimulus), the research assistant continued to observe the study participant, ending the trial after 30 seconds if the study participant showed no further engagement.

Specific outcome variables on the OME are as follows:

Attention to the stimulus occurs when the study participant is focused on the stimulus, i.e., eye tracking, visual scanning, facial, motoric or verbal feedback, or eye contact (Cohen-Mansfield et al., 2009a). Attention to the stimulus during an engagement trial was measured on this 4-point scale: not attentive, somewhat attentive, attentive, and very attentive. Level of attention was rated twice, attention observed during most of the trial and the highest attention levels during the trial were recorded. As these were found to be very highly correlated ($r = 0.905$; Cohen-Mansfield et al., 2009a), a mean score of the two ratings was used for analyses.

Attitude toward the stimulus may be observed by positive or negative facial expression, verbal content, or physical movement toward the stimulus (Cohen-Mansfield et al., 2009a). Positive attitude is recorded when the study participant smiles, laughs, or shows other outward manifestation of happiness. Negative attitude includes the participant aggressively pushing the stimulus away (e.g., starts to use toy blocks and then pushes them away angrily), throwing the stimulus, cursing, manifesting frustration at the stimulus (e.g., watching a respite video and becoming angry at the video because they don't like to sing) and other outward manifestations of negativity. Attitude toward 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. We recorded attitude that the participant demonstrated toward the stimulus during most of the trial as well as the highest rating of attitude observed during the trial. Based on the high correlation between the two ratings ($r = 0.856$; Cohen-Mansfield et al., 2009a), a mean score was used for analyses.

Duration referred to the amount of time (in seconds) that the participant was engaged with the stimulus. This measure started after presentation of the engagement stimulus. Each trial lasted a minimum of three minutes and a maximum of 15 minutes; between these times, the trial was terminated 30 seconds after the study participant no longer appeared to be engaged with the stimulus. Duration was calculated in two alternative ways. In the first, if a study participant refused a stimulus, duration was coded as zero, and in the second, if the participant refused a stimulus, duration was coded as missing. Attention and attitude were coded as missing in cases of refusal (Cohen-Mansfield et al., 2009a).

The five research assistants were trained on coding the three measures of engagement by conducting multiple reliability trials. These trials and subsequent discussions ensured that all research assistants were interpreting the scales in the same way and accurately timing engagement duration.

Inter-Rater Reliability

Inter-rater reliability of the OME was assessed by six dyads of research assistants' ratings of the engagement measures during 48 engagement sessions with nursing home residents. Intraclass correlation (alpha values) averaged 0.78 for the engagement outcome variables.

Analytic Approach

Dependent measures were duration, attention, and attitude. Paired *t*-tests were used when comparing two levels of a variable (e.g. social vs. nonsocial stimuli). All statistical analyses were performed using SPSS software.

A challenge in the analyses was that each stimulus represents a combination of attributes on the different dimensions examined: sociability, real versus not real, animated versus nonanimated, human versus nonhuman, and being alive versus not alive. We therefore tried to conduct each comparison of an attribute by choosing stimuli that vary on the dimension under study whereas remaining comparable on other attributes. Specifically, we first compared engagement to social versus nonsocial stimuli. We then proceeded to examine the impact of the following attributes of social stimuli: realistic, animated, human, and alive. For the comparison of realistic versus not realistic stimuli, we compared the childish-looking doll with the life-like baby doll. Those two stimuli are both nonanimated and not alive, but have human features. For the comparison of animated versus nonanimated stimuli, a robotic versus a plush animal (both nonhuman, not alive, and differing in level of realistic portrayal of a pet, as the robotic dog is capable of movement and sound) were compared. For the comparison of human versus nonhuman stimuli, four analyses were undertaken: (1) the mean of responses to a life-like baby doll and a childish-looking doll combined versus a plush animal (both not animated and not alive); (2) a robotic animal versus a respite video (both animated and not real, but the respite video features a human being); (3) a real baby versus a real dog (both real and alive); and (4) one-on-one socializing with a research assistant versus a real dog (both real and alive). Finally, to compare the impact of being alive, three analyses were conducted: (1) a life-like baby doll versus a real baby (both human, realistic); (2) one-on-one socializing versus a respite video (both realistic and animated, but examines interacting with a live person versus a videotaped person); and (3) a robotic animal versus a real dog (both nonhuman and animated).

Missing Data

We presented each stimulus to each person twice, once with a longer introduction with modeling and once without. There were a few instances where we were unable to present all stimuli, and therefore 8.3% of the participants were missing at least one stimulus (one participant did not encounter three stimuli, four participants had two missing, and 11 participants were missing one) because the person was sick or asleep. The exception was the real baby stimulus which was only available to be presented once and only with 42 participants. Participants sometimes chose to refuse the stimuli, and refusal rates were as follows: a life-like baby doll (26%), a childish-looking doll (27.2%), a plush animal (28.6%), a robotic animal (27.3%), a real dog (19.4%), a real baby (7.1%), a respite video (25.8%), a one-on-one socializing with a research assistant (2.6%), a squeeze ball (22.8%), a tetherball (26.7%), an expanding sphere (25.6%), music (18.4%), a large print magazine (19.7%), an activity pillow (26.7%), an envelope stamping activity (16.6%), coloring with markers (28%), towels to fold (18.9%), artificial flowers to arrange (21.6%), building

blocks, (22.6%), an envelope sorting task (22.4%), a fabric book (18%), a wallet or purse (20.8%), and a puzzle (24.1%). Refusals are not missing for the calculation of duration, as they set duration to zero, but they do appear as missing for attention and attitude.

RESULTS

Are Social Stimuli More Engaging Than Nonsocial Stimuli?

The participants of the present study were engaged for significantly longer durations, were significantly more attentive, and displayed a significantly more positive attitude with the social stimuli than with the nonsocial stimuli (Table 1).

How Important Is the Realistic Portrayal of a Stimulus?

For the comparison of realistic versus not realistic stimuli, we examined responses to the life-like baby doll and the childish-looking doll. As can be seen in Table I, the residents were engaged for significantly longer durations and received higher ratings of attention and attitude with the life-like baby doll than with the childish-looking doll.

How Important Is the Animated Aspect of Social Stimuli for Engaging Residents?

To answer this question, we selected 2 social stimuli that were similar except for animation—the robotic animal and the plush animal—and paired *t*-tests were performed. Results revealed that the robotic animal yielded significantly longer engagement durations, more attention, and a more positive attitude than did the plush animal (Table 1).

How Important Is the Human Aspect of Social Stimuli for Engaging Residents?

To examine this question, we performed four analyses. In the first, we compared engagement to human stimuli (a life-like baby doll, a childish-looking doll) with a nonhuman stimulus (a plush animal). As none of the stimuli were alive, our results were not influenced by whether or not the stimulus was living. Moreover, only nonanimated stimuli were selected for this analysis so that results would not be confounded by animation. We observed these nursing home residents to be engaged for significantly longer durations, to be significantly more attentive, and to be significantly more positive with the baby dolls rather than with the plush animal (Table 1).

In the next analysis, we looked at stimuli that were animated but not real by performing paired *t*-tests where the grouping variable was the robotic animal and the respite video. Engagement duration was significantly longer for the respite video as compared with the robotic animal. None of the other test statistics were significant.

In the third analysis, we examined responses to stimuli that were alive and real and compared engagement with a real baby to engagement with a real dog. Having a baby available for our trials was a constant challenge and is reflected by the considerably smaller *n* in these analyses (Table 1). Results revealed that a baby yielded significantly higher attention, and a more positive attitude as compared with a dog (Table 1).

Next, we examined responses to 2 stimuli that were alive and real: one-on-one socializing with a research assistant (i.e., a live person who was physically next to the resident and engaged the resident in conversation) and a real dog. Results of the *t*-tests revealed that the study participants were engaged longer, were more attentive, and had a more positive attitude with one-on-one socializing with a research assistant (Table 1).

How Important Is it That the Stimulus Is Alive Versus Not Alive?

Three analyses were conducted: one with a baby stimulus, another with a human adult stimulus, and one with an animal stimulus. The results of paired *t*-tests that compared the engagement response measures for the real baby (a live stimulus) with the life-like baby doll (a stimulus that is not alive) indicated that residents had significantly better attention and attitude with the real baby (Table I). No significant differences emerged with engagement duration, most likely because mean durations were long for both stimuli. As can be seen in Table 1, only the engagement duration for one-on-one socializing was longer than the engagement durations seen for the real baby and the life-like baby doll.

The analysis for the adult stimuli compared engagement response measures to one-on-one socializing with a research assistant (i.e., a live person who was physically next to the resident and engaged the resident in conversation) with a respite video (i.e., a live person who spoke to the resident from a television screen). One-on-one socializing was found to be significantly superior at engaging these residents on all response measures (Table 1). It is noteworthy that the mean duration for one-on-one socializing with a research assistant was around 666 seconds, or 11 minutes, which is considerably longer than any of the other stimuli presented in this paper.

Finally, the animal stimuli analysis compared the real dog with the robotic animal. Previous studies such as Fritz et al. (1995) have found that live pets can have a calming effect on institutionalized Alzheimer patients, so it follows that live pets might engage persons with dementia. Consequently, we were surprised by our nonsignificant test results and a significant finding in the unexpected direction of higher duration with the robotic animal when refusals were coded as missing.

Is Any Stimulus Better Than Nothing?

To answer this question, we selected the 2 “least effective” stimuli (i.e., those with the shortest mean engagement durations— the childish-looking doll and the plush animal) and compared the engagement value of these to a control condition (i.e., when no stimulus was introduced to the study participant by a research assistant; however, the resident might be involved in a solitary activity or an activity on the unit). Results of paired *t*-tests in which the childish-looking doll and the control condition were compared for the 3 outcome measures were all statistically significant. Specifically, mean duration was 125.09 seconds for the childish-looking doll and 57.37 seconds for the control condition ($t_{(192)} = 4.29, p < 0.001$). As to attention and attitude, the study participants were significantly more attentive to the childish-looking doll than to the control condition (means = 2.43 and 1.75, respectively; $t_{(84)} = 5.53, p < 0.001$) and were significantly more positive to the childish-looking doll relative to the control (means = 5.13 and 4.55, respectively; $t_{(84)} = 5.78, p < 0.001$). We performed another group of paired *t*-tests, examining the plush animal relative to the control condition. Again, all test statistics were significant, with the plush animal producing longer duration, more attention, and a more positive attitude than the control condition (duration: $t_{(192)} = 2.59, p = 0.01$; attention: $t_{(85)} = 4.48, p < 0.001$; attitude: $t_{(85)} = 5.54, p < 0.001$). Taken together, these analyses suggest that giving any social stimulus to the residents is preferable to not doing so.

DISCUSSION

Social stimuli were found to positively influence engagement in persons with dementia when examined over all of the social versus nonsocial stimuli. However, social attributes of stimuli (realistic, animated, human, or alive) also matter. By using different groupings of stimuli in our analyses, we discerned that social stimuli were more potent than nonsocial

ones, realistic stimuli were more potent than nonrealistic stimuli, animated more so than nonanimated, and human more so than nonhuman. That the stimulus was alive rather than not alive was significant in some analyses but not in others. Human interaction was clearly the most potent stimulus for engaging nursing home residents with dementia, as evidenced by the fact that one-on-one socializing with a research assistant was the most engaging stimulus in terms of duration, and the encounter with the real baby resulted in the most positive levels of attitude. It should be noted that, while very effective, live stimuli do require more resources and greater effort on the part of staff. For example, some live stimuli necessitate the presence of a staff member or volunteer for the duration of the interaction (e.g., live dog, live baby). The presence of the staff member throughout stimulus presentation could also affect the nature of the participant-stimulus interaction. However, in the present study the research assistants were instructed to remain as unobtrusive as possible with all stimuli except for the one-on-one interactions so as to not influence the engagement.

Analysis of this data set presented some challenges, due to the difficulty of classifying and controlling for the attributes of natural phenomena. That is, each stimulus can be characterized by an infinite number of attributes which cannot all be controlled for. For example, the stuffed animal was softer to touch than was the robotic animal. Colors and sizes could not be completely controlled for, since we used commercially available stimuli. In the case of blocks, however, we found that color and material did not affect engagement (Cohen-Mansfield et al., 2009b). We tried to control for as many variables as we could by making stimuli similar on other dimensions whenever possible and by randomizing the order of stimulus presentation and of research assistants, but found no way to exercise complete control. We therefore trust that our findings are robust, especially when results are significant and consistent. However, some results need to be replicated and further examination may be required to clarify the specific findings. For example, the comparison of the real baby versus the real looking doll and of the robotic animal to the real animal may suggest that persons with advanced dementia may not be able to differentiate between real-looking simulated social objects and the real social objects themselves. Alternately, very close proximity of the stimulus, such as being on the lap of the older person or on a table right in front of her/him, may be crucial, and this condition may be more easily compromised with real live objects. The differential impact of stimuli on the various dimensions of engagement should be explored in future research. Most of the stimulus attributes seemed to affect all 3 aspects of engagement (duration, attention, and attitude), although significant effects were not consistent for some. The differential impact of the interaction between social attributes of stimuli (e.g., real vs. not real, human vs. not human) and characteristics of the study participants (e.g., cognitive functioning, past preference for a particular stimulus) on attitude versus duration require further exploration. Future research should also examine the impact of group interventions. The authors plan to explore the utility of group stimuli, as they may benefit residents in different ways than individual interventions and may be more cost-effective.

This paper clearly demonstrates the utility of social interventions for nursing home residents with dementia, leading us to suggest that nursing home administrators consider the possibility of increasing the availability of social stimuli for their residents. The present situation for nursing home residents is that social contact is often limited (Cohen-Mansfield et al, 1992; Burgio and Stevens, 1999; Drageset, 2004). Typically, nursing home staff members are overworked and are responsible for many residents, and do not have the time to give extensive individual attention to each resident. Furthermore, even during those times that staff members do spend in one-on-one contact with nursing home residents with dementia, such as during dressing, this time is often spent in silence and without social interaction (Cohen-Mansfield et al., 2006). Clearly, staff members could benefit from training in how to better use such time. Another way to increase one-on-one socializing

within the current system would be to increase the utilization of family members and volunteers. Nursing home administrators might want to consider providing training and mentoring for volunteers and family members so that they learn to interact effectively and consistently with residents in a way that will be rewarding for all involved.

For times when one-on-one socializing is not possible, the present study has shown that nursing home residents can be effectively engaged with simulated social stimuli, particularly with animated stimuli (e.g., robotic animal, respite video), as these were found to yield longer and more positive engagement. Such stimuli could be easily incorporated by nursing home staff into the care plans of their residents. Respite videos are inexpensive and easy to obtain (Hall and Hare, 1997; Lund et al., 1995), and they take only a short time to set up for the resident. As to robotic animals, there are very sophisticated and expensive ones described in the literature (Libin and Cohen-Mansfield, 2004; Richeson, 2003), but we used robotic animals purchased for approximately \$78 each at Toys R'Us. The price range for the lifelike dolls is approximately \$20 to \$50 at Toys R'Us.

For caregivers interested in providing stimuli on the unit that are relatively engaging yet affordable, we suggest that they invest in social stimuli, as we have found these to produce longer durations, higher levels of attention, and more positive attitudes than nonsocial stimuli. Examples of social stimuli include a life-like baby doll, a plush animal, and a childish-looking doll. The life-like dolls are more costly, but the difference is not substantial and they appear to be well worth the expense. However, we have found that any social stimulus, alive or simulated, has the potential for engaging the person with dementia, and therefore would be preferable to providing nothing at all or to providing a nonsocial stimulus. When choosing stimuli, more realistic, animated, and human stimuli should be preferred over the alternatives. The authors thank the nursing home residents, their relatives, and the nursing homes' staff members and administration for their help, without which this study would not have been possible.

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TABLE 1
Paired *t* Tests Comparing Different Attributes of Stimuli for the 3 Engagement Response Measures

	Engagement Duration (Seconds)—Missing When Refused		Engagement Duration (Seconds)—0 When Refused		Attention	Attitude
Social vs. nonsocial						
Social ^a	260.79	$t_{(192)} = 9.81^*$	196.99	$t_{(192)} = 8.87^*$	2.47	$t_{(192)} = 6.22^*$ 5.125 $t_{(192)} = 12.86^*$
Nonsocial ^b	172.16		132.46		2.27	4.784
Realistic vs. not realistic						
Life-like baby doll	263.23	$t_{(152)} = 4.41^*$	203.61	$t_{(192)} = 5.17$	2.5	$t_{(152)} = 2.76^{**}$ 5.15 $t_{(152)} = 2.15^{***}$
Childish-looking doll	177.31		125.09		2.32	5.01
Animated vs. nonanimated						
Robotic animal	199.44	$t_{(147)} = 3.31^*$	145.79	$t_{(192)} = 3.67^*$	2.36	$t_{(147)} = 3.55^*$ 5.02 $t_{(147)} = 2.22^{***}$
Plush animal	133.78		94.67		2.12	4.9
Human vs. nonhuman						
Human stimuli (baby dolls) ^c	215.62	$t_{(163)} = 5.38^*$	164.35	$t_{(192)} = 5.43^*$	2.38	$t_{(163)} = 4.08^*$ 5.06 $t_{(163)} = 3.54^*$
Nonhuman (plush animal)	130.34		94.67		2.13	4.89
Respite video	273.73	$t_{(142)} = 2.55^{**}$	210.89	$t_{(192)} = 3.11^{**}$	2.27	$t_{(141)} = 1.00$ 4.94 $t_{(141)} = 1.16$
Robotic animal	206.69		145.79		2.35	5.02
Real baby	311.88	$t_{(31)} = 2.57^{***}$	290.62	$t_{(41)} = 2.59^{***}$	3.33	$t_{(28)} = 3.86^*$ 5.93 $t_{(28)} = 3.86^*$
Real dog	146.21		137.89		2.52	5.26
One-on-one socializing	705.38	$t_{(150)} = 20.84^*$	666.16	$t_{(192)} = 21.75^*$	3.23	$t_{(142)} = 8.92^*$ 5.59 $t_{(142)} = 4.01^*$
Real dog	150.02		125.77		2.47	5.24
Alive vs. not alive						
Real baby	327.75	$t_{(31)} = 1.17$	290.62	$t_{(41)} = 0.019$	3.36	$t_{(31)} = 2.87^{**}$ 6.02 $t_{(31)} = 4.69^*$
Life-like baby doll	402.87		291.65		2.86	5.41
One-on-one socializing	697.98	$t_{(159)} = 14.68^*$	666.16	$t_{(192)} = 17.60^*$	3.15	$t_{(157)} = 12.54^*$ 5.55 $t_{(157)} = 9.79^*$
Respite video	274.23		210.89		2.29	4.96
Real dog	157.87	$t_{(140)} = 2.44^{***}$	125.77	$t_{(192)} = 1.155$	2.42	$t_{(135)} = 0.25$ 5.21 $t_{(157)} = 1.51$
Robotic animal	218.24		145.79		2.44	5.09

^a

Social stimuli included: a life-like baby doll, a plush animal, a childish-looking doll, a robotic animal, a real dog, a real baby, a respite video, and one-on-one socializing with a research assistant.

^b

Nonsocial stimuli included: a squeeze ball, tetherball, an expanding sphere, music, a large print magazine, an activity pillow, envelope stamping activity, coloring with markers, folding towels, flower arrangement, building blocks, an envelope sorting task, a fabric book, a wallet or purse, and a puzzle.

^c

Mean of life-like baby doll and childish-looking doll.

*

$p \leq 0.001$;

**

$p \leq 0.01$;

$p \leq 0.05$.