Archives of Psychiatric Nursing 29 (2015) 377–382

Contents lists available at ScienceDirect

Archives of Psychiatric Nursing

journal homepage: www.elsevier.com/locate/apnu

Assessing Engagement in People With Dementia: A New Approach to Assessment Using Video Analysis

Cindy Jones [a,b], Billy Sung [a], Wendy Moyle [a,b,*]

[a] Menzies Health Institute Queensland, Centre for Health Practice Innovation, Nathan Campus, Nathan, QLD, Australia
[b] Griffith University, School of Nursing and Midwifery, Nathan, QLD, Australia

A B S T R A C T

The study of engagement in people with dementia is important to determine the effectiveness of interventions that aim to promote meaningful activity. However, the assessment of engagement for people with dementia in relation to our current work that uses social robots is fraught with challenges. The Video Coding - Incorporating Observed Emotion (VC-IOE) protocol that focuses on six dimensions of engagement: emotional, verbal, visual, behavioral, collective and signs of agitation was therefore developed. This paper provides an overview of the concept of engagement in dementia and outlines the development of the VC-IOE to assess engagement in people with dementia when interacting with social robots.

Dementia is a growing international epidemic with no imminent cure (World Health Organisation & Alzheimer's Disease International). As the disease progresses, an individual experiences a reduction in their ability to communicate. They are unable to express themselves clearly, and as a result they spend most of their time alone, doing little and not being engaged in meaningful activity (Harper-Ice, 2002; Moyle et al., 2011; Roos & Malan, 2012; von Kutzleben, Schmid, Halek, Holle, & Bartholomeyczik, 2012). Prolonged lack of stimulation can increase the risk of loneliness and social isolation (Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Moyle, Kellett, Ballantyne, & Gracia, 2011), as well as increase cognitive decline (Zuidema, Koopmans, & Verhey, 2007). Furthermore, limited social connection increases the risk of behavioral and psychological symptoms of dementia (BPSD) such as apathy, depression, aggression and agitation (Samus et al., 2005; Scherder, Bogen, Eggermont, Hamers, & Swaab, 2010). Engaging a person with dementia in meaningful activity is therefore important and a priority in care provision, and in particular to improve wellbeing through an increase in positive emotions (Materne, Luszcz, & Goodwin-Smith, 2014; Moyle et al., 2013; Schreiner, Yamamoto, & Shiotani, 2005; van der Ploeg et al., 2013) and an improvement in quality of life (van der Ploeg et al., 2013; Moyle, Cooke, et al., 2013; Gitlin et al., 2009). Consequently, the study of engagement (also called social interaction/connection) in people with dementia is important to determine the effectiveness of interventions that can promote meaningful activity. Furthermore, engagement is important in people with dementia as engagement in social activities may be beneficial in preventing or delaying cognitive impairment. In addition, a reduction in engagement may also be a marker of cognitive decline. For example, poor social connections, infrequent participation in social activities, and social disengagement are predictors of the risk of cognitive decline (Hughes, Flatt, Fu, Chang, & Ganguli, 2013). Low levels of social engagement are also known to be associated with poor quality of life. Depression is one of the most potent predictors of engagement (Kang, 2012).

Cohen-Mansfield and colleagues (Cohen-Mansfield, Dakheel-Ali, Jensen, Marx, & Thein, 2012) reported that the analysis of engagement displayed by a person with dementia can help determine person-centered activities to reduce boredom and loneliness, and thereby improve quality of life. However, analysis of engagement is challenging for people with dementia as they have reduced emotionality (i.e., affective blunting), making the analysis of facial expression very challenging in this population.

Our current research involves the use of social robots such as mobile telepresence (Moyle, Jones, et al., 2013; Moyle et al., 2014) and companion robots (Moyle, Cooke, et al., 2013), and the examination of their effect in engaging people with dementia living in nursing homes in meaningful activity while reducing BPSD. Telepresence robots are focused on telecommunication and remote presence. Telepresence robots enable a remote user to virtually see into another space through a two-way camera and to move around the environment using software on the remote user's computer. This allows the remote user to feel as though they are physically present at the location of the telepresence robot, no matter where the robot is located (Cesta, Cortellessa, Orlandini, & Tiberio, 2013). Telepresence enables dialog between a local user (a person at the robot's location – in our research this is a person with dementia) and remote user (in our research this is a family member or friend) by transmitting audio and video display including gestures. On the other hand, companion robots such as PARO, a therapeutic animal shaped as a baby harp seal (Wada, 2007) are a comparatively new field of robotics. Such research focuses on user's social interaction with the robot as a means to encourage social inclusion,

* Corresponding Author: Prof. Wendy Moyle, PhD, MHSc, BN, RN, Menzies Health Institute Queensland, Centre for Health Practice Innovation, Nathan Campus, 170 Kessels Road, Nathan, Queensland 4111, Australia.
E-mail addresses: c.jones@griffith.edu.au (C. Jones), b.sung@griffith.edu.au (B. Sung), w.moyle@griffith.edu.au (W. Moyle).

http://dx.doi.org/10.1016/j.apnu.2015.06.019
0883-9417/

reduce BPSD and improve quality of life (QOL). The physical embodiment of social robots leverages the inherently human tendency to engage with the robot's life like social behavior. People ascribe intention, personality, and emotion to even the simplest robot, and the social robot uses this interaction as a means to motivate, encourage and improve human engagement (The Computer Research Organization). Social robots can therefore help to improve the social function of people with dementia by embracing and augmenting the social and emotional connection between the human and the robot. Such robots have also been shown to improve BPSD outcomes in people with dementia (Moyle, Cooke, et al., 2013; Kramer, Friedmann, & Bernstein, 2009; Libin & Cohen-Mansfield, 2004; Bemelmans, 2012). The simple presence of a social robot that a person can touch and hold and that is able to respond even if in a minimal way has been shown to defuse the behavior of the most hostile and angry adult (Martin-King, 2011).

The approach to our dementia research includes exploratory designs, feasibility frameworks, pre-post surveys, mixed methods including qualitative and quantitative measures, randomized controlled trials and direct observation and observational video data to determine a person with dementia's engagement with a telepresence or social robot (Moyle, Cooke, et al., 2013; Moyle, Jones, et al., 2013; Moyle et al., 2014). Several concerns, however, arise with the use of traditional methods where an observer is sent into the field to assess engagement of the person with dementia. These include: (i) the effect of the observer's presence on the person with dementia, (ii) selective inclusion and omission of information (i.e., observer bias), (iii) missing information during the period of observation due to the complex construct of engagement and (iv) no means of validating the observed events without a minimum of two observers and validation methods post observation (Yoder, Symons, & Publishing, 2010). To reduce these concerns in our research, we always use video (with audio) footage recorded using a small wide angled and light sensitive camera to reduce the observer presence effect and allow for improved quantifiable data for assessment with increased reliability and validity. We attach a small discrete camera to the telepresence robot in such a way that it appears to be part of the robot technology and use cameras attached to furniture or discreetly hand-held to capture video footage of participants.

This paper provides an overview of the concept of engagement in dementia and describes an existing measure of engagement for people with dementia. The challenges of assessing engagement for people with dementia are discussed in relation to our current work that uses social robots. Finally, this paper presents a video coding scheme that is based on existing literature on engagement and validated in our research to assess engagement in people with dementia. The video coding scheme is not a scale instrument, instead, it facilitates researchers and practitioners to objectively and quantitatively assess the overall experience of engagement of people with dementia observed in video data. The coding system described could also be used in clinical situations where psychiatric nurses want to understand a patient's response to an intervention or therapy.

ASSESSING ENGAGEMENT IN PEOPLE WITH DEMENTIA

"Dual-Channel" Hypothesis

Lawton (Lawton, 1983) introduced the dual antecedent pattern for positive and negative aspects of psychological well-being (i.e., quality of life and depression) and termed this as the "dual-channel" hypothesis for older people. Positive affect is hypothesized to be influenced by externally engaging phenomena such as socializing and engaging in recreational activities. External engagement is behavior, cognition, or affect whose object lies outside the person. On the other hand, the origin of inner phenomena is where the person's attention is some internal object, such as a memory, a thought, or some internal stimulus such as a physical symptom. Intrapersonal factors including health, self-esteem, and personality factors such as neuroticism, contribute to negative affect states. The "dual-channel" model of engagement is thought to be relative, rather than an absolute congruence between the valences of antecedent events and affective consequences (Lawton, Van Haitsma, & Klapper, 1996).

Comprehensive Process Model of Engagement

Engagement is also defined as '*the act of being occupied or involved with an external stimulus*' (Cohen-Mansfield, Dakheel-Ali, & Marx, 2009). Although Lawton's work has been instrumental in helping researchers understand engagement, to date there has been a dearth of work that has examined engagement for people with dementia; therefore the difficulty in quantifying engagement in this population remains. The most notable and recent work in this area is that of Cohen-Mansfield and colleagues (Cohen-Mansfield et al., 2009) who introduced a theoretical framework called the Comprehensive Process Model of Engagement. This model indicates that engagement with a stimulus is influenced by environmental, person and stimulus attributes. Environmental attributes refer to the location, the people around, the timing, the level of lighting, noise and temperature as well as the way to which the stimulus is presented to the person. Person attributes include characteristics and traits such as demographic features, past activities and hobbies, cognitive ability and level of concentration, apathy and interest. The attributes of the stimulus in terms of its appearance, texture, movement, and the sound it makes and social qualities (if any) may also affect level of engagement. The interactions between environmental-stimulus and person-stimulus will influence engagement leading to a change in affect which then in turn change the presentation of behavioral symptoms. This model is subsequently conceptualized into five dimensions of engagement (known as the Observational Method of Engagement) that are then measured via:

1. Rate of refusal of the stimulus (*i.e., frequency*)
2. Duration of the time that the resident was occupied or involved with the stimulus (i.e., *duration*)
3. Level of attention to the stimulus (*4-point scale ranging from not attentive to very attentive*)
4. Attitude toward the stimulus (*7-point scale ranging from very negative to very positive*)
5. Action toward the stimulus (*4-point scale ranging from none of the time to most of the time*)

The Observational Method of Engagement

Unlike earlier research on engagement in people with dementia that merely suggested that a stimulus which reduced agitation must have produced engagement or showed promise in the effect of stimuli to engage the person (Trahan, Kuo, Carlson, & Gitlin, 2014), the Observational Measurement of Engagement (OME) specifically addresses the experience of engagement (Cohen-Mansfield et al., 2009) with quantifiable measures. The OME conceptualizes engagement as a construct beyond the simple absence of agitation or agitated behaviors. While the OME has frequently been used as a direct observation measure in studies focusing on activity engagement in people with dementia (Trahan et al., 2014), there are also a number of considerations when using the OME. Firstly, the OME comprises of five dimensions of engagement with different units of measurement. To assess the relationship between the five dimensions of engagement, inter-correlations of the dimensions of engagement are computed. The lack of a total OME score makes it difficult to understand the experience of engagement for people with dementia. People with dementia can have fluctuating affect and receptivity to stimulus and may refuse or accept the stimulus in the same setting and/or on different occasions. For example, a person with dementia may refuse the stimulus the majority of the time. However, when the person with dementia accepts the stimuli on another occasion, he or she may spend a substantial amount of time with the stimulus. Therefore, the individual dimensions of OME do not provide a coherent and comprehensive assessment of engagement. Secondly, expressed emotion and behaviors toward the stimulus are measured