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ESRC CASE-funded Doctoral Student, Division of Health Research

Keywords: Dementia; Participatory; Arts Activities; Wellbeing; Therapeutic Landscapes

"The Role of Engaging in Participatory Arts for the Health and Wellbeing of People with Dementia and their Carers"

Supervised by Professor Christine Milligan (Co-Director of Lancaster University Centre for Ageing Research), Professor Emma Rose (Lancaster Institute of Contemporary Arts) and Mary Elliott (House Manager and Creative Engagement Co-Ordinator, Theatre by the Lake, Keswick).

My ESRC-funded CASE Studentship considers the health and wellbeing benefits of engaging in participatory arts activities for people with dementia and their carers. The project is based at Theatre by the Lake's 'Setting the Scene' programme in Keswick, Cumbria, which is a multi-arts creative activity group, including storytelling and conversation, movement and dance, arts and crafts, singing and music, multi-sensory experiences and group games.

Using mixed methods - including participatory observations, interviews, photography and video data - the project aims to explore and evaluate the overall effectiveness of 'Setting the Scene' by considering:

- the importance and effectiveness of the different individual activities involved.
- how to best sustain the engagement of people with dementia in creative arts settings.
- the role and benefit of 'Setting the Scene' for family and professional carers.
- the role of additional factors including setting/space/place, group relations and materiality (objects and props used).

People living with dementia, their carers and theatre staff have all played an active role in the research project, aided by adopting a participatory action research methodology (PAR). Participant feedback contributes to both the research project findings and the gradual development and refinement of the 'Setting the Scene' programme. In addition to traditional research outcomes, the project aims to produce a 'Setting the Scene' toolkit for use by Theatre by the Lake, as well as an exhibition of research findings based at the theatre.

Fieldwork was conducted between July 2018 and August 2019. The research is underpinned by therapeutic landscapes literature (e.g. Gesler, 1993; Williams, 2007), more-than-human geographies (e.g. Whatmore, 2006) and wellbeing literature.
Emma Gorman (an ESRC phd student co-supervised with Eugeunio Zuchelli in DHR) shows that the effect of ageing on cognition is causally affected by education level when young. The findings from a regression discontinuity design show that an extra year of schooling improves working memory of the elderly by up to one-half of a standard deviation. This effect appears robust to alternative specifications and sensitivity analyses. There is only limited evidence of causal effects of schooling on measures of verbal fluency and numeric ability - but the increases in mandatory schooling led to improved performance on memory tests many decades after schooling completion. Education levels have continued to rise and the implication is that investments in education may continue to yield large payoffs as populations age.

Since education has been rising across cohorts (especially the 46 and 58 raising of the school leaving ages) this suggests that future elderly cohorts may suffer from smaller non-cognitive deficits than recent ones have. Whether this is big enough effect to keep up with ageing of successive cohorts is something we are working on; as well as looking into possible transmission mechanisms. The work uses the “Understanding Society” panel data. Further work on the ELSA cohort study is under way.

Emma spent 6 months as an ESRC funded policy intern at DWP in Whitehall to work on “life chances cohort analysis” using the Millennium Cohort Studies babies born in 2000.
Emma Drummond

I work on finding genes on the mitochondrial genome linked to various conditions associated with ageing. Mitochondria are implicated in lots of pathways in the body, like energy production and cell death, and succumb to ageing too, so knowing the genetic factors influencing the rate of these processes is important. Whilst focussing on ischaemic heart disease to begin with, we hope to expand the search once we have a watertight, data analysis pipeline.
Beth Cheshire, Prof Carol Holland & Dr Trevor Crawford

Neuropsychological effects of chronic low-level carbon monoxide exposure in older adults

Currently, there is a knowledge gap regarding ‘safe’ levels of carbon monoxide (CO) exposure and whether chronic exposure to low-levels of CO are associated with neuropsychological deficits. Working alongside West Midlands Fire Service, the PhD examines the health and cognitive effects of such exposures from household appliances such as cookers and heaters within an older adult population. Although limited, chronic exposure studies of low-level CO indicate the presence of neuropsychological deficits such as memory and attention impairments following these less severe exposures. Older adults may be more susceptible to the effects of CO due to reduced physiological reserve and pre-existing disease through which the adequate regulation of oxygen supply or metabolism is already compromised. Fire Officers often report high levels of confusion in older residents who may be at risk of chronic CO exposure at levels not sufficient to trigger CO alarms, but which could still be harmful to health. With evidence indicating that neuropsychological deficits may result from less severe CO exposures, and that older adults may be particularly vulnerable, such exposures may be a significant unidentified cause of cognitive impairments that improved awareness and identification could prevent. The research examines the prevalence of low-level CO within a sample of older adult homes in Coventry and aims to determine the effects of such exposures on cognitive function, health and mental health. The extent to which intervention by the Fire Service, in reducing levels of CO in the home, results in measurable changes in functioning over time will also be examined.

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West Midlands Fire Service (WMFS).

Project funded by the Gas Safety Trust registered in England and Wales.
Accounts of internal conflicts associated with end of life care for people with a moderate to advanced dementia have been given by informal caregivers. Other healthcare professionals have also given accounts of similar experiences. However, while these accounts have been explored and described as moral distress, experiences of informal caregivers are yet to be investigated. This study adopts a narrative inquiry design using unstructured interviews to collect data from 15 informal caregivers. Recruitment into the study was through UK organisations which offer services to both the informal caregivers and the person receiving care. Only the informal caregivers were recruited into the study and accounts were not sought from care recipients. The data collected from interviews were analysed using Riessman (2008) narrative analysis approach and the preliminary findings show that participants describe their experiences in terms of their loss, control, role change coping and help seeking. These findings would be used to propose approaches which best support informal caregivers while providing care to people with a moderate to advanced dementia within a home-based setting.
Testing and development of TDP-43 aggregation inhibitors

In several neurodegenerative diseases (ALS (motor neuron disease), FTLD (frontotemporal dementia) and to some extent in Alzheimer's disease and Parkinson's disease) a common pathology is the presence of aggregates or “clumps” of the protein TDP-43 in neurons. This is similar to the long-studied aggregates of amyloid beta and tangles of tau in Alzheimer's disease. It is thought that either the aggregates themselves, or smaller species known as oligomers that are formed in the aggregation process may be toxic to the cells, or that the aggregation process prevents the protein from carrying out its normal roles in the cell, so leading to neurodegeneration. This project aims to test and develop inhibitors of this aggregation, in the hope that such inhibitors may be used as potential therapies for ALS and FTLD.

Work so far has involved expressing recombinant TDP-43 in a bacterial (E. coli) system, and attempts to purify this protein for use in aggregation experiments to test the inhibitors. Following this we will look to produce a neuronal cell model, showing TDP-43 aggregation, and further test the inhibitors in this model. We may also combine the inhibitors with liposomes, a potential “delivery system” for the peptide inhibitors that have been designed.
PhD Thesis: Insulin/IGF-like Signalling and Brain Ageing in Drosophila melanogaster

Understanding the biological mechanisms of ageing is essential to improve human health at older ages and extend health-span. Reduced Insulin/IGF-like signalling (IIS) improves longevity and some measures of health-span in model organisms, such as worms, fruit flies (Drosophila melanogaster) and mice suggesting an evolutionarily conserved role. Recent studies, however, have found a disconnection between lifespan extension and behavioural health-span. It was recently shown that selective reduction of IIS in Drosophila neurons extended female lifespan but had not or detrimental effect on cognitive and locomotor function in both sexes.

My research focuses on the disconnection between lifespan and health-span in response to reduced insulin signalling in the brain, using fruit flies as a model organism. I’m studying the mechanism of lifespan extension in response to reduced IIS in neurons and looking for possible causes of the detrimental effects on behavioural function. We found that the detrimental effects on behaviour in response to reduced IIS in neurons are reversible, therefore, reduced IIS is likely to reduce the function of the neurons. We also found that reduced IIS in neurons alters the expression of some of the insulin like peptides, suggesting that the lifespan extension involves an endocrine mechanism. IIS reduction in specific neuronal subtypes either does not affect or has detrimental effects on lifespan and health-span suggesting that individual neuronal subtypes do respond differently to IIS changes. We did not find evidence that the ageing of neurons is altered by reduced IIS and further work is needed to elucidate the molecular mechanisms involved in lifespan extension and reduced neuronal function due to reduced IIS in neurons.
Toyni Adewunmi, BSc (Hons), RGN  
Doctoral Student, Division of Health Research  
Keywords: Depression; Older Workers; Workplace Health; Wellbeing; Qualitative  

Supervised by Professor Carol Holland (Lancaster University, Director, Centre for Ageing Research; Chair in Ageing; Deputy Dean - Faculty of Health and Medicine) and Professor Jane Simpson (Lancaster University, Asst. Dean – Communications and Marketing, Faculty of Health and Medicine).

This project explores the experiences of depression on older workers in the contemporary workplace and it draws participants from various organisations in the United Kingdom.

Based on a generic qualitative approach, a purposive sampling of older workers who had depression at age 50 or above during employment in a UK-based organisation are invited for a Skype or Telephone interview. The study aims to explore the experiences of older workers who experienced depression and how they make sense of their experiences. The following areas are being explored:

- the impact of depression on older workers’ work attendance, functioning and participation;
- the workplace issues that were related to older workers’ experiences;
- the meaning that older workers gave to their experiences of depression;
- older workers’ experiences of workplace support provisions.

For reliability reasons, the indicative interview schedule for this study was piloted with an older worker who experienced depression at age 50 while in UK-based employment. It is hoped that this study will impact policymakers, occupational health practice, workplace wellbeing strategies and workplace culture. The findings of this study may be submitted for publication in books and academic or professional journals such as the Occupational Health and Wellbeing journal as well as Health and Safety journals.

The fieldwork for this study was conducted between January 2018 and June 2020. The research is underpinned by the World Health Organization’s Healthy Workplaces Framework and Model (Burton, 2010) and the Conservation of Resource Theory (Hobfoll, 2018).

Demographic changes in industrialised nations, such as an increasing older population and a declining younger population, along with Government reforms affecting the upper working age limit, are resulting in a growing number of older workers. Consequently, work participation among older workers is becoming increasingly crucial to sustaining the economy in developed nations. In the United Kingdom, an older worker is defined as those who are between 50-65 years (ONS, 2013).

Along with the rapidly changing world of works, studies have shown there is an increasing prevalence of mental health across the entire working-age groups. Findings from quantitative studies have revealed that older workers are more susceptible to the consequences of mental health conditions, such as depression than younger adults. Nevertheless, there is only limited qualitative evidence to substantiate the experiences of older workers who have had depression. This study is concerned with exploring the experiences of older workers who had depression at age 50 or above and the meaning given to their experiences.
Elizabeth O’Donnell, MSc (Science), PGD (Pharm), BSc Nat. Sci. (Hons).

PhD researcher, Division of Health Research
Elizabeth O’Donnell, MSc (Science), PGD (Pharm), BSc Nat. Sci. (Hons).

PhD research title: Exploring how care home staff manage responsive behaviours, associated with dementia, in care homes in Ireland during the Covid-19 pandemic.

Keywords: Dementia; Care home; Nursing home; Responsive behaviours; Antipsychotic.

Supervised by Dr. Caroline Swarbrick (Senior Lecturer in Ageing, Division of Health Research, Lancaster University) and Professor Carol Holland (Director of the Centre for Ageing Research, Lancaster University).

Most care home residents with dementia exhibit responsive behaviours, which can be defined as behaviours that arise in response to specific situations or environments or due to an unmet physical, psychological, or emotional need. Responsive behaviours include, agitation, aggression and wandering. Antipsychotic drugs are frequently used as a pharmacological approach to manage responsive behaviours despite evidence of limited effectiveness and an increased risk of death. This mixed-methods study, underpinned by critical theory, aims to explore how responsive behaviours, associated with dementia are managed, using both pharmacological and non-pharmacological approaches, by care home staff in in the Republic of Ireland, before and during the Covid-19 pandemic. Also, to identify specific barriers and facilitators to implementing a non-pharmacological approach. A further objective is to examine the impact of social isolation on responsive behaviour in residents with dementia during the Covid-19 crisis.

After receiving ethics approval from the Faculty of Health and Medicine Research Ethics Committee (FHMREC), an online questionnaire has been distributed by email to care homes in the Republic of Ireland (n = 443), to be completed by care home managers, nurses and healthcare assistants. Survey distribution is also promoted via website and social media posts from Nursing Homes Ireland, The Alzheimer’s Society of Ireland and the All Ireland Gerontological Nurses Association. Questionnaire data is currently being collected and analysed. Findings from the questionnaire study will be explored in greater depth by interviewing an estimated sample of 12-20, care home staff, who have submitted a questionnaire. Interviews are expected to be conducted in June, July, and August 2020. Quantitative questionnaire data will be analysed using SPSS, while analysis of qualitative questionnaire and interview data will be informed by thematic analysis.

It is anticipated that the findings will be presented to the Health Service Executive (HSE) and the Health Information and Quality Authority (HIQA) in Ireland and may lead to policy or practice changes that support care homes and facilitate adoption of non-pharmacological approaches by care home staff in managing responsive behaviours in residents with dementia. Furthermore, the findings may instigate further research into development of non-pharmacological interventions to manage these behaviours.
Evanthia Koukouli, BSc, MSc

**NWSSDTP ESRC funded Doctoral Student, Division Social Statistics**

**Keywords:** ageing process, individual heterogeneity, healthy ageing phenotype, English Longitudinal Study of Ageing, longitudinal data analysis

Supervised by Dr Juhyun Park (Lecturer in Statistics, Department of Mathematics and Statistics, Lancaster University) and Dr Stefanie Doebler (Lecturer in Social Statistics and Sociology, Department of Sociology, Lancaster University).

My NWSSDTP funded project based at the Department of Mathematics and Statistics, considers advanced statistical methodologies to help us provide a more comprehensive picture on the factors that affect healthy ageing over time.

Using both survey and genetic data from the English Longitudinal study of Ageing, the project aims to provide quantitative evidence towards assessing the future needs to deal with the ageing population. In particular, our goal is to study:

- the relationships between ageing, health, social connectedness and well-being;
- the mechanisms that benefit healthy and active ageing over time;
- items constituting a healthy ageing phenotype and potential interactions over time, and;
- genetic factors that influence interactions between the healthy ageing dimensions and heterogeneity across the ageing population.

Until now there has been significant work on healthy ageing quantification by investigating previous literature. Next steps include examining the ageing dimensions over time by simultaneously addressing problems such as the high dimensionality and the high missing rates of the data.

The project has been approved by the METADAC Committee to obtain access to the English Longitudinal Study of Ageing genetic data [https://www.metadac.ac.uk/elsa-approvals/].
What is the MODEM project?

Simple everyday eye movements can provide a vast amount of information about how our brain is functioning. Abnormal eye movements can be an indicator of cognitive impairment and neurodegenerative disorders such as Alzheimer’s Disease. The Monitoring of Dementia Eye Movements (MODEM) team at Lancaster University is working with NHS trust across the UK to recruit people with a diagnosis of Dementia due to Alzheimer’s, people with mild cognitive impairment and also healthy older adults. The MODEM project proposes to tackle measurement of dementia severity and progression with eye tracking and novel strategies for cognitive health assessment embedded with everyday activities such as watching TV and tea-making. We aim to develop computerised methods for measuring dementia disease progression using eye movements. We will look to do this by developing formulas that identify different eye movements that can be used to measure disease severity and progression.
Total hip replacement [THR] is an effective intervention for people with osteoarthritis [OA]. Findings from a literature review show that THR allow people to return to physical activity [RTA] but participation decreases, return to pre-symptomatic [historic] activity levels not possible and people aged 60 and over less likely to RTA. The individual’s expectations, experiences and perceptions are central to this issue and, to date, no research has focused on the lived experience of physical activity for people aged 60 and over following THR for OA. Understanding their journey will generate knowledge needed to promote healthy ageing.

Adopting an interpretive phenomenological design, this study aims to explore in detail via semi-structured interview how historically physically active people aged 60 and over make the journey back to an active lifestyle [or, if the case, do not] following their THR for OA. To complement interview, a subjective activity level assessment will be conducted to capture participants experience of physical activity at three timepoints: ‘pre-symptomatic’ [historic], ‘before THR’ and ‘after THR’ [current].

By understanding participants journey, findings will ensure that person-centred data informs practice. The knowledge derived will be useful to health care providers working with THR patients to guide counselling and shared decision making. Findings will be particularly important to occupational therapists [OTs] working with adults undergoing THR as new evidence by the Royal College of Occupational Therapists [2017] practice guideline suggest that the return to physical and sporting activities be considered within an OT assessment and intervention.
Throughout of a series of studies my PhD focuses on the influence of Parkinson’s Disease (PD) on perceptual motor calibration across an array of tasks. Whilst PD is conventionally considered a paradigmatic movement disorder, PD is also associated with a broad-spectrum of non-motor symptoms (Poewe, 2008). For example, several studies have shown that touch perception deficits are common in PD (Cao et al., 2011), to the extent that somatosensory touch deficits have been implicated to be one of the earliest occurring symptoms in PD (Ketzef et al., 2017). These motor and non-motor deficits are thought to arise as a consequence of degeneration of dopaminergic cells (Javoy-Agid, 1992) and Lewy body presence in those remaining cells of the substantia nigra in the basal ganglia (Gibb & Lees, 1988). Importantly, the basal ganglia provides extensive links between areas implicated in visual, somatosensory and motor processing (Schwarz et al., 1984). Subsequently, it can be assumed that the basal ganglia plays a pivotal role in perceptual motor integration, that is the rapid integration of motor information with sensory input from multiple sources that furnishes individuals with reliable information regarding their action capabilities. As the basal ganglia and the subsequent basal ganglia functioning are fundamentally impaired in PD, presumably patients with PD will have impaired perceptual motor integration functioning. Therefore, through a series of studies we sought to illuminate our understanding of perceptual-motor calibration within patients with PD. Specifically, we will analyse the influence of PD on ones perceptions of the maximum extent over which they can perform grasping, reaching and aperture passing actions. Based on the notion highlighted above we anticipate that individuals with PD will not be as accurate in perceiving the maximum extent to which they can perform these actions compared to healthy older adults. In addition to this, we will analyse patients with PD’s ability to update their perceptions based on the provision of tools. We will also analyse the influence of PD on individuals perceptions of their body proportions and the occurrence of two major perceptual illusions, the size weight illusion and the pint glass illusion.