5.Meeting the attachment needs of nursing home residents with dementia

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5. Meeting the attachment needs of nursing home residents with dementia? Exploring the utility of a social robot (Paro baby seal) with residents with dementia, compared to other activities

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Abstract

Evidence indicates that social robots can benefit individuals with dementia by improving mood, reducing loneliness, enhancing social engagement, and addressing behavioural symptoms. However, existing literature often overlooks concepts, models, and theories from dementia care, limiting our understanding of social robots' effectiveness. This study uniquely employs the concepts of attachment and engagement from the Validation Method, the Behavioural Staging Model, and POPFid theory to explore residents' responses to Paro and their interactions.

Using an observational design, video footage of twelve residents during afternoon activities was captured. Six participated in the Paro robot activity intervention, while six engaged in usual activities, each receiving three facilitated sessions per week for seven weeks. A total of 320 video sessions were analysed to assess verbal and non-verbal behaviour, focusing on affect and engagement levels.

Three main themes emerged: feeling safe and meaningfully engaged with others; feeling insecure and anxious when alone; and deriving comfort from familiar people and objects. The study found that Paro can serve as an attachment object and a suitable activity for some dementia residents, with success influenced by factors such as dementia stage, age, gender, and staff support.

Reactions to Paro varied: some residents treated it as a real pet or baby, while others were indifferent or annoyed. Effective use of Paro is challenging without detailed instructions due to limited dementia education among care staff. Although female residents generally engaged more with Paro, it facilitated group conversations and social interaction, which are vital for psychological well-being and relationship development.

Introduction

There are over one hundred types of dementia. Prevalence statistics vary, depending on the diagnostic criteria used, but Alzheimer's Disease (AD) is the most common type, accounting

for over half of all diagnosed cases, with vascular Dementia (Vasc D), dementia with Lewy Bodies and Frontotemporal dementia representing other common, but less prevalent, forms (Table 1). Managing dementing illnesses well and sustainably is a critical challenge for health care systems nationally and internationally and urgently so, given the cost of providing care and shortages of professional caregivers (Martin et al., 2020). In Ireland, 39,272 - 55,266 people are currently living with dementia (Pierse et al., 2019). This is projected to grow to 141,200 people by 2050, in line with ongoing population ageing (Alzheimer Europe, 2020).

Type of Dementia	Prevalence of diagnosed cases %
Alzheimer's Disease (AD)(often co-exists with Vasc D)	50-75
Vascular Dementia (Vasc D)	< 20
Lewy Body Dementia	10-15
Frontotemporal dementia	2

Table 1: Most common types of dementia and prevalence rates [Source: Alzheimer's Association 2021]

Most dementing illnesses are progressive and, depending on which brain areas are affected, result in changes to memory, attention, logical reasoning, calculation, communication and other cognitive abilities. People can require care for a period of over twenty years. This makes it easy to lose sight of 'where' the person is in their illness journey, and their pre-morbid abilities, which may mean the person does not get the right care at the right time.

As symptoms progress in a broadly similar way, dementia is often divided into stages as a way to more accurately track changes within and between stages of dementia severity. There are over a dozen staging models: most allocate a score range (on a cognitive test), to a particular stage; and most are three-stage models. Some miss the early-stage or the end-stage, so we use the four-stage Behavioural Staging Model, that relies on behavioural observation, not test scores. It is considered by many to be the best model for caregiving purposes, as opposed to clinical rating scales (Feil, 1985; Jones, 2011).

In addition to the Behavioural Staging Model, we use Validation (Feil 1972; 1997) and POPFiD (Parent-Orientation and Parent-Fixation in Dementia) theory (Miesen, 1999; 2004) an extension of Bowlby's Attachment Theory, as applied specifically to people with

dementia. These are well-established concepts and theories from the dementia-care knowledge base. They provide the lens with which the present study explores how a social robot, in the form of Paro, a baby seal, can provide a meaningful activity and an engagement or attachment object for nursing home residents with dementia. Our goal is to support a better understanding of how to meet the psychosocial needs of persons with dementia, who - at some point - try to seek-out and secure emotional attachments (to people, pets, objects and environments that feel familiar), to allay fear and feel safe.

Justification for using social robot pets with residents with dementia

Interest in using social robots (as opposed to care robots)[1] in care settings has grown in recent years, reflecting the challenges in providing good dementia care in the face of increasing pressures. As Breazeal (2008) notes, social (or sociable) robots are designed to be companions, to interact with people in a natural, interpersonal manner often to support social and psychological needs. Finding effective ways to meet the psychosocial needs of residents with dementia is a growing challenge for the care sector given the anticipated increase in demand.

An estimated 66 per cent of nursing home residents have dementia and some studies have estimated that up to 90 per cent of persons with dementia experience behavioural and psychological symptoms (such as agitation, aggression, depression and apathy) that may be related to unmet needs. These symptoms are independently associated with poor outcomes including: distress in residents and caregivers; long-term hospitalisation; misuse of medication; and increased health care costs (Cerejeira et al., 2012; O'Shea et al., 2017). It is well recognised that prolonged lack of stimulation can, for people with dementia, magnify the apathy, boredom and loneliness that often accompany the progression of a dementing illness (Cohen-Mansfield et al., 2009).

As demands increase, some have drawn attention to the diminishing number of family and professional carers available to provide care (Poulsen & Burmeister, 2019; Martin et al.,

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[1] Care robots are machines that operate partly or fully autonomously to support users, older adults and relatives as well as professional caregivers, in providing physical, cognitive or emotional support (Johansson-Pajala et al*.,* 2020). Social robots can establish and maintaining social relationships, using natural cues (gaze, gestures, etc.), and exhibiting distinctive personality and character and they may also develop social competencies (Hegel et al., 2009).

2020). The shortfall of health workers in Europe, estimated at 1.6 million in 2013, is projected to grow to 4.1 million by 2030 (Michel & Ecarnot, 2020). Despite ethical concerns about reduced human contact-time for older persons (Sharkey & Sharkey, 2012), the integration of robotics into dementia care has been seen to open up new possibilities for caring for and stimulating residents and alleviating the pressures on caregivers and healthcare services (Ienca et al., 2016). Specifically, 'social robotic pets' aim to provide emotional support and companionship, mimicking the benefits of having a pet while avoiding hygiene and safety concerns around live animals (Liang et al., 2017).

About the robot seal 'Paro'

The social robot 'Paro' (Fig. 1), a baby harp seal facsimile, was designed for use with older persons with dementia. It has five kinds of sensors (tactile, light, audio, temperature, and posture) with which it can perceive people and its environment. When interacting with people, Paro responds as if alive, moving its head and legs, making sounds; it learns to respond to a resident's most preferred behaviour.

Figure1: Baby seal robot, Paro [source: https://upload.wikimedia.org/wikipedia/commons/a/a6/Robots%C3%A4len_Paro_TEKS0057912.jpg Creative Commons license]

Paro has been used in care settings for over a decade in several countries and has been the subject of much research interest.[2] Some studies have reported Paro's positive effect on mood, social engagement and 'behavioural symptoms' in persons with dementia (Moyle et al., 2013; Robinson et al., 2013) but without specifying these parameters in much detail. Others have reported reduced levels of loneliness (Moyle et al., 2019; Sung et al., 2015). One study found a positive, long-term effect on depression and agitation using Paro in activity groups for residents with dementia in nursing homes (Jøranson et al., 2015).

Evidence points to the lack of relevant theory or conceptual frameworks to support a grounded understanding of human-robot interaction [HRI] specific to the dementia field, to help explain just how social robots may, or may not, meet psychosocial needs (Hung et al., 2019). A unique contribution of the present study is that it uses the Validation Method, the Behavioural Staging Model of dementia and POPFiD (Parent-Orientation and Parent-Fixation in Dementia) Theory to further our understanding about whether and how Paro may meet the psychosocial needs of nursing home residents with dementia.

The Validation Method™ and the Behavioural Staging Model of the dementia journey
Feil developed the Validation Method for 'one-to-one and group interventions, for working with people with dementia' (1985, 1992, 1993). This method involves acknowledging and validating each person's emotions and circumstances accurately, with empathy, and by using communication methods to match people's abilities. Feil supported stage-specific care, classifying older individuals with dementia along a continuum of four Behavioural Stages. She offered validation techniques to help carers communicate with and be present to a person in each stage. This involves working with a person's feelings, in whatever time or location is real to them, using a variety of communication methods (empathy, touch, eye contact, mirroring body movements, matching voice and body rhythms) and picking up cues about feelings and putting them into words, accepting without judging, and total listening (Feil, 1985).

Studies on the efficacy of the Validation Method have reported positive outcomes, including minimising the degree to which the person withdraws from the outside world. This promotes communication and interaction with other people and reduces stress and anxiety

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[2] See https://www.paroseal.co.uk/

(Feil, 1985; Neal & Briggs, 2000; Neal & Barton Wright, 2003). Jones (1985, 1997, 2004) added to Feil's work and linked the behavioural stages to the Braak neuropathological staging model of dementia (Braak et al, 1998) and to visuoperceptual changes that occur in Alzheimer's Disease (Jones et al., 2006; 2008).

POPFiD (Parent-orientation and Parent-fixation in Dementia) theory - extending the concept of attachment to people with dementia

People with dementia seek people, objects and physical environments that feel safe - especially when they are frightened and lonely. This observation was made by Miesen (1992) when he extended John Bowlby's work on Attachment Theory with children to understand the behaviour of disoriented people with dementia. Jones' later (2004) work on POPFid theory points out that feeling insecure and unsafe is a frequently occurring experience for persons with dementia. Furthermore, a person's ability to feel safe depends on various factors, including the stage of dementia, the proximity of carers or caregivers and the ability of the person to secure attachments to carers and caregivers. When unable to secure attachments, people with dementia use the only other option to feel safe, namely, to return to 'memories of safety with attachment figures'. This is reflected in the phenomenon of people with dementia in Behavioural Stage Two, at some point, speaking about parents as being present, or still alive, and friends and children being young.

Miesen (1992) identifies attachment behaviours in older persons living with dementia such as trying to secure the presence of others (symbolic attachment figures), searching for, asking about, calling after and trying to hold onto them. He distinguished between three types of distress in people with dementia: Type A distress, that disappears for the duration that another remains present; Type B distress, that disappears during, and for some time after, a person has been present; and Type C, distress - that is resistant to disappearing, or does not disappear, even in the presence of others.

Jones (2004) extended the idea of 'attachment to people' to objects to feel safe, and discusses the increasing difficulty of people with dementia to 'hold onto' objects as the dementia progresses. Since then, studies have looked at the use of animals and pets (such as dogs or cats) to visit residents in care homes; usually called 'pet therapy'. An analysis of 'pet therapy' is beyond the scope of this paper except to acknowledge that it has been shown to

improve sleep, reduce depression and enhance mood in older patients (Veilleux, 2020). Nevertheless, it is not tolerated by everyone due to factors that may include allergies, dislike and fear of certain animals, availability, and the cost and effort required to maintain them.

Methodology

The setting

The research was conducted in a nursing home in Ireland with 50-100 beds[3], that provided care to persons with dementia, physical disability and palliative care needs. It employed 25-40 care staff on a full- and part-time basis. On the ground floor, the communal area comprised of a large square room. Residents sit in high-back chairs arranged around the walls and similarly in a line along the middle of the room. On the first floor, the communal area is smaller and the room is rectangular. Residents sit in high-back chairs arranged around the walls. Some people have a small, low table placed alongside their chair. The conservatory, on the first floor was rearranged and used as an additional activity space for Group 1, with seven chairs placed around a circular table.

Study design and physical setting of the observation areas

As noted above, care was provided on two floors. Residents on the first floor received the 'Paro robot activity intervention' and comprised Group 1. Residents on the ground floor received usual activities programme (singing, games, painting) and comprised Group 2. An observational design was used that involved video recordings to capture interactions of residents in both groups. Data analysis included observations of both verbal and non-verbal behaviour to gauge affective stages and attachment/engagement of residents to people, objects and activities.

The study was approved by the ethics committee of the relevant higher education institution. All participants and staff provided written informed consent before any procedure took place. The consent process was continuous throughout the seven weeks. The researchers designed an 'easy to read' information leaflet that explained the study using pictures to aid understanding. Informed consent was confirmed by correct 'yes' and 'no'

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[3] Details have been provided in generic terms so as to maintain the anonymity of the setting

responses to a series of simple questions. Specifically, the resident was asked 'Do you have to take part in this study?'; 'Does the study involve a baby seal robot?'; 'Will you be video recorded?'; 'Will your name be included in my report?'

Staff, resident participants and study procedure

Information about the number of care staff, their age, duration of employment and past dementia education was collected before the start of the study. The 'participant inclusion criteria' for this study were: a minimum age of 60 years; diagnosis of dementia of any type or severity, and a Rowland Universal Dementia Assessment Scale (RUDAS) score of 22 or less.[4] The 'Staff inclusion criterion' was - written permission to be filmed, if incidentally present during the filming. No personal care was filmed.

Demographic and health data were collected for each participant at baseline. Twelve residents met the criteria and consented. At baseline, each completed the consent process and the RUDAS assessment tool for cognitive impairment (memory, body orientation, visuospatial praxis, motor praxis, judgment and language (Storey et al., 2004). Resident consent was re-confirmed at each session.

Technical information and description of Paro

Paro's weight is 2.7 kg, it is 57 cm long, 16 cm in height and 35 cm wide. It has four primary senses: sight (light sensor), audition (to identify the direction of sounds and speech recognition), balance and tactile sensors. Its moving parts include vertical and horizontal neck movements, front and rear paddle movements and independent movement of each eyelid, for creating facial expressions. It responds to pats and to external stimuli by moving the body and the head in a coordinated way, by fluttering the eyelids, making sounds (squeaking), purring if cuddled (Marti et al., 2005). These actions are designed to encourage

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[4] The Rowland Universal Dementia Assessment Scale (RUDAS) is a 6-item cognitive screening tool for dementia detection (Storey et al 2004). RUDAS measures a range of cognitive domains associated with the ability to conceptualise, plan, and organise movements in order to complete unfamiliar motor tasks. This includes the coordination between both hands; visioconstructional drawing e.g. copying of cube; judgement e.g completing a road safety task; memory recall, e.g. remembering a shopping list; and semantic verbal fluency, e.g. naming as many animals as possible in a given time. RUDAS is easy to administer and can be complete in 10–15 min. It has a maximum score of 30, with higher scores reflecting better cognitive performance, and a cutoff point of ≤ 22 (Manjavong et al., 2021).

nurturing behaviour. Paro can learn to respond preferentially to the characteristic behaviours of residents as it is designed to place positive values on preferred stimulation such as stroking and negative values on undesired stimulation such as beating. Thus, Paro's behaviour can be gradually tuned to preferred behaviour of residents (Wada et al., 2010).

Robotic Paro baby seal activity versus control activity interventions

For the Group 1 activities sessions, a large round table that could seat seven people was used. Where possible, residents were seated together around the table (Fig. 2). Although it was initially intended that Paro would be the sole focus of group activity, it quickly became apparent that Paro's presence (in the middle of a table) was not enough to engage all residents, leading to a dearth and unnatural flow of dialogue. Subsequently, various card games, pictures, pencils and paper were also placed on the table with Paro. A researcher joined participants at the table, chatting and encouraging interactions with Paro with individuals and collectively. Activity sessions were 40-60 minutes, ending with tea for the group and the researchers.
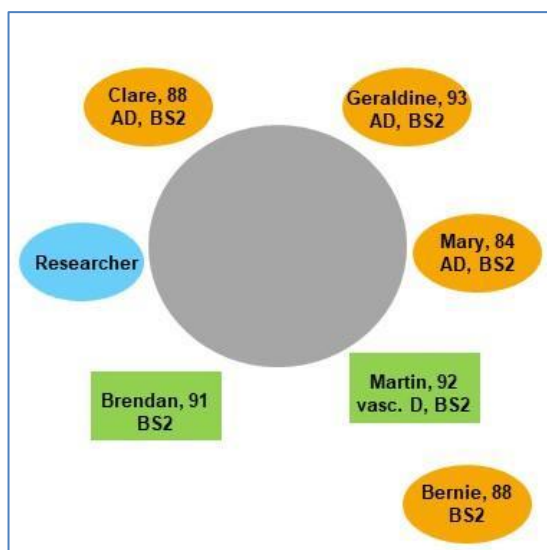

Figure 2 Schematic showing resident names, details and seating arrangement[5]

Two residents required individual sessions with Paro. One, a woman who chose not to sit at the table; the other, a man who often preferred to sit alone in his room. During individual

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[5] Names are pseudonyms

sessions, a researcher sat with the person, chatting and encouraging interactions with Paro, they then left the person alone with Paro for fifteen minutes.

Video camera use: timing and locations for films

Small 'GoPro' cameras were positioned in the rooms where activities took place and in the bedrooms of participants who received individual sessions. No personal care was filmed. Baseline videos were filmed before the Paro intervention commenced. Subsequent video filming took place between 1-5pm, thrice weekly, for seven weeks. Data observations and analyses included both verbal and non-verbal behaviour to assess the affect and attachment/engagement of residents to activities.

Analysis of videos

The 320 video segments were viewed, and key ones transcribed, reviewed again and scored on a second-to-second basis. The researchers then used thematic analysis and reached an agreement about the emerging themes. This involved viewing multiple participant perspectives concurrently, including resident interactions (or not) with the activities and with other residents and staff. Residents' behaviours were coded to include non-verbal behaviour (including attachment behaviours, gaze, affect, types of touch; self-stimulation behaviour and verbal behaviour (speech and other vocalisations.)

Description of participating residents

Table 2 presents descriptive data for the seven male and five female participants. Their mean age was 86 (SD 6) and their median length of stay in the nursing home was 2.8 years. Most participants (n=9) were unable to walk without the aid of a walking frame or wheelchair. Five residents had AD, three had Vasc. D; four were diagnosed with unspecified 'dementia'.

		Gender	Age	Dementia type	Other conditions	Mobility	Speech	Night sedation	Dementia meds	Antipsychotics	Antidepressant
Social robot Paro group	1.	F	87	AD	High BP	Walks unaided	Can speak in full sentences. Starts with, "where am I?"	N	Y	N	Y
	2.	M	91	Vasc.D	DVT	wheelchair	Can speak in full sentences. Gets angry with activities	Y	N	Y	Y
	3	F	87	'dementia'	High BP	Zimmer frame	Can speak in full sentences & observations about environment.	N	Y	Y	Y
	4.	F	92	AD	High BP	rollator	Can speak in full sentences. Can initiate conversation.	N	N	N	N
	5	F	83	AD	Diabetes High BP	Wheel-chair	Can speak in full sentences.	N	Y	N	Y
	6.	M	90	'dementia'	High BP	Zimmer frame	Can speak in full sentences.	N	Y	N	Y
Control group normal activities	1	M	85	Mixed	stroke	Zimmer frame	Can speak in short sentences. Asks about his son.	N	Y	N	Y
	2	M	84	Vasc.D	Aortic aneurism AFib	Wheel-chair	Can speak in short sentences.	N	Y	N	N
	3.	M	75	Vasc.D	Not recorded	Walks unaided	Stutters – uses short phrases. Difficult, but possible to understand.	N	N	N	Y
	4.	M	73	AD	Not recorded	Walks unaided	Speech is normal.	N	Y	Y	Y
	5	M	90	'dementia'	High BP Diabetes	Wheel-chair	Has little speech. He gestures mostly.	Y	N	Y	N
	6	F	84	'dementia'	Vertigo, Low BP	Zimmer frame	Can speak in short phrases, but rarely does	N	N	N	N

Table 2: Description of participating residents

As seen in Table 2, there were noticeable gender differences in the use of medication, with more males than females taking anti-dementia medication (n=4 males and n=3 females), antipsychotics (n=3 males and 1 female) and antidepressants (n=5 males and n=3 females).

Profile of the Caregiving Staff at the Nursing Home

The nursing home employed 25-40 care staff; divided on a ratio of 1:4 between nurses and healthcare assistants. Some (28%) had worked in the home for less than one year, others (32%) for less than two years, but some had been there for 3-4 years (28%) and 5-10 years

(12%). Most staff (72%) were employed full-time, and all part-time staff had permanent contracts. Dementia training, in the form of a half-day dementia course, was mandatory for all staff and provided in-house by an external trainer. The content of this course was unknown to the researchers.

Results

The results are given in two parts. Part 1 shows the responses of individuals in both activity groups, during the seven week intervention. Part 2 illustrates the three themes arising from the thematic analysis, with two examples.

Results – Part 1

Although this study is not large enough to make any statistically meaningful comparisons, taken collectively, the observations point to the futility of providing *any one* type of activity to a resident group with mixed stages and mixed communication abilities. Using the Behavioural Staging criteria, one resident was in Stage 1, two were in transition between Stages 1 and 2, and seven were in Stage 2.

Three of the six residents in the 'Paro group' did not engage with Paro, and one engaged periodically; four of the six residents in the 'control activity group' did not engage with any of the activities present (Table 3). Three of the four females in the Paro group engaged with Paro, and one man periodically engaged with it. Across both groups, four of the six men engaged in any activity. The three residents with Vascular dementia wanted to be solitary, or to do solitary activities.

Group		Diagnosis	Age	Behavioural stage	Gender	Time in Nursing home	Engaged with the main Activity	Observed the Activity	Took possession of Activity - from others	Often distracted by other activities	Other observations
Social robot/ Paro activity group	1	AD	87	s2	F	3y 2m	with support	No	No	No	Worried constantly
	2	Vasc.D	91	s2	M	1y 6m	No	No	No	No	Gets angry at activities
	3	'dementia'	87	s1-s2	F	8y 7m	With support	No	No	No	Stays in her chair
	4	AD	92	s1-s2	F	8m	Yes	Yes	Yes	No	
	5	AD	83	s2	F	3y 4m	No	Yes	No	No	
	6	'Dementia'	90	Near s2	M	2m	No	Yes	No	No	
Control group - normal activities	1	Mixed dementia	85	s2	M	8m	No	No	No	No	Often sits with head in hands
	2	Vasc.D	84	s1?	M	7m	No	No	No	No	Sits in bedroom with TV on
	3	Vasc.D	75	s1	M	1y 6m	Yes	Yes	Yes	No	Plays jigsaws constantly
	4	AD	73	s2	M	2y 6m	No	No	No	No	Walks a lot
	5	'dementia'	90	s2	M	1y 3m	No	No	No	No	Always lies in chair.
	6	dementia'	84	s2	F	3y 2m	Yes	Yes	Yes	No	Cares for two dolls

Table 3: participants' responses to activities (N=12).

Results - Part 2

After reviewing, transcribing and analysing the videos for verbal and non-verbal content, researchers agreed that three key themes emerged from the data analysis as follows:

1. feeling safe while meaningfully engaged with others
2. **feeling insecure and anxious when alone and lost**
3. receiving comfort from the presence (or perception) of familiar, nearby people and objects

These themes are discussed in more detail, with a small but representative selection of quotes and narratives from the participants.

Some observations about Group 1 – Paro robot seal activity

Paro was variously referred to as 'Fluffy', 'the baby seal', and as a male ('he' or 'him'). It is unclear why a female pronoun was never used, or whether this affected anyone's interactions with Paro. Some (n=4) residents realised Paro was a 'toy', or 'not real' and did not want to associate with it as such. One resident related to it as though it was real; and the remainder (n=5) seemed to treat it as a pleasant amusement. Only one resident in the intervention group enjoyed holding Paro close to her, hugging and chatting to the robot, all the while looking into Paro's eyes. The remaining five residents in the intervention group generally preferred to have Paro on a table where they could touch him periodically or watch him from a distance, rather than hold him.

Some observations about Group 2 – standard afternoon activities

Participants in Group 2 were seated against the walls in the large communal room and in chairs along the centre of the room. Usual activities included group painting (in which case residents were seated at a rectangular table), jigsaw puzzles (usually one resident, seated alone beside a window), and country and western music, played on the TV screen located above the fireplace. Residents largely did not show any interest in what was on the TV, perhaps because of its location, high up on the wall. Looking up for an extended period of time, would cause neck strain for most older people with limited mobility (Liu et al., 2023).

There were no activities done individually with residents by the activity or caregiving staff. One resident, in Stage1, played with (200+ piece, large) jigsaws daily, usually alone, but occasionally with other residents or staff, briefly, explaining what he was doing. Occasionally, the activities coordinator would play the guitar and sing songs. Residents would typically sit in the chairs and listen. There was no obvious attempt to engage them in a sing-song. Some residents sang along spontaneously during the live music sessions which were held on the first floor every Wednesday afternoon. These sessions were provided by a professional singer, using an amplifier and microphone to project the music around the room, into the corridor and bedrooms, creating a party feel.

Theme 1: An example of residents feeling safe while meaningfully occupied in the presence of others

In Group 1 (Paro activity intervention) five of the six participants were seated at a round table (Fig. 2)

Example 1 Some observations from the group members about Paro's presence

Claire, recently admitted, was often in a distressed anxious state, frequently calling out, '*Where is this place?*' '*Who put me here?*' '*Do you know me?* However, while at the table with others, she would sit contentedly and 'work'. Since Claire had been a bookkeeper, the researcher asked her to help prepare a ledger by writing from 0-100 on a page. Claire needed little support to do so, a simple occasional prompt kept her content and meaningfully occupied. She was not interested in touching Paro, though she joined in some conversations about him.

Geraldine, on the other hand, was strongly attached to Paro, right from the first meeting, and kept Paro close to her on the table. Even while she played cards she frequently stopped to talk to him and tell him what was going on or ask him a question. On one occasion, while cradling Paro, the conversation went as follows.

> [Geraldine] 'What does he eat?'
>
> [Researcher] 'He doesn't really eat anything.'
>
> [Geraldine] 'I thought that.'
>
> [Researcher] 'When I'm here next time I'll show you how we charge him, it's like a baby's dummy.'
>
> [Geraldine] 'In his bum is it?'
>
> [Researcher] 'No - in his mouth.'
>
> [Brendan laughs out loud]
>
> [Geraldine] laughs and asks, 'What are you laughing at?'
>
> [Researcher] 'That's the devilment coming out there isn't it Brendan?'
>
> [Others present join in laughing].

When the researcher shared Paro, moving Paro beside each resident in turn, Geraldine would often try to explain to Paro what was happening, and try to reassure [him], as typified in the following example

> [Geraldine] 'What is it? What's the matter? Is there too many people? They're all your friends.'
>
> [Paro squeaks]
>
> [Geraldine] 'Yes they're all your friends.'

Brendan, a quiet, softly spoken man, showed little interest in Paro, only engaging when prompted to do so by a researcher. He occasionally made light-hearted comments such as 'you're a great boy' when Paro was the focus of everyone's attention, such as when the group was startled by Paro's squeak and everyone laughed.

Mary's relationship to Paro was similar to Brendan's, showing little interest in one-to-one engagement. Occasionally she stroked Paro with the flat of her hand, but typically used the tips of her fingers only. She remained guarded in her interactions throughout, yet, like Brendan, enjoyed watching others engage with Paro and contributed to the light-hearted conversations that occurred on-foot of naturally occurring events at the table.

Martin had the least interest in Paro and in the activities in general. He preferred to watch others since he enjoyed the social aspect of being in the group. On awaking after a doze, the researcher chatted to him, enquiring if he knew the others. He immediately smiled and extended his hand to shake the hands of others present, with no sign of hesitation as the researcher introduced each resident. This is shown in the excerpt below.

Theme 1, Example 2 - Martin engaging with the other group members

> Martin joined the table later than others
>
> [Researcher] 'Do you know everybody here Martin?'
>
> [Martin] 'No this is the first time I've sat at this table.'
>
> [Researcher] 'Is it? … So this is Brendan. Brendan do you remember Martin?'
>
> [Brendan] 'Not really.' [Both men shake hands with each other unprompted]

[Researcher] 'That's Claire, this is Mary, and Geraldine and himself (Paro), there you go that's everybody'

[Martin smiles at everyone and extends his hand to those that he can reach].

The group session ended with tea for the residents and researchers, which prompted a different type of conversation to unfold, but still encouraged social contact.

Theme 2: uncertainty, confusion, fear and distress and the importance of validating these emotions

When people are in Behavioural stage 2, they are permanently lost in time. If they [mistakenly] *think* they know where they are (at home, at work, in a hotel on holiday) and these places hold nice memories for them, they can feel safe. If they do not, they can exhibit fear behaviours and become anxious or distressed. They need the security of familiarity of people and/or objects around them, to feel heard and believed, to have their feelings validated. The two examples below illustrate this.

Theme 2, Example 1 - Martin is sitting alone in his room – calling out

Martin calls out, 'Hello', 'Hello', 'Hello' - shouting louder each time, leaning forward in his chair, looking into the hallway to see if anyone is there. A carer approaches, stops in the doorway, leans against the frame and starts a conversation with Martin, trying different strategies to cajole him, including trying to orient him and lie to him. They are to no avail, and appear to leave Martin even more distressed than at the start.

[Carer] 'What's wrong Martin?'

[Martin] 'I've been here one and a quarter hours and nobody came.'

[Carer] 'This is your room Martin, you are staying here for a while, ok?'

[Martin] 'Ok.'

[carer] 'You'll be going home tomorrow.'

[Martin, kicking his bedside table] 'For fuck's sake, there's nothing wrong with me,'

[Carer, on leaving the room says] 'You'll be going home soon.'

A short while later a researcher, trained in stage specific care and communication options enters the room, unaware of the previous events.

> [Researcher] 'Hello Martin.'
>
> [Martin] 'Another scandal, isn't it?'
>
> [Researcher] 'What's that Martin'?
>
> [Martin] 'I've been here one and a quarter hours and nobody came.'
>
> [Researcher] 'Nobody came?'
>
> [Martin, says angrily] 'Bad, bad administration.'
>
> [Researcher, getting down within Martin visual field] 'I can see you're a bit annoyed Martin.'
>
> [Martin, getting calmer] 'Tell you can go and then keep you.'
>
> [researcher, placing a hand on Martin's arm] 'Are you lonely?'
>
> [Martin] 'If there was even someone that I knew.'
>
> [researcher] 'Do you not know anyone here Martin?'
>
> [Martin] 'No.'
>
> [researcher] 'Not a good place to be.'

Theme 2, Example 2 - Claire is sitting in the communal room with no one nearby

Claire is seated alone and calls out to a researcher; she continually seeks answers to her questions and the researcher tries to connect her with another resident.

> [Claire] 'Where am I?'
>
> [Researcher] 'You're in [name of nursing home].'
>
> [Claire] 'Who put me here?'
>
> [Researcher] 'Your doctor.'
>
> [Claire] 'My doctor?'
>
> [Researcher] 'Yes.'

[Claire] 'Have I paid? Do I owe them any money?

[Researcher] 'I'm not sure. I don't think you owe them money.'

[Claire] 'Oh, I'm all mixed up. I don't know where I am.'

[Clare] 'Where am I?'

[Researcher] 'You're in [name of nursing home]'

[Claire] 'Who put me here?'

[Researcher] 'Your doctor.'

[Claire] 'My doctor?'

Researcher] 'Yes'

[Claire] 'Have I been here long?'

[Researcher] 'I'm not sure, not long I think, but you like it here.'

[Claire] Do I?'

[Researcher] 'Yes, you told me you like it here, everybody is very nice.'

[Claire] 'I do, I do like it here.'

[Claire] 'I'm all mixed up.'

[Researcher] 'That's ok, we all have days like that. It's your turn today, tomorrow it'll be my turn. You worked hard all your life, you're having a rest now.'

[Claire] 'I did, I did work hard all my life.'

[Researcher] 'Would you like to move up beside Geraldine? You're all alone here.'

[Claire] 'Who?' [researcher, pointing to Geraldine] 'Geraldine, she's very nice.'

[Claire] 'Yes, all right.'

Theme three: receiving comfort from familiar people and objects

People in Stage 2 feel safe when they are near people, objects, and/or an environment that feels familiar and safe; this feeling of connectedness and safety contributes to quality of life and a comfortable emotional atmosphere for everyone around.

The first example below, links to the previous one, in which Celia has agreed to move beside Geraldine, who is sitting with Paro. When Clare joins them, Geraldine immediately comforts and reassures her, while including Paro in the conversation. As Claire begins to relax, she joins in the conversation, talking directly to Paro, and telling him who she is. Before long, all three fall asleep—Claire, Geraldine and Paro.

Theme 3, Example 1

Researcher and Claire approach Geraldine

[Researcher] 'Geraldine, is it alright if Claire sits beside you? She was sitting all by herself?'

[Geraldine] 'Yes of course; sit down here.'

[Claire sits down beside Geraldine] 'How long am I here?'

[Researcher] 'I'm not sure, maybe a couple of weeks or a couple of months.'

[Claire] 'Is everybody here that I know and they know me?'

[Geraldine] 'Everybody knows each other. When you come in here they say - What's your name? Where do you come from? - and we talk to each other until we get to know.'

[Claire] 'How do you know where I'm from? Where am I from?'

[Geraldine] 'I suppose around here somewhere.'

[Paro squeaks]

[The researcher holds Claire's hand and encourages her to stroke him] 'Fluffy (Paro) is saying hello.']

[Claire] 'Hello Fluffy. Whose dog is he? Who owns him?'

[Researcher] 'He's mine but I took him in to see everyone. He has been coming in now for a while. He is really getting very fond of everybody. He loves you and he loves Geraldine.'

The conversation continues back and forth between Claire and the researcher.

[Claire asks repeatedly] 'Where am I and how did I get here?'

[The researcher gives Paro to Geraldine since Claire doesn't want him, and leaves].

[Geraldine says, comfortingly, to Claire] 'Have a wee doze, you don't need to keep talking all the time. Doze off. Close your eyes and have a wee sleep, that's what I do. When I get tired I say "let's have a wee sleep."'

[Geraldine continues to whisper] 'Close your eyes and sleep.'

[Claire falls asleep beside Geraldine who also closes her eyes].

Theme 3, Example 2 – researcher takes Paro to Bernadette

Bernadette is sitting in her armchair eating her dessert. She prefers to be alone and has ceased participating in group activities long ago. When the researcher takes Paro to Bernadette, she puts it on the small table beside her (Bernadette, and others, found Paro too heavy to hold). Bernadette keeps a close eye on Paro while eating, at times showing her annoyance with Paro when he is noisy, momentarily turning him away from her.

[Researcher] 'Hello Bernadette'.

[Bernadette] 'Hello there'.

[Researcher] 'I've taken Fluffy to see you'

[Bernadette] 'Yes, I see that'

[Researcher] 'Can I leave him with you for a while? Will you mind him for me?'

[Bernadette, pointing to the small table beside her] 'Yes, surely, leave him there'

[Researcher] 'Ok, I'll come back in a while'.

[Bernadette] 'Ok yes, surely, alright'.

[Bernadette carries on eating her dessert]

[Fluffy] crying

[Bernadette, turns as she hears Fluffy cry out, puts down her dessert, wipes her mouth and reaches out and pats it on the head several times, before picking up her dessert again]

[Fluffy] crying

[Bernadette, on hearing Fluffy cry again, puts down her dessert and reaches over and turns Fluffy away from her, while muttering something to herself]

After a few minutes she looks towards Fluffy, and turns him to face her once again.

Discussion

Aside from the findings about the potential use of Paro, this research showed that there are major issues concerning the use of *any* activity with nursing home residents. Six residents with dementia in a nursing home received three facilitated interventions each week, for seven weeks, which involved the chance to interact with the Paro robot seal (and incidental table-top activities). Six other residents, in a control group, received the usual activities provided. In both groups, half or more of residents did not want to participate in the activities present, presumably because they did not meet their abilities, interests or needs.

At a certain point in a dementing illness, being disoriented and fearful may activate attachment behaviours (Jones, 2004 ; Miesen, 2010; Nelis et al., 2012). Our findings suggest that Paro can provide an attachment object/figure in the lives of *some* people, somehow fulfilling their need for comfort and companionship. For some residents, this occurred while they were very anxious. The success of using Paro as an attachment object is also dependent on having necessary staff and assistance, and staff understanding of how to use Paro effectively (Share & Pender, 2022).

Some obvious disadvantages about using Paro with residents is that most are frail, use a walking assistive device, so cannot walk independently and have no free hand to carry Paro. Even when seated, although Paro weighs the same as a new-born infant, this is still too much for some people to support. They need a table close beside them, at the right height, to see and touch Paro. Crucially, assistance is needed for such practical tasks, but also in knowing how and when to use Paro. There will be times when it is appropriate to use Paro with a resident and times when it is appropriate to set Paro aside and to be present with the person in other ways. Thus ethical concerns about 'social robot contact' replacing human contact, remain (Sharkey & Sharkey, 2012; Johnston, 2022).

Consistent with previous research on gender differences in human-animal interactions (Harold & Herzog, 2007), our limited findings show that women had higher levels of positive behaviours and attitudes towards Paro, with the men in this study largely indifferent. Nonetheless, Paro did at times provide a focal point for group conversations in which there were no notable gender differences, with everyone sharing a reaction to something that

Paro did unexpectedly. Such social interaction is important not only for psychological wellbeing but also for developing relationships between residents (Curle & Keller, 2009).

We all experience a range of feelings, and people with dementia are no different; sometimes happy, lonely, sad or angry. It is important for care staff to understand how to acknowledge, and show acceptance of all feelings. When residents receive this type of validation, they know that their emotions are recognised and also accepted.

Our findings suggest the care staff in the nursing home would be challenged to use Paro effectively as a formal care activity or supplementary activity. In the present study, although all staff had completed the same half-day course about dementia, they would clearly have benefited from learning about the type of stage-specific, behavioural type models discussed in the present study.

This draws attention to the need for new and existing training and education to take account of subjects that are currently under-represented, in order to ensure that training reflects evidence regarding best practice for delivery (Smith et al., 2019). Our findings suggest such subjects should include information about the Behavioural Staging model of dementia, and stage-specific communication and care interventions, as described in Validation Therapy. Alongside this, is the need for caregiving staff to understand POPFiD theory, the ongoing search for attachment, and the meaning of attachment behaviour in people with dementia. Perhaps, most importantly, is the need for caregivers to understand that people and objects, (including Paro), can function as 'symbolic or substitute attachment figures' for older persons with dementia.

In summary, Paro was perceived and used in different ways by nursing home residents. The diagnosis and stage of dementia helped to predict who would engage with Paro in what way. Residents who are in the transition phase between Stages 1 and 2, who are not yet fully disoriented in time, are most likely to distance themselves from contact, because they recognise Paro as being 'not real' and toy-like. Residents who are in Stage 2, who are permanently disoriented in time, are very likely to engage closely with Paro, and see it as being a real animal, or even relate to it as a doll or baby. They are often frightened and seeking a handhold from anyone, or anything proximate, when they cannot find their bearings.

Although Paro was an awkward shape, and too heavy for most residents to hold, or have on their lap, there were other options for optimising its use. Putting Paro in the middle of a table, with residents seated around, readily made for conversation and amusement when they noticed Paro squeaking or moving. However, some people's needs to attach to Paro were so great that they monopolised it.[6]

Conclusion

There is need for more research about how social robots can be best used with individual residents and in group activity settings in nursing homes. Our findings suggest that a facilitator is needed to use Paro in groups, and also, that ideally, these groups comprise of residents in Behavioural Stage 2. Residents in Behavioural Stage 1 were disinterested in and even (angrily) avoided Paro.

Interest in social robots is likely to grow given the demographic shift towards a growing older population and ongoing resource constraints which put pressure on services and care staff. Given the issues identified in the present study, the use of a variety of dementia care models, methods and theories could support the development of a better understanding and explanation of how and why an intervention succeeds or fails. Social robots may meet some of the psychosocial needs of *some* people with dementia, but their use will need to be bespoke, carefully in tune with people's communication and attachment needs.

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[6] A similar episode of monopolisation of Paro by one care home user is described in Wright (2023, pp. 110-112)

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