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Retirement: The eternal contradiction?

A systematic review of the physical and mental health impacts of retirement, and a longitudinal investigation of the psychological impact of retirement and the predictive role of individual differences.

Kara Ann Gibson

Doctorate in Clinical Psychology

The University of Edinburgh

March 2019

Word Count: 17,596
Name: Kara Ann Gibson

Title of Work: Retirement: The eternal contradiction? A systematic review of the physical and mental health impacts of retirement, and a longitudinal investigation of the psychological impact of retirement and the predictive role of individual differences.

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Signature    Kara Ann Gibson

Date     17/07/2019
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The most important thank you goes to all the participants who gave up their time to take part in this project by sharing their experiences. Without them, none of this would have been possible. I am very grateful.

I would like to thank my academic supervisor Dr. David Gillanders for all of his support and guidance throughout this process, for his quiet confidence in my ability to rise to the challenge, and for helping me to ‘hold lightly’ to my expectations. I am also grateful to my clinical research supervisor, Dr. Fionnuala Edgar, for all of her support and expertise in the area of older adults. Thanks also to Dr. Ana Sim, Dr. Mary Smeddle and all of the team in NHS Dumfries & Galloway for their enthusiasm and support – it is much appreciated.

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And finally, a special thank you to DJW for your endless patience, understanding and rock-steady belief that I can do it. Thank you for being my anchor throughout it all. I solemnly swear that my education is now complete.
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Thesis Portfolio Abstract

Background

It is important to understand how retirement impacts on health, in order to predict the experiences of and provide services for the rapidly aging population. The evidence base is contradictory and retirement has been found to have positive, negative and neutral effects on physical and mental health, prompting the need for an updated review. As the effects of retirement are unclear at a population level, it is also important to consider what role individual and employment-related factors may play in adjustment to retirement. In a move away from traditional retirement theories, the framework of functional contextualism is applied to understand the individual differences in retirement experience.

Method

The systematic review of studies published from 2013 – 2018 assesses, evaluates and interprets the most recent evidence regarding the physical and mental health impact of retirement. The subsequent longitudinal study focuses on the psychological impact of retirement. A group of older workers approaching retirement completed measures of individual factors (psychological flexibility, job satisfaction and job control) and psychological wellbeing (mental health, wellbeing and quality of life) before and after retiring.
Results

The systematic review identified 13 high or acceptable quality studies which met inclusion criteria. There was significant heterogeneity across studies. The findings were contradictory: studies reporting on physical health found positive, negative and neutral effects of retirement, and studies reporting on physical health found an equally mixed picture. Country-level trends were noted, with improvements in studies from Scandinavia and deteriorations in studies from the USA and Japan. In the empirical study, 51 participants completed the baseline measures and 27 also completed the follow-up measures. Key findings were as follows: 1) Psychological flexibility was significantly associated with better psychological wellbeing scores at baseline. 2) Across participants, wellbeing significantly increased from baseline to retirement, and smaller increases were seen in mental health and some quality of life domains. 3) Psychological flexibility was a significant predictor of mental health scores post-retirement T2, although these findings should be considered with caution due to the small sample size.

Conclusion

There continues to be a lack of clarity around the impact of retirement on health and individual differences may play an important role in understanding the variance found across studies. Heterogeneity across studies presents many challenges to synthesising the evidence base, and there is a clear need for further studies using validated, comprehensive measures to follow a diverse range of participants through the retirement
transition. The empirical study is an encouraging example of how the role of individual differences in the retirement transition can be explored, and the findings indicate that psychological flexibility is a protective factor both for those in work and those who retire. Theoretical and practical implications of the findings are discussed, along with the potential benefits of trialling interventions to increase psychological flexibility with workers preparing for retirement and the older population in general.
Lay person summary

Retirement is defined as ‘exit from the labour force, taken by individuals after middle age, and taken with the intention of reduced psychological commitment to work thereafter’ (Feldman, 1994). As the population lives longer and more people retire, it is important to understand how retirement affects people’s physical and mental health. Although lots of research has investigated this, there is no agreement on the answer because different studies have shown retirement to have positive effects, negative effects, or no effect at all. In the first part of this thesis, the most recent scientific evidence in reviewed and evaluated. The findings showed that some people experienced improvements in their physical and mental health, some people got worse, and some remained the same. One important finding was that people in Scandinavia and Europe seemed to have improved mental and physical health after retirement, while people in the US and Japan reported feeling worse. It is important that more studies examine why different people experience retirement differently to help us understand this better.

Psychological flexibility is a person’s ability to adapt to changes, balance different demands and cope when things go wrong. Studies have found that people with more psychological flexibility cope better with having an illness and can perform better at work. The second part of this thesis is a research project where a group of people who were planning to retire completed questionnaires about their psychological flexibility, job satisfaction and job control while they were still working. They also completed
questionnaires about their psychological wellbeing (how they were feeling). They then repeated these questionnaires when they retired, and the results were compared.

The findings showed that people with higher psychological flexibility had better wellbeing while still working. For most people, their wellbeing improved when they retired. There was some evidence that people with higher psychological flexibility had fewer mental health symptoms, but more studies are needed to understand this better.
Chapter 1: Systematic Review

How does retirement affect health? A systematic review of the physical and mental impact of retirement.

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This article is written according to the guidelines for Aging & Mental Health (Appendix A)

Word Count: 4863
Abstract

Objectives. The evidence base to date regarding the impact of retirement on health has produced contradictory results, indicating retirement can have positive, negative and neutral effects on physical and mental health. The purpose of this systematic review was to provide an updated review of recent research in this field.

Method. A comprehensive literature search identified 13 studies published between 2013 – 2018 which met inclusion criteria. Due to high levels of heterogeneity across studies it was not possible to carry out a meta-analysis, and so narrative synthesis is presented.

Results: In line with previous reviews, findings were contradictory. Eight of the 13 studies reported on physical health measures: Three found a positive effect of retirement; three reported a negative effect, and two reported no significant effect. Ten studies reported on mental health measures: Two found retirement had a positive effect, while three found a negative effect. The remaining five studies found a combination of positive, negative and neutral effects. Country-level trends were noted, with improvements in studies from Scandinavia and deteriorations in studies from the USA and Japan.
**Conclusion:** This systematic review reaffirms the lack of clear conclusion regarding the impact of retirement on health, with significant variation in outcomes across studies. It is therefore difficult to predict how people will experience retirement, and to recommend ways to better prepare people for the transition. Directions for future research are discussed including the importance of a balance of large- and small-scale studies, consideration of international context, and the potential contribution of individual differences to the variation in experience.

**Keywords**

Retirement, aging, physical health, mental health, longitudinal
Introduction

Retirement is a significant life event defined as ‘the exit from the labour force, taken by individuals after middle age, and taken with the intention of reduced psychological commitment to work thereafter’ (Feldman, 1994). For many, retirement represents the transition into later life (Barron, Streib, & Suchman, 1952; Ekerdt, 2010) and it has implications for health and wellbeing (Atchley, 1989). For employers, health services and policymakers to predict and plan services for those who make the transition from working life to retirement, it is essential to understand the unique health needs of this group. This is especially important as the number of retired people is growing.

The global population is estimated to have grown by 3.1 billion (over 65%) between 1980 and 2017. This rate of growth is now slowing and is projected to reduce to 35% between 2017 – 2050, and life expectancy around the world is increasing (Organisation for Economic Cooperation and Development, 2019; see Table 1.1). As a result, it is estimated that those aged 65 and over (who currently account for 9.3% of the global population) will make up 11.7% of the worldwide population in 2030, and 15.8% in 2050 (International Labour Office, 2018). In the UK, this proportion is higher. People aged 65 and over made up 18.2% of the UK population in 2017, and this is projected to increase to 20.7% by 2027 (Office for National Statistics, 2018c).

In the UK the age of statutory retirement – the age at which an individual can leave the labour force and claim their State Pension – is 65 for
all (until 2016 different thresholds were defined for men and women).

However as the population lives longer and the age dependency ratio increases, the cost of supporting the retired population increases and pensions have to last longer. In response the UK government plans to increase the State Pension age for all to 67 by 2028 (Age UK, 2018), and a similar pattern is underway around across the western world (Finnish Centre for Pensions, 2018; Social Security Administration, 2019). As more people retire and live longer in retirement than ever before, it is essential for policy makers and health services to respond to the major economic and social challenges of this demographic shift.

Table 1.1 Examples of life expectancy born in 1980 and in 2014 - 2016

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>UK</td>
<td>71.0</td>
<td>77.0</td>
</tr>
<tr>
<td>Germany</td>
<td>69.6</td>
<td>76.2</td>
</tr>
<tr>
<td>Poland</td>
<td>66.0</td>
<td>74.4</td>
</tr>
<tr>
<td>India</td>
<td>53.78</td>
<td>53.94</td>
</tr>
<tr>
<td>USA</td>
<td>70.0</td>
<td>77.4</td>
</tr>
<tr>
<td>Japan</td>
<td>73.4</td>
<td>80.9</td>
</tr>
</tbody>
</table>

The evidence regarding the impact of retirement on physical health is contradictory. Many studies have found that retirement has a positive impact on physical wellbeing resulting in better self-reported health (Hessel, 2016) and increases in physical activity (Sprod et al., 2017; Zantinge, van den
However contradictory evidence suggests that retirement has a negative impact on physical health. Zantinge et al.’s review (2014) also indicated that, although most retirees reported increased levels of leisure-time activity, their overall physical activity levels decreased. Retirement has also been associated with decreases in self-reported health (Lee & Kim, 2017), increases in mobility issues (Dave, Rashad, & Spasojevic, 2006), increased risk of cardiovascular disease (Moon, Glymour, Subramanian, Avendaño, & Kawachi, 2012) and increases in smoking and problem alcohol consumption (Zantinge et al., 2014).

The evidence around mental health presents a similarly mixed picture. Some studies have found that retirement increases stress, particularly for those who retire involuntarily (Bosse, Aldwin, Levenson, & Workman-Daniels, 1991; Holcomb, 2010; Park & Kang, 2016). Kail & Carr (2016) reported that retirement is associated with increased levels of depression. Lee & Smith (Lee & Smith, 2009) reported that while retirees were more likely to be depressed than age-matched workers there was no evidence that levels of depression increased over the retirement transition.

Further contradictory results have demonstrated positive impacts of retirement on mental health. A large-scale study of civil servants presented strong evidence that retirement has a positive impact on mental health, particularly for those from higher socio-economic groups (Mein, Martikainen, Hemingway, Stansfeld, & Marmot, 2003). Other studies have found that retirement leads to greater life satisfaction (Gorry, Gorry, & Slavov, 2018).
decreased anxiety and increased positive affect (Drentea, 2002). Finally, some studies have reported that retirees tend to maintain their wellbeing across the retirement transition (Atchley, 1999) and report no significant changes in physical or mental health post-retirement (Latif, 2013). There is therefore no clear consensus from the evidence on how retirement affects mental and physical health at a population level, and as such no clear predictions can be made around how individuals will experience retirement.

Some studies have attempted to explore the potential mechanisms behind these contradictory findings, finding that voluntariness of retirement (Bender, 2012), gender and relationship roles (Kim & Moen, 2002), socioeconomic status (Barnett, Guell, & Ogilvie, 2012) and job satisfaction and status (Mo Wang, 2007) are related to retirees’ wellbeing outcomes in longitudinal and cohort studies. Individual differences in personality and affect have also been shown to influence retirement outcomes (Ekerdt, 2010; Georg Henning, Lindwall, & Johansson, 2016; Osborne, 2012; van Solinge, 2007).

These factors may explain some of the variance in findings across the literature, however high levels of heterogeneity across studies has made it difficult to draw robust conclusions. The potential scope of ‘health and wellbeing’ is vast, and many studies have pragmatically chosen one focus area (e.g. physical activity or depression symptoms), rather than attempt to capture the whole experience. Studies have also used a wide range of approaches to measure health and wellbeing outcomes, of varying reliability.
and replicability. In addition, the challenges of carrying out longitudinal studies with a representative sample are significant and often studies use data from existing cohort studies e.g. the Health and Retirement Study (Stoiko, 2014) which reduces the specificity of question which can be asked. Both Wang and Bender’s studies report findings from the Health and Retirement study which used single-question ratings to measure health and wellbeing outcomes rather than validated, objective measures. Kim & Moen’s study used validated measures of wellbeing and depression symptoms and considered the impact of individual factors including gender and marital satisfaction on wellbeing, however their sample was limited to married, predominantly white individuals from high-earning positions in New York, limiting the generalisability of the findings. Studies to date have therefore measured a range of health and wellbeing outcomes using a diverse selection of measures and have considered the role of multiple individual factors as potential contributors to those outcomes.

In 2013 van der Heide et al. published a systematic review in an attempt to synthesise the existing evidence base. Their review included 22 studies which investigated various aspects of the impact of retirement on health. They found strong evidence for retirement having a beneficial effect on mental health, while the evidence of the impact of retirement on physical health was contradictory. Their review provided a valuable synthesis of the evidence base in 2013, but only eleven of the 22 studies were published after the year 2000, with the oldest study published in 1966. While this broad
timespan provided a comprehensive overview of the literature and ensured inclusion of a high number of relevant studies, it is possible that their conclusions are no longer representative of the current knowledge in the field, particularly as a large number of studies have been published in the interim. As the debate around the health implications of retirement continues and the evidence base continues to develop, it was therefore deemed timely to carry out an updated systematic review of recent studies which examine the relationship between retirement and physical or mental health outcomes.
Method

**Inclusion criteria and search strategy**

Inclusion criteria were defined as follows:

1. Study used a prospective or retrospective longitudinal design.
2. Study primarily involved a non-patient and non-chronic disease population who did not retire as a result of health problems and did not receive a disability pension.
3. Study measured physical and/or mental health outcomes and reported the tools used to measure these outcomes.
4. Study measured outcomes before and after retirement and did not simply compare retirees to the working population or use retirees as a comparison or control group.
5. Study was published between 2013 and 2018, to ensure no replication of studies included in van der Heide et al.'s review.
6. Study was published in English (non-English language studies were excluded due to lack of resources to translate).

A literature search using the terms described in Table 1.2 was carried out on Embase, MEDLINE®, PsycINFO, ProQuest Dissertations and Google Scholar on June 3rd 2018, and repeated on June 17th 2018.

**Data extraction and quality assessment**

One reviewer (KG) extracted the relevant data from the selected
publications. The following study characteristics were extracted: Target population (setting, age, sex); sample size; follow-up durations; assessment of retirement; health outcome measured; measures used, and key findings. A set of criteria was developed to assess study quality (Table 1.3) based on those used by van der Heide et al. (Hayden, Côté, & Bombardier, 2006; Hoogendoorn, van Poppel, Bongers, Koes, & Bouter, 2000; Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008).

Table 1.2 Search terms used for database searches

<table>
<thead>
<tr>
<th>Search category</th>
<th>Search terms used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure</td>
<td>“Retirement” OR “pensions”</td>
</tr>
<tr>
<td></td>
<td>“Health status” OR “physical health” OR “mental health” OR “well-being” OR “quality of life” OR “mental disorders” OR “chronic diseases” OR “hospitalisation” OR “depression” OR “anxiety” OR “anxiety disorders”</td>
</tr>
<tr>
<td>Outcome</td>
<td>“Longitudinal studies” OR “cohort studies” OR “prospective studies” OR “retrospective studies” OR “follow-up studies” OR “longitudinal design”</td>
</tr>
</tbody>
</table>

Minor adaptations were made to ensure that studies declared their purpose and clearly defined both their target health outcome and method of measurement (Critical Appraisal Skills Programme, 2019). One point was awarded for each criteria clearly met by the paper, while no points were awarded where the criteria was not met, or where it was unclear from the
information provided whether or not the criteria was met. Where possible, when studies were rated ‘Unclear’ on criteria, the authors were contacted for clarification and this was resolved. Based on the overall score, studies were designated to be either of high quality (11 – 14 criteria met), acceptable quality (6 - 10 criteria met) or low quality (0 – 5 criteria met).

**Data analysis**

Due to the variety of study designs, target outcomes and measures used, the resulting heterogeneity of studies meant it was not possible to carry out a meta-analysis. Instead, descriptive and narrative synthesis of the findings is presented.

**Table 1.3 Criteria for quality assessment**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Description of criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study population and baseline</td>
<td>1</td>
<td>Purpose of study is clearly stated</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Adequate description of period and place of recruitment, recruitment method and follow-up timeframe, or clear reference to an alternative source containing this information e.g. via in-text citation</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Adequate description of key characteristics of baseline study sample (including age and gender)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Participation rate at baseline was at least 80% (i.e. overall participation of the number recruited)</td>
</tr>
<tr>
<td>Data collection</td>
<td>5</td>
<td>Adequate measurement of retirement status at baseline and at follow-ups</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Clear definition of physical/mental health outcome measured</td>
</tr>
<tr>
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</tr>
<tr>
<td>7</td>
<td>Health outcomes measured using a valid and standardised measure with details of measure provided</td>
<td></td>
</tr>
<tr>
<td><strong>Study attrition</strong></td>
<td>8</td>
<td>Provision of the exact n at each follow up measurement</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Response at short-term follow-up (up to 6 months) was at least 80% of participating n at baseline, and at long-term follow-up at least 70% of participating baseline (over 6 months)</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Information is provided on selective nonresponse during follow-up measurement</td>
</tr>
<tr>
<td><strong>Data analysis</strong></td>
<td>11</td>
<td>Statistical model used is appropriate and point estimates with measures of variability (CI or SE) are reported</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Confounding factors are stated and appropriate strategies used to address these, or relevant covariates are accounted for in the statistical model</td>
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<tr>
<td></td>
<td>13</td>
<td>No evidence of selective reporting of results</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Information is provided on how missing data was handled</td>
</tr>
</tbody>
</table>
Results

**Summary of literature search**

The initial literature search resulted in 1564 hits. After duplicates were removed, 833 studies remained. Based on review of title and abstract, 86 studies were selected for full-text review. Of these, 12 were selected for inclusion in the final study. Hand searching the references of these papers produced one further study, so that 13 studies were included in the final review (Figure 1.1). Summaries of the study and population characteristics can be found in Tables 1.4 and 1.5.

![PRISMA flow-chart of study selection process](image-url)

Figure 1.1 PRISMA flow-chart of study selection process
**Overview of studies**

All of the thirteen studies were published in peer-reviewed journals and included longitudinal data on populations from the following countries: France (1); Australia (1); USA (2); Sweden (1); Finland (3); Japan (2); China (2) and Europe-wide (1). All studies reported pre-retirement measurements, and at least one post-retirement measurement for all participants. The majority of studies ($n = 11$) utilised data from established longitudinal studies and had large sample sizes (mean $n = 13389$). The studies by Yeung & Xhiaou (2013) and Yeung (2017) recruited their own populations and therefore presented smaller sample sizes ($n = 118; n = 90$). The areas of focus were as follows: physical health outcomes only [7, 10, 11]; mental health outcomes only [1, 4, 5, 9, 13], and a combination of physical and mental health outcomes [2, 3, 6, 8, 12].
Table 1.4 Study characteristics

<table>
<thead>
<tr>
<th>No.</th>
<th>Primary author, year of publication</th>
<th>Location</th>
<th>Cohort</th>
<th>Focus areas</th>
<th>Specific outcomes</th>
<th>Measures used</th>
<th>Data collection period</th>
<th>Follow-up length</th>
<th>Funding source</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Airagnes, 2017</td>
<td>France</td>
<td>GAZ and ELelectricité Cohort (GAZEL)</td>
<td>Mental health</td>
<td>Depression</td>
<td>Center of Epidemiologic Studies Depression Scale (CES-D)</td>
<td>2004 - 2012</td>
<td>2 - 4 years</td>
<td>None reported</td>
</tr>
<tr>
<td>2</td>
<td>Byles, 2016</td>
<td>Australia</td>
<td>45 And Up</td>
<td>Mental/physical health</td>
<td>1. Psychological distress 2. Physical functioning</td>
<td>1. Kessler Psychological Distress Scale (K10) 2. Short Form 36 Health Survey (SF36) – Physical component</td>
<td>2006 - 2010</td>
<td>2 - 4 years</td>
<td>None reported</td>
</tr>
<tr>
<td></td>
<td>Author</td>
<td>Country</td>
<td>Study Title</td>
<td>Mental/Physical Health</td>
<td>Measurement</td>
<td>Duration</td>
<td>Funding Sources</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>-----------------------------------------------------------------------------</td>
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<td>----------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Depression  
3. Quality of life  
4. Life satisfaction  
1. Perceived Stress Scale  
2. CES-D  
| 6 | Manty, 2017           | Finland | Helsinki Health Study                                                       | Mental/physical health | 1. Physical health  
2. Mental health  
1. SF36 - Physical component  
2. SF36 - Mental component | 2000 - 2012 | Various incl. Finnish Work Environment Fund, Academy of Finland |
| 7 | Myllyntausta, 2018    | Finland | Finnish Public Sector Study (FPSS)                                          | Physical health        | Sleep difficulties  
Jenkins Sleep Problem Scale | 2000 - 2013 | Various incl. Academy of Finland, Finnish Ministry of Education |
| 8 | Oshio, 2017           | Japan   | The Longitudinal Survey of Middle-Aged and Older Adults                     | Mental/physical health | 1. Self-rated health  
2. Psychological distress  
1. Self-rated Likert scale  
2. Kessler Psychological Distress Scale (K6) | 2005 - 2014 | Japan Society for the Promotion of Science |
| 9 | Shiba, 2017           | Japan   | Japan Gerontologic al Evaluation Study                                      | Mental health          | Depression  
Geriatric Depression Scale | 2010 - 2013 | Various incl. Health Labour Sciences Research Grant |
<table>
<thead>
<tr>
<th></th>
<th>Author(s)</th>
<th>Location</th>
<th>Study</th>
<th>Health Category</th>
<th>Physical Activity</th>
<th>Physical Health</th>
<th>Functional Mobility</th>
<th>Other Measures</th>
<th>Duration</th>
<th>Funding</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>10</td>
<td>Stenholm, 2016</td>
<td>Finland</td>
<td>Finnish Public Sector Study</td>
<td>Physical health</td>
<td>Physical activity</td>
<td>Average weekly hours of exercise</td>
<td>2000 - 2009</td>
<td>3 – 9 years</td>
<td>Various incl. Academy of Finland, Medical Research Council</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>van Zon, 2016</td>
<td>USA</td>
<td>HRS</td>
<td>Physical health</td>
<td>Functional mobility</td>
<td>Mobility index</td>
<td>1992 - 2012</td>
<td>8 - 16 years</td>
<td>Authors' institutes</td>
<td></td>
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<tr>
<td>12</td>
<td>Yeung, 2017</td>
<td>Hong Kong</td>
<td>N/A</td>
<td>Mental/physical health</td>
<td>Mental/physical health</td>
<td>1. Physical wellbeing</td>
<td>Not reported</td>
<td>1.5 years</td>
<td>Research Grants Council of the Hong Kong SAR</td>
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</tr>
<tr>
<td>13</td>
<td>Yeung, 2013</td>
<td>Hong Kong</td>
<td>N/A</td>
<td>Mental health</td>
<td>Mental health</td>
<td>1. Psychological wellbeing</td>
<td>Not reported</td>
<td>1 year</td>
<td>None reported</td>
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Table 1.5 Participant characteristics

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<th>No.</th>
<th>Primary author, year of publication</th>
<th>Population focus</th>
<th>n</th>
<th>% female</th>
<th>Age at baseline</th>
<th>Categories of retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Airagnes, 2017</td>
<td>Employees of national gas/electricity company</td>
<td>9242</td>
<td>23%</td>
<td>55 - 59</td>
<td>N/R*</td>
</tr>
<tr>
<td>2</td>
<td>Byles, 2016</td>
<td>General population</td>
<td>216 (21608)</td>
<td>51%</td>
<td>55 - 69</td>
<td>N/R</td>
</tr>
<tr>
<td>3</td>
<td>Calvo, 2013</td>
<td>General population</td>
<td>6624</td>
<td>46%</td>
<td>Mean age 55</td>
<td>N/R</td>
</tr>
<tr>
<td>4</td>
<td>Heller-Sahlgren, 2017</td>
<td>General population</td>
<td>8566</td>
<td>N/R</td>
<td>60 - 65</td>
<td>N/R</td>
</tr>
<tr>
<td>5</td>
<td>Lindwall, 2017</td>
<td>General population</td>
<td>4651</td>
<td>54%</td>
<td>60 - 66</td>
<td>1. Not retired</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>2. Retired and working, consider myself a worker</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Retired and working, consider myself a retiree</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Retired &quot;full time&quot;, not working</td>
</tr>
<tr>
<td>6</td>
<td>Manty, 2017</td>
<td>Employees of City of Helsinki</td>
<td>2330</td>
<td>78%</td>
<td>57 - 69</td>
<td>1. Voluntary retirement</td>
</tr>
<tr>
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<td></td>
<td>2. Involuntary retirement</td>
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<td></td>
<td>3. Disability retirement</td>
</tr>
<tr>
<td>7</td>
<td>Myllyntausa, 2018</td>
<td>Public sector employees</td>
<td>5807</td>
<td>80%</td>
<td>60 - 64</td>
<td>N/R</td>
</tr>
<tr>
<td>8</td>
<td>Oshio,</td>
<td>General population</td>
<td>9283</td>
<td>52%</td>
<td>50 - 59</td>
<td>N/R</td>
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<tr>
<td></td>
<td>Authors</td>
<td>Type of population</td>
<td>Number</td>
<td>Percentage</td>
<td>Age Group</td>
<td>Retirement Type</td>
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<td>-----------</td>
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</tr>
<tr>
<td>9</td>
<td>Shiba, 2017</td>
<td>General population</td>
<td>62438</td>
<td>54%</td>
<td>&gt; 65</td>
<td>N/R</td>
</tr>
<tr>
<td>11</td>
<td>van Zon, 2016</td>
<td>General population</td>
<td>7242</td>
<td>48%</td>
<td>50 - 70</td>
<td>N/R</td>
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<td>12</td>
<td>Yeung, 2017</td>
<td>Employees of organisations in city of Hong Kong</td>
<td>118</td>
<td>39%</td>
<td>50 - 63</td>
<td>Statutory retirement only</td>
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<tr>
<td>13</td>
<td>Yeung, 2013</td>
<td>Employees of organisations in city of Hong Kong</td>
<td>90</td>
<td>27%</td>
<td>50 - 63</td>
<td>Statutory retirement only</td>
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</tbody>
</table>

* N/R denotes not reported
Table 1.6 Study results

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<tr>
<th>No.</th>
<th>Primary author, year of publication</th>
<th>Analysis model</th>
<th>Focus area/s</th>
<th>Specific outcomes</th>
<th>Gender split</th>
<th>Summary of findings</th>
<th>Direction of findings</th>
<th>Pre-scores</th>
<th>Post-scores</th>
<th>Change score</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Airagnes, 2017</td>
<td>General linear models</td>
<td>Mental health</td>
<td>Depression</td>
<td>Men</td>
<td>↓ Depression symptoms</td>
<td>Positive</td>
<td>12.1 [SD 8.0]</td>
<td>10.0 [SD 7.1]</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Women</td>
<td>↓ Depression symptoms</td>
<td>Positive</td>
<td>16.4 [SD 10.5]</td>
<td>13.6 [SD 9.2]</td>
<td>N/R</td>
<td>N/R</td>
</tr>
<tr>
<td>2</td>
<td>Byles, 2016</td>
<td>Generalised estimating equations (GEE)</td>
<td>Mental/physical health</td>
<td>Distress</td>
<td>Men</td>
<td>↑ Distress</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>1.02 [CI 1.00, 1.04]</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Women</td>
<td>No association</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>1.00 [CI 0.99, 1.02]</td>
<td>N/R</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Physical functioning</td>
<td>↑ Dysfunction</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>1.25 [CI 1.17, 1.34]</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Women</td>
<td>↑ Dysfunction</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>1.17 [CI 1.09, 1.25]</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>3</td>
<td>Calvo, 2013</td>
<td>Instrumental variables</td>
<td>Mental/physical health</td>
<td>Self-rated physical health</td>
<td>All</td>
<td>↓ Self-rated physical health</td>
<td>Negative</td>
<td>3.69 [SD 1.04]</td>
<td>3.19 [SD 1.09]</td>
<td>N/R</td>
<td>N/R</td>
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<tr>
<td>ID</td>
<td>Authors</td>
<td>Methodology</td>
<td>Domain</td>
<td>Variable</td>
<td>Reference</td>
<td>Design</td>
<td>Outcome</td>
<td>Effect Size</td>
<td></td>
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<td>3</td>
<td>Heller-Sahlgren, 2017</td>
<td>Individual-fixed effects IV design</td>
<td>Mental health</td>
<td>Depression All</td>
<td>↑ Depression symptoms</td>
<td>Negative</td>
<td>7.41 [SD 1.11]</td>
<td>6.86 [SD 1.90]</td>
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<td>N/R</td>
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<td>4</td>
<td>Heller-Sahlgren, 2017</td>
<td>Individual-fixed effects IV design</td>
<td>Mental health</td>
<td>Mental health All</td>
<td>↓ Mental health</td>
<td>Negative</td>
<td>1.91 [CI N/R]</td>
<td>2.25 [SD 2.05]</td>
<td>0.34 [SD 2.05]</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depression All</td>
<td>↑ Likelihood of meeting clinical threshold</td>
<td>Negative</td>
<td>0.19 [CI N/R]</td>
<td>0.25 [CI N/R]</td>
<td>0.06 [SD 0.46]</td>
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<tr>
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<td>Lindwall, 2017</td>
<td>Bivariate correlation analysis ANOVAs</td>
<td>Mental health</td>
<td>Perceived stress All</td>
<td>No association</td>
<td>Neutral</td>
<td>21.6 [SD 5.6]</td>
<td>21.1 [SD 5.8]</td>
<td>N/R</td>
<td>N/R</td>
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<tr>
<td></td>
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<td></td>
<td>Depression All</td>
<td>↓ Depression symptoms</td>
<td>Positive</td>
<td>4.0 [SD 3.7]</td>
<td>3.4 [SD 3.8]</td>
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<td>N/R</td>
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<td>Quality of life All</td>
<td>↑ Quality of life</td>
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<td>39.9 [SD 8.1]</td>
<td>N/R</td>
<td>N/R</td>
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<td></td>
<td></td>
<td>Autonomy All</td>
<td>↑ Autonomy</td>
<td>Positive</td>
<td>11.6 [SD 2.2]</td>
<td>12.3 [SD 2.1]</td>
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<td>N/R</td>
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<td>Manty, 2017</td>
<td>Linear regression Generalised estimated equations</td>
<td>Mental/physical health</td>
<td>Physical functioning All</td>
<td>No association</td>
<td>Neutral</td>
<td>45.6 [CI 48.2, 49.9]</td>
<td>46.3 [CI 45.5, 47.0]</td>
<td>0.7 [CI 0.2, 1.1]</td>
<td>N/R</td>
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<td>Mental health All</td>
<td>↑ Mental health</td>
<td>Positive</td>
<td>51.5 [CI 50.5, 52.5]</td>
<td>53.4 [CI 52.5, 54.4]</td>
<td>1.9 [CI 1.5, 2.4]</td>
<td>N/R</td>
<td></td>
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<tr>
<td>Page</td>
<td>Author, Year</td>
<td>Methodology</td>
<td>Variables</td>
<td>Outcome</td>
<td>Effect Size</td>
<td>CI</td>
<td>Statistical Significance</td>
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<tr>
<td>7</td>
<td>Myllyntaus, 2018</td>
<td>Log-binomial regression and GEE</td>
<td>Physical health</td>
<td>Sleep difficulties</td>
<td>All</td>
<td>↓ Sleep difficulties</td>
<td>Positive</td>
<td>RR</td>
<td>1.12</td>
<td>[CI 1.03 - 1.22]</td>
<td>N/R</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Men (% prev)</td>
<td>Sleep difficulties</td>
<td>Positive</td>
<td>N/R</td>
<td>N/R</td>
<td>RR</td>
<td>0.91</td>
<td>[CI 0.81, 1.01]</td>
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<td></td>
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<td>Women (% prev)</td>
<td>Sleep difficulties</td>
<td>Positive</td>
<td>N/R</td>
<td>N/R</td>
<td>RR</td>
<td>0.88</td>
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<td>Oshio, 2017</td>
<td>Regression models to explain each variable separately</td>
<td>Mental/physical health</td>
<td>Self-rated health</td>
<td>Men</td>
<td>↓ Self-rated health</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>0.059</td>
<td>[CI N/R]</td>
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<td>Negative</td>
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<td>N/R</td>
<td>0.032</td>
<td>[CI N/R]</td>
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<td>Distress</td>
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<td>N/R</td>
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<td>Women</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>0.009</td>
<td>[CI N/R]</td>
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<td>Shiba, 2017</td>
<td>Chained equation method</td>
<td>Mental health</td>
<td>Depression</td>
<td>Men</td>
<td>↑ Depression symptoms</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>0.33</td>
<td>[CI 0.21, 0.45]</td>
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<td>Women</td>
<td>↑ Depression symptoms</td>
<td>Negative</td>
<td>N/R</td>
<td>N/R</td>
<td>0.28</td>
<td>[CI 0.12, 0.44]</td>
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<td>Physical health</td>
<td>Physical activity</td>
<td>All</td>
<td>↑ Physical activity</td>
<td>Positive</td>
<td>N/R</td>
<td>N/R</td>
<td>1.81</td>
<td>[CI 1.20, 2.42]</td>
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<td>Study</td>
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<td>Domain</td>
<td>Outcome</td>
<td>Association</td>
<td>Effect Size</td>
<td>p Value</td>
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<td>N/R</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>van Zon, 2016</td>
<td>GEE Physical health</td>
<td>Mobility limitations</td>
<td>All</td>
<td>↑ Mobility limitations</td>
<td>Negative</td>
<td>0.95 [SD 1.19]</td>
<td>1.28 [SD 1.28]</td>
<td>N/R</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeung, 2017</td>
<td>Latent growth modelling Mental/ physical health</td>
<td>Physical functioning</td>
<td>All</td>
<td>No association [+ trend]a</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>-0.02 [SE 0.02]</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Life satisfaction</td>
<td>All</td>
<td>No association [+ trend]a</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>-0.02 [SE 0.06]</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psych. wellbeing</td>
<td>All</td>
<td>No association [+ trend]a</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>-0.01 [SE 0.02]</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psych. distress</td>
<td>All</td>
<td>No association [-trend]a</td>
<td>Neutral</td>
<td>N/R</td>
<td>N/R</td>
<td>0.04 [SE 0.05]</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yeung, 2013</td>
<td>Regression Mental health</td>
<td>Psych. wellbeing</td>
<td>All</td>
<td>No association</td>
<td>Neutral</td>
<td>3.60 [SD 0.44]</td>
<td>3.60 [SD 0.44]</td>
<td>-0.02</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Psych. distress</td>
<td>All</td>
<td>No association</td>
<td>Neutral</td>
<td>1.75 [SD 0.36]</td>
<td>1.75 [SD 0.36]</td>
<td>0.05</td>
<td>N/R</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* N/R denotes Not Reported

a Result approached but did not reach significance  b Result stated to be significant, but p value not reported
**Methodological quality assessment**

To ensure consistency of assessment, the author (KG) and another independent reviewer (IM) initially rated 50% of the papers \(n = 7\) individually using the criteria in Table 1.3. On the first rating, the raters achieved 80% inter-rater agreement overall (kappa = 0.61, \(p = .005\)) which was deemed to be acceptable. Conflicts \(n = 5\) at criteria level) were resolved through discussion to reach 100% inter-rater agreement. The remaining papers were rated by KG only.

A summary of the results of the quality assessment can be seen in Table 1.7. All studies clearly stated their purpose, provided adequate description of recruitment, clearly defined the health outcomes assessed and applied an appropriate statistical model \(n = 13\). The vast majority of studies adequately described their baseline sample and measured retirement at baseline and follow-ups \(n = 12\). However only five studies provided information on selective nonresponse during follow-up assessment, and only six provided information about handling of missing data. Nine of the thirteen studies met 11 or more of the quality criteria and were therefore judged to be of high quality (Table 1.8, or Appendix B for a study-by-study breakdown).

**Findings**

A summary of the main results of the studies can be found in Table 1.6.
Physical health

Eight studies [2, 3, 6 – 8, 10 – 12] reported on a range of physical health measures. Three studies [2, 6, 12] used the physical component of the standardised SF-36 form. One study used a standardised measure, The Jenkins Sleep Problem scale, to report sleep difficulties [7] and another used two measures of functional mobility [11]. Finally, three studies used

Table 1.7 Summary of quality assessment by criteria

<table>
<thead>
<tr>
<th>Criteria no.</th>
<th>Criteria description</th>
<th>Studies rated Yes (n)</th>
<th>Studies rated No/Unclear (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Purpose of study is clearly stated</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Adequate description of period and place of recruitment, recruitment method and follow-up timeframe, or clear reference to an alternative source containing this information e.g. via in-text citation</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Adequate description of key characteristics of baseline study sample (including age and gender)</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Participation rate at baseline was at least 80% (i.e. overall participation of the number recruited)</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Adequate measurement of retirement status at baseline and at follow-ups</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Clear definition of physical/mental health outcome measured</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Health outcomes measured using a valid and standardised measure with details of measure provided</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Provision of the exact n at each follow up measurement</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Response at short-term follow-up (up to 6 months) was at least 80% of participating n at baseline, and at long-term follow-up at least 70% of participating baseline (over 6 months)</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>
Information is provided on selective nonresponse during follow-up measurement.

Statistical model used is appropriate and point estimates with measures of variability (CI or SE) are reported.

Confounding factors are stated, and appropriate strategies used to address these, or relevant covariates are accounted for in the statistical model.

No evidence of selective reporting of results.

Information is provided on how missing data was handled.

**Table 1.8 Summary of quality assessment by study**

<table>
<thead>
<tr>
<th>Quality rating</th>
<th>No.</th>
<th>Study reference</th>
<th>Criteria rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>High quality studies</td>
<td>3</td>
<td>Calvo, Sarkisian, &amp; Tamborini, 2013</td>
<td>Yes 12, No 2, Unclear 0</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Heller-Sahlgren, 2017</td>
<td>Yes 11, No 1, Unclear 2</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Lindwall et al., 2017</td>
<td>Yes 12, No 0, Unclear 2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Manty et al., 2017</td>
<td>Yes 12, No 0, Unclear 2</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Myllyntausta et al., 2018</td>
<td>Yes 12, No 2, Unclear 0</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Shiba, Kondo, Kondo, &amp; Kawachi, 2017</td>
<td>Yes 11, No 2, Unclear 1</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>van Zon, Bultmann, Reijneveld, &amp; de Leon, 2016</td>
<td>Yes 11, No 2, Unclear 1</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Yeung &amp; Zhou, 2017</td>
<td>Yes 11, No 3, Unclear 0</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Yeung, 2013</td>
<td>Yes 12, No 2, Unclear 0</td>
</tr>
<tr>
<td>Acceptable quality studies</td>
<td>1</td>
<td>Airagnes et al., 2016</td>
<td>Yes 10, No 0, Unclear 4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Byles et al., 2016</td>
<td>Yes 10, No 0, Unclear 4</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Oshio &amp; Kan, 2017</td>
<td>Yes 10, No 3, Unclear 1</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Stenholm et al., 2016</td>
<td>Yes 10, No 3, Unclear 1</td>
</tr>
</tbody>
</table>

self-rated Likert scales to report physical health outcomes; two reported self-rated health [3, 8] and one reported physical activity levels [10].
Two studies found retirement had a positive impact on physical health, with decreases in sleep difficulties [7] and increases in physical activity [10]. Of these, one was of acceptable quality [10] and one of high quality [7]. Another high-quality study [11] reported that functional mobility limitations increased over the retirement period but that the rate of decline slowed post-retirement, indicating that while increasing age exacerbates mobility difficulties, retirement may moderate this. One study reported a positive trend of improvement in physical functioning, but the findings did not reach significance [12]. In contrast two studies found retirement had a negative impact on physical health, with significant increases in physical dysfunction for men and women [2] and deterioration in self-reported health [3, 8]. Of these one was high quality [3] and two were of acceptable quality [2, 8]. Finally, one study found that retirement had no significant effect on physical health [6].

*Mental health*

Ten studies [1 - 6, 8, 9, 12, 13] reported on various aspects of mental health, defined as follows: Depression [1, 3 - 5, 9]; psychological distress [2, 8, 12, 13]; psychological wellbeing [12, 13]; life satisfaction [2, 5], perceived stress [5] and quality of life [5]. A variety of measures were used to operationalise these outcomes, for example depression was measured using the CES-D [1, 3, 5], the Euro-D Scale [4] and Geriatric Depression Scale [9].

Three studies found that retirement had a positive impact on mental health for men and women, with reduced depression symptoms [1, 5],
improved overall mental health [6] and improved quality of life [6]. Of these, one was of acceptable quality [1] and two were of high quality [5, 6]. In contrast four studies reported a negative impact on mental health [2, 3, 4, 9]. Two of these studies reported increases in depression symptoms for men and women [3, 9] and one showed an increase in psychological distress for men [2]. One study [4] found that while retirement had no short-term negative impact, at long-term follow up participants showed poorer mental health and were more likely to meet the threshold for clinical depression. Of these, one was of acceptable quality [2] while the remainder were of high quality [3, 4, 9]. Finally, five studies reported no effect of retirement on perceived stress [5], psychological distress [2, 8, 12, 13] or psychological wellbeing [13]. All but one [2] were of high quality.

There was not sufficient homogeneity across the studies to perform a meta-analysis. However while the findings appear contradictory, some patterns can be seen across nationalities. In all studies carried out in Finland [6, 7, 10] and Sweden [5], mental and physical health improved or remained unchanged. In contrast, all studies from Japan [9, 10] and from the USA [3, 11] reported declines across physical and mental health. No other significant trends were noted.
Discussion

While the previous review by van der Heide et al. (2013) found strong evidence that retirement has a beneficial effect on mental health and conflicting evidence regarding physical health, this review presents contradictory findings on both fronts and suggests that retirement can have a positive, negative or neutral impact on mental and physical health. The overall quality of studies was high and there was no clear trend of outcomes according to quality; findings from the high-quality studies [3–7, 9, 11–13] indicate that both mental and physical health improves, deteriorates or remains the same after retirement, while similar findings were reported in the studies of acceptable quality [1, 2, 8, 10].

In order to move towards a clearer consensus, it is important to consider possible explanations for this variation in findings. In this review, studies varied significantly in their target health outcome and choice of measures. This heterogeneity of measurement may be a significant contributor to the variance, and if this were the case then a review of studies which all used the same measures would be likely to yield more consistent results. On the basis of this review, however, this does not appear to be the case. Three studies which used the CES-D to measure depression symptoms found that depressive symptoms improved [1, 5] or deteriorated [5]. Three studies used the SF-36 to assess physical health and found that this deteriorated [2], improved [6] or remained the same [12]. These findings therefore indicate that increased consistency of measurement tools used
does not necessarily lead to increased consistency of findings, and that alternative explanations for the variation should be considered.

An alternative is international context. It was noted that groupings of studies in this review which originated in the same geographical region followed trends. All studies from Sweden and Finland [5 - 7, 10] reported improvements in mental and physical health post-retirement. Both countries have low health inequality and comprehensive universal healthcare systems (Kokko, Liveng, & Torp, 2018). Both countries are also amongst the top 20 for life expectancy worldwide, and consistently rank high in international quality-of-life comparisons (Durand, 2015). In contrast, all studies from the USA [3, 11] and Japan [9, 10] reported deteriorations in mental and physical health. In the USA the majority of the population are required to self-fund health insurance in a complex and often expensive system (Doming, 2019), and income and health inequality are increasing (Dickman, Himmelstein, & Woolhandler, 2017). In Japan – which has one of the highest life expectancy rates in the world, and a heavily government-subsidised health insurance system – only 35% of the population self-report being in good health, compared to the average of 69% across OECD countries (Organization for Economic Cooperation and Development, 2018). Life satisfaction and work-life balance are also rated below average. The trend of improved outcomes in Finland and Sweden may in part be explained by retirees’ universal access to high-quality healthcare, and the benefits of living in a country with high quality of life and low health inequality. In contrast, the trends of deterioration
in the USA and Japan may reflect issues of reduced access to healthcare, the impact of inequality, and low quality of life in countries with poor work-life balance. There were no other examples of multiple studies from the same region in this review, and it was not deemed appropriate to compare Airagnes et al. (2017) and Heller-Sahlgren (2017) as one contained data from multiple European countries. These trends are of interest, however further studies comparing the outcomes of matched groups in different countries are needed to investigate this potential explanation further.

When considering directions for future research, the scale and design of studies should be considered carefully. Almost all of the studies in this review presented findings from established cohorts whose infrastructure and scale enable extraction of large, well-powered samples. However there are drawbacks to reliance on this type of study, including reduced specificity of focus area and a tendency to rely on the one-question measures often embedded into large panel survey designs to maximise data while minimising participant fatigue. Smaller-scale studies tend to produce smaller samples which are more likely to be under-powered and therefore at greater risk of Type II error (a failure to reject a false null hypothesis or false negative); however they benefit from the ability to recruit a targeted group and select bespoke measures to address specific questions, and their findings should be considered carefully.

As an example, Oshio & Kan’s 2017 study presented a large sample from The Longitudinal Survey of Middle Aged and Older Adults ($n = 9283$)
and found that physical health deteriorated over retirement in men and women. This study assessed physical health using only one self-rated Likert scale and was rated to be of acceptable quality. In contrast, Yeung & Zhou’s 2017 study presented a small sample ($n = 118$) but used a validated measure of physical health with reliable psychometrics (SF-36) and was found to be of high quality. Their study reported a trend of improvement in physical health for men and women, but their findings did not reach significance. If this design and outcome were replicated in a larger sample and the results reached significance, these findings could arguably be considered more robust than those of Oshio & Kan’s report due to the higher quality and more robust measurement of health. A challenge for researchers in the field, therefore, is to find the balance of bespoke study design using robust measures to address specific questions, and the need to recruit large, well-powered samples in order to extrapolate findings on a population level.

As the evidence in this field remains contradictory it is difficult to predict how people will experience their retirement and consequently difficult to plan services to meet their needs, or to suggest interventions to better prepare them for the transition. It is clear that predicting adjustment to retirement at a population level is a complex task, and that many variables – including individual factors – contribute to individuals’ experiences. It may be that retirement is a phenomenon too complex to be explained at a population level, and that further attempts to do so will continue to produce similarly conflicted results. It may therefore be helpful for future studies to focus more
on identifying the specific individual factors which may influence the retirement transition, in the hope that this will improve our understanding and consequently our ability to meet the needs of the growing retired and retiring population.
Conclusions

In a systematic review of 13 longitudinal studies retirement was found to have positive, negative and neutral effects on physical and mental health. Studies were all of high or acceptable quality. Country-level trends were noted; in Scandinavia and Europe outcomes improved or stayed the same, while in the US and Japan outcomes deteriorated. With the growing pressures of an aging population and rising life expectancy it is essential to improve our understanding of the needs of this group. Future research should consider how to balance the need for large, well-powered studies drawn from existing cohorts with the value of smaller-scale studies which target specific questions; the role of individual differences in the retirement experience should also be considered.
References


Lindwall, M., Berg, A. I., Bjalkebring, P., Buratti, S., Hansson, I., Hassing, L., Henning, G., Kivi, M., Konig, S., Thorvaldsson, V., & Johansson, B.


Appendices

Appendix A: Instructions for Authors from Aging & Mental Health

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Original article

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Should be no more than 5000 words, inclusive of figure captions, footnotes, endnotes, excluding references, cover pages and tables/figures.

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Updated 24-05-2018
## Appendix B: Quality assessment breakdown

Table B1: Quality assessment by criteria and study

<table>
<thead>
<tr>
<th>Study no.</th>
<th>Primary author, year of publication</th>
<th>Quality criteria rating (✓ = Yes, X = No, ? = Unclear)</th>
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Chapter 2: Original Research Paper

The impact of psychological flexibility, job satisfaction and job control on work and retirement experience: How individual differences affect psychological wellbeing pre and post retirement.

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This article is written according to the guidelines for The European Journal of Work & Organisational Psychology (Appendix C)

Word Count: 10,457
Abstract

The aims of this study were to investigate the psychological impact of retirement in a group of older workers, and to explore the contributing role of three individual factors: psychological flexibility, job satisfaction and job control. The baseline sample consisted of 51 workers approaching retirement, and 27 completed follow-up measures post-retirement. At baseline psychological flexibility was associated with better psychological wellbeing, and there was a strong association between job satisfaction and job control. Across the retirement transition, participants reported a significant improvement in a measure of wellbeing and smaller improvements were noted in mental health and quality of life. Higher psychological flexibility was a significant predictor of better mental health scores at follow-up, and higher job control was a significant predictor of lower wellbeing scores at follow-up. Overall the findings indicate that psychological flexibility is a protective factor for employees and retirees, and interventions to increase psychological flexibility may not only help to increase worker wellbeing, but may assist retirees with adjustment to retirement. The theoretical and practical implications of these findings are discussed.

Keywords

Retirement; mental health; psychological wellbeing; psychological flexibility; job satisfaction; job control; longitudinal
Introduction

 Retirement context

Retirement is defined as ‘withdrawal from one’s position or occupation or active working life’ (Merriam-Webster, 2019). The concept of retirement originated in Germany in 1883. In part as an expansion of the existing welfare state and in part as a political move to force older workers from the workforce, a state pension was introduced for all who reached age 70 (later reduced to 65). Other countries in Europe and across the developed world followed with their own state pension systems, most choosing a retirement age between 60 – 65 (Organisation for Economic Cooperation and Development, 2011). At this time, average life expectancy at birth across Europe ranged from 37 – 49 and life expectancy at age 65 ranged from 73 – 78 (Roser, 2019), meaning that most who retired would only draw on their pensions for a relatively short time.

Since then a rapid transformation of the global population has taken place. Life expectancy at birth has more than doubled and those aged 65 and over are projected to make up 15.8% of the global population by 2050, a rise from 9.3% in 2017 (International Labour Office, 2018). Life expectancy is also increasing for those over the age of 65, with men and women born between 2014 – 2016 in the UK now expected to live to 83.6 and 85.9 years (Office for National Statistics, 2018b). Providing pensions from the traditional age of 65 is no longer sustainable (Age UK, 2018) and so across the
developed world a pattern of increases to statutory retirement ages is underway (Age UK, 2018; Finnish Centre for Pensions, 2018; Social Security Administration, 2019). In the UK, the last two decades have also seen a steady increase in the proportion of people over the age of 65 remaining in work (Office for National Statistics, 2018a) or engaging in bridge employment, where the individual leaves their main career employment but seeks alternative paid work (Beehr & Bennett, 2015).

Two key trends have therefore emerged from these demographic shifts: people are remaining in the workforce for longer, and people are living longer in retirement than ever before. As this group continues to grow it is essential to understand their physical and mental health needs, which differ in nature and complexity to those of the general population (Middleton et al., 2017; Sadavoy, 2009). It is also essential to develop and promote interventions which support the health and wellbeing of the older workforce, promote positive transitions to retirement, and enable retirees to live well.

**Work and wellbeing**

Work plays a key role in the development, expression and maintenance of psychological health (Blustein, 2008). Satisfying work is related to better mental health outcomes (Modini et al., 2016) and positively-perceived working environments have been associated with better performance, motivation and attitudes (Parker et al., 2003). In contrast unemployment and perceived job instability have been associated with poorer psychological wellbeing (Griep et al., 2016). Evidence also indicates that specific
employment-related factors including job satisfaction and job control - defined as ‘the organisation of work in terms of the workers' possibilities to make decisions concerning their work’ (Elovainio, Kivimaki, Steen, & Kallimomaki-Levanto, 2000, p. 269) – contribute to employee wellbeing at work (Bond & Bunce, 2003). Low job control has associated with decreased self-rated health and lower levels of physical activity in a large representative sample of Canadians (Smith, Frank, Mustard, & Bondy, 2008), and with increased likelihood of disability retirement in female government employees in Helsinki (Lahelema et al., 2012).

A robust meta-analysis of 500 studies (Faragher, Cass, & Cooper, 2013) found that employees with lower job satisfaction were significantly more likely to experience anxiety and depression, burnout and low self-esteem. Job satisfaction was also associated with poorer physical health, though these effects were smaller. A limitation of their review is that the studies included were predominantly cross-sectional or observation, with only a small number of longitudinal designs following the same participants meaning it is not possible to assume causation between reduced job satisfaction and poorer health. However their findings indicate that lack of job satisfaction is likely to have a negative impact on mental health, and potentially on physical health, regardless of country or culture.

Evidence indicates that job satisfaction and job control not only function as discrete influences, but also interact to influence wellbeing on a more complex level. Karasek (1979) proposed that a combination of low job
control and heavy job demands can result in mental strain and reduced job satisfaction, and that interventions to increase job control lead to improved health and increased job satisfaction in employees (Karasek, 1990). Recent research has shown that increased job control in the form of ‘job crafting’ – the active involvement of employees in shaping their role, determining their tasks and managing their activity – leads to higher job satisfaction, improved performance and enhanced wellbeing (Tims, Bakker, & Derks, 2015; van Wingerden, Bakker, & Derks, 2017). Job satisfaction and control are therefore important factors which are associated with employee health and wellbeing.

Research has also explored the impact of job satisfaction and control on employee decisions to retire. Some studies have found that increased job satisfaction is associated with decreased likelihood to retire early (Sibbald, Bojke, & Gravelle, 2003), while lower job satisfaction is a key cause for choosing early retirement (Davidson, Lambert, Parkhouse, Evans, & Goldacre, 2001; Mein et al., 2000; Topa, Moriano, Depolo, Alcover, & Morales, 2009). In contrast, however, some studies have found that job satisfaction does not predict the decision to retire in university employees (Adams, 1999) and military personnel (Smith, Holtom, & Mitchell, 2011), and Davies and Cartwright warn against placing too much emphasis on individual factors’ contribution to the decision to retire, as retirement decisions are often determined by organisational policy (2011). Of note, all of the studies discussed predominantly present findings from professionals of higher socio-
economic status and caution should be taken when generalising to the population at large; there is notable lack of studies following lower-income groups whose jobs by nature may provide less security and job control.

To better understand the contributing factors which influence outcomes, there is a need for more longitudinal studies with a diverse range of occupational groups using comprehensive measures of wellbeing. The current evidence indicates that job satisfaction and control contribute both to employee wellbeing at work, and to decisions about retirement. It is therefore relevant to consider how these factors may be related to the experience of retirement.

**Retirement and wellbeing**

Retirement is one of the key transitions of later life, and for many marks a time of significant change and adjustment (Atchley, 1999). The nature of the retirement transition has evolved over recent years to reflect changes in the labour market (Fouad & Bynner, 2008). A significant body of research has investigated how retirement impacts on health and wellbeing, however a clear consensus has not yet been reached. A 2006 review indicated that retirement contributes to deterioration of health and increased demands on healthcare systems (Waddell & Burton, 2006), however a subsequent review concluded that retirement can have a beneficial or detrimental effect on health (van der Heide, van Rijn, Robroek, Burdorf, & Proper, 2013). Researchers from the fields of clinical and organisational psychology and public health have proposed a series of theories to explain how retirement
impacts on health and wellbeing.

Role theory proposes that societally-prescribed and personally meaningful roles – particularly work roles – are key to the development and maintenance of identity (Carter & Cook, 1995; George, 1990). Individuals whose work-role is central to their identity, and who are fulfilled and satisfied by work, are likely to experience retirement as a crisis and report deteriorations in health and wellbeing (Feldman, 1994). In contrast, individuals whose work-role is stressful or unsatisfactory, or who place more value on other life roles, are likely to experience retirement as a relief or welcome change, and as a result experience increases in well-being and satisfaction (Kim & Moen, 2001). While there is some evidence to support the idea that those who retire from stressful jobs experience increased wellbeing (Kim & Moen, 2001) role theory does not consider any aspect of individual difference in how people relate to and value their job, how they respond to stress, and how values can shift and change throughout the life-course. It also lacks suggestions for ways to prepare workers for the transition, and does not consider how individuals may be able to adapt to better cope with negative aspects of the experience.

An alternative explanation is continuity theory (Atchley, 1989), the central theme of which is that adults in the middle and older stages of life actively try to maintain internal and external continuity when making adaptive choices. Internal pressures for continuity come from the individual’s need to have a stable view of the self and the surrounding world, while external
pressures come from the demands of the role the individual occupies and from their environment (von Bonsdorff & Ilmarinen, 2012). Continuity theory suggests that most retirees will maintain their health and wellbeing over the retirement transition: those who experience high levels of wellbeing in work are likely to maintain these in retirement, while the reverse is true for low levels of wellbeing. While continuity theory offers a more holistic view by taking into account all aspects of life and identity rather than just work, it does not offer an explanation for why there is such disparity in physical and mental health retirement outcomes amongst individuals who report good health while in work (Bosse et al., 1991). As with role theory, continuity theory does not offer suggestions around how to support individuals to better manage the retirement transition and is limited in its ability to inform policy.

A third explanation is the life-course perspective which suggests that social, historical and personal factors are central to the individual’s development over time (Elder, Johnson, & Crosnoe, 2003). The life-course perspective assumes all life experiences from pre-birth onwards influence all subsequent events, and that the influence of social, historical and personal factors varies at different stages of development (Settersten, 2003). Life-course theory also acknowledges that experiences in one area of life (e.g. work) impact on – and are impacted by – experiences in other areas (e.g. family relationships). Life-course theory therefore takes into account the influence of individual factors and experience on retirement, and suggests that the retirement transition is experienced differently by each individual and
cannot be predicted on a population level (Damman, Henkens, & Kalmijn, 2015; Gettings & Anderson, 2018). The theory lacks a clear explanation for the mechanisms behind these individual differences, however, and does not provide guidance on how to identify the individuals most likely to struggle with the retirement transition, or how to support them.

A more recent offering from research is the resource perspective (Wang, 2007) which argues that role theory and continuity theory do not sufficiently acknowledge the variation between individual experiences of retirement, and that the life-course perspective does not explain the mechanisms behind this variation (Wang, Henkens, & van Solinge, 2011). Resource theory proposes that an individual's adjustment to retirement is determined entirely by their access to resources, described as the total capability an individual has to fulfil their centrally valued needs (Hobfall, 2002). Resources can be categorised as physical, cognitive, financial, motivational, social and emotional (Wang et al., 2011). Those with access to more of the resources required for the retirement transition will experience less difficulty in adjusting to retirement, and therefore maintain or increase their levels of wellbeing. There is empirical evidence to support role theory from a recent review of longitudinal studies (Henning, Lindwall, & Johansson, 2016) which found that much of the variation between the individual's adjustment to retirement and wellbeing outcomes was due individual resources. They summarised that ‘In general, the effects of retirement seem to depend on the individual resources that are lost or gained in retirement,
and especially resources that may outweigh losses’ (Henning et al., 2016, p. 229). However it is unclear if the presence or absence of resources accounts fully for this difference, or whether more complex individual factors contribute to experience. Resource theory does not consider the prospect that different people may respond differently to the same lack of resources depending on many factors: their past experiences; their mood or emotional state; the society and culture they live in, and the values which drive them.

The theories discussed present various explanations for how people experience retirement but do not provide a compelling explanation for the wide variation in physical and mental health retirement outcomes described in the literature, or an explanation for the mechanism behind the variation. It is therefore proposed that the framework of functional contextualism can provide this.

Psychological flexibility

Functional contextualism and psychological flexibility

The philosophical position of functional contextualism frames any event as an ongoing act, inseparable from its current and historical context (Hayes, 2015). The role of context is crucial in understanding behaviour, and understanding the individual’s unique context is key to understanding their experiences (Gifford & Hayes, 1999). Within this framework, the success or wellbeing of an individual faced with adversity does not depend only on resources available to them, although resources play a part. Rather, it
depends on how they relate to their situation, their ability to adapt and accept difficult emotions, and their willingness to pursue their personal values within their unique social, personal and historical context. Adapting to a transition such as retirement therefore requires not only appropriate resources as described by Wang et al. (2011), but the ability to accept adversity, adapt to the change and find value in the new normal. This ability is known within functional contextualism as psychological flexibility.

*Defining psychological flexibility*

In their review of the history of psychological flexibility as a research concept and its role as a determinant of health outcomes, Kashdan & Rottenberg define the term as ‘the measure of how a person (1) adapts to fluctuating situational demands; (2) reconfigures mental resources; (3) shifts perspective, and (4) balances competing desires, needs and life domains’ (Kashdan & Rottenberg, 2010, p. 866). Their review concludes that individuals with higher levels of psychological flexibility are better able to ‘extract the best possible outcomes in varying situations’ (Kashdan & Rottenberg, 2010, p 480). It follows that increasing psychological flexibility can lead to improvements in an individual’s ability to thrive, independently of resources.

This belief provides the basis for Acceptance and Commitment Therapy (ACT), a third-wave cognitive behavioural therapy which frames the human experience of suffering as the result of psychological inflexibility (Hayes, Strosahl, & Wilson, 1999). Studies have found that psychological
inflexibility is associated with behavioural avoidance in anxiety disorders (Kashdan, 2007) and negative symptoms of mental health (Woodruff et al., 2014), and is a key component of social and emotional functioning in depression (Rottenberg, Gross, & Gotlib, 2005). The aim of ACT is therefore to increase psychological flexibility by targeting six key processes: acceptance; cognitive defusion; being present; self-as-context; values and committed action. By increasing psychological flexibility, ACT aims to reduce struggle, promote valued living, and consequently reduce suffering.

**Psychological flexibility in health**

The transdiagnostic nature of ACT has enabled effective adaptation and application across a wide range of problems and settings (Dindo, Van Liew, & Arch, 2017). There is a growing evidence base for the efficacy of ACT-based treatments for anxiety and depression (Twohig & Levin, 2017) and chronic pain (Veehof, Oskam, Schreurs, & Bohlmeijer, 2011; Veehof, Trompetter, Bohlmeijer, & Schreurs, 2016). ACT has also shown benefits as a treatment for psychosis (Tonarelli, Pasillas, Alvarado, Dwivedi, & Cancellare, 2016) and managing over-eating in obese adults (Rogers, Ferrari, Mosely, Lang, & Brennan, 2017), and new applications are reported regularly.

There is significant evidence that ACT is beneficial for those living with chronic and long-term conditions and leads to improved quality of life and reduced symptoms in epilepsy (Lundgren, Dahl, Melin, & Kies, 2006), cardiac conditions (Goodwin, Forman, Herbert, Butryn, & Ledley, 2012) and diabetes
(Gregg, Callaghan, Hayes, & Glenn-Lawson, 2007). Hulbert-Williams & Storey (2016) found psychological flexibility to be a powerful predictor of positive adjustment to cancer, with those with higher levels of psychological flexibility more likely to report positive mood, better quality of life and lower levels of anxiety, depression and stress. The authors acknowledge their study’s limitations – particularly the small sample size, and the potential for a biased sample if only those having a more positive cancer experience felt motivated to return the postal survey – but these promising findings indicate the need for larger-scale studies in this area. However, the evidence base should be considered with care. A recent systematic review of studies of ACT in long-term conditions (Graham, Gouick, Krahe, & Gillanders, 2016) found that while initial findings were positive, the overall quality of studies was low with few using a robust RCT design. As a result, they concluded it is impossible to determine from the current evidence whether increases in psychological flexibility as a result of ACT intervention were causally related to the positive outcomes. They recommended further investigations in this area, and some subsequent findings have reported that positive outcomes from treatment of anxiety and depression with ACT were mediated specifically through increases in psychological flexibility (Twohig & Levin, 2017).

In summary, the existing evidence indicates that ACT-based interventions are associated with improvements in wellbeing and adjustment to health conditions, and there is some evidence that psychological flexibility
is a contributing factor to these improvements. If this is the case, then this knowledge can be applied usefully not only in health but in other areas, including employment and retirement.

*Psychological flexibility in the workplace*

Research into the positive benefits of higher psychological flexibility has not been limited to the sphere of health. Research in organisational settings has demonstrated that employees with higher psychological flexibility are better able to learn new workplace skills (Bond & Flaxman, 2006). Higher levels of psychological flexibility have been associated with better mental health and job performance in call-centre workers in the UK (Bond & Bunce, 2003), higher psychological wellbeing and life satisfaction in paramedics in Austria (Mitmansgruber, Beck, & Schüßler, 2008) and better mental health and social outcomes in rehabilitation workers in Singapore (McCracken & Yang, 2008). These studies present relatively small sample sizes (mean $n = 216$) from single-occupation groups which may limit how their findings can be generalised to the general population. However it is positive to see consistent results amongst diversity of cultures, occupations and income levels in these studies, and the long-term implications for the applicability of this research base are encouraging. Some studies have also reported benefits from using ACT-based interventions preventatively, demonstrating decreased stigmatising attitudes and burnout at long-term follow up in substance-misuse counsellors (Hayes et al., 2004), and decreased stress and burnout at follow-up in student nurses (Frögéli, Djordjevic, Rudman, Livheim, & Gustavsson,
Studies in this field have attempted not only to prove the existence of an association between higher psychological flexibility and increased wellbeing, but to demonstrate that psychological flexibility is the mechanism for change in improved wellbeing. In a study involving UK government workers, ACT was equally as effective as Stress Management Training at reducing workplace-related distress. Mediation analysis indicated that an increase in psychological flexibility fully mediated the beneficial impact of ACT on a measure of psychological distress, even after controlling for decreases in dysfunctional cognitions (Flaxman & Bond, 2010), indicating that the increase in psychological flexibility was responsible for the decrease in distress.

In summary, a growing evidence base indicates that greater psychological flexibility is associated with higher wellbeing in employees in a range of settings, and that interventions to increase psychological flexibility are associated with improved performance and wellbeing. Studies have also demonstrated that using ACT-based interventions preventatively can lead to improvements in wellbeing and reduce stress and burnout in the workplace. There is some evidence that increased psychological flexibility is the mechanism for change in these studies, and research continues in its attempts to evidence this. Increasing psychological flexibility may therefore not only be a useful way to support employees in the workplace, but may
have value as a preventative approach to prepare employees for the transition to retirement, and thereby improve wellbeing after the transition.

**Purpose of study and hypotheses**

Retirement is an important employment-related transition during which many people experience significant health changes which can be positive, negative or neutral. As yet the mechanisms behind these changes are unclear, and it is therefore difficult to predict outcomes for future retirees on a population level. As people remain in work for longer, and those retiring live longer into their retirement, it is necessary not only to find ways to increase wellbeing in older workers and to improve wellbeing in those who retire, but to identify and prepare those more likely to experience difficulty in adjustment to retirement. The previous theories of retirement proposed to date do not offer a comprehensive framework to explain the variety in individual experience and thereby suggests practical approaches to support the population.

The framework of functional contextualism offers an alternative way to understand this variety: that the retirement experience is a fundamentally personal experience, framed by the individual’s unique context, and made easier or more difficult according to individual factors. Psychological flexibility, job satisfaction and job control have all been shown to impact on wellbeing at work and increases across these factors have been associated with better health outcomes and increased workplace resilience. It is therefore proposed that these factors may influence how individuals
experience retirement, and that in particular psychological flexibility will play an important role in determining outcomes in the retirement transition.

The aim of this study therefore is to explore how psychological flexibility, job satisfaction and job control are associated with psychological wellbeing in older workers both pre and post retirement. Based on the evidence presented in this review, the following hypotheses are proposed:

(1) Higher psychological flexibility will be associated with higher job satisfaction and control at baseline.

(2) Higher psychological flexibility will be associated with better psychological wellbeing outcomes at baseline.

(3) There will be significant changes for better or worse in psychological wellbeing outcomes from baseline to follow-up across participants.

(4) Psychological flexibility, job satisfaction and job control will be predictors of changes in psychological wellbeing outcomes from baseline to follow-up.
Materials and Method

Participants

This longitudinal study consisted of two phases of assessment. Time 1 (T1) was conducted while participants were still employed, between one and six months prior to their retirement. Time 2 (T2) was carried out three months post-retirement. The participants were recruited from a range of organisations including NHS health boards, employees of which comprised 45% of the sample.

Procedure

Ethical approval was obtained from the research ethics committees of the relevant university (Reference CLIN431; IRAS Reference 240578) and NHS health board (Reference 18/DGY/016; Appendices I – J). The study questionnaires were hosted online by Jisc Online Surveys. Individuals over the age of 55 were eligible to take part if they met the following criteria: currently in full or part-time employment; planning to retire within the next six months; fluent English speaker; no existing illness, injury or cognitive impairment which would prevent them from giving consent or answering questions. The target population was recruited through internal advertising in the local NHS board intranet, HR departments of local organisations, external advertising in the local community, online advertising on social media and through the online participant database Call for Participants (www.callforparticipants.com). Individuals could choose to contact the
researcher for further information or proceed directly to the first survey where they were required to read the participant information sheet (Appendix N) and give consent as part of the online questionnaire before taking part.

The T1 survey included demographic questions and measures of the three individual factors: psychological flexibility, job satisfaction and job control. The T1 survey also included measures of three aspects of psychological wellbeing: mental health, wellbeing and quality of life. The T2 survey included the measures of psychological wellbeing only.

In the T1 survey participants were asked to create a unique, anonymous survey code to identify them throughout the study and to provide their retirement date. They were also asked to provide an email address by which they could be contacted with invitations to follow-up surveys. They were then contacted by email three months after their retirement date with an invitation to complete the T2 survey. If they did not respond, two follow-up emails were sent to remind them to complete the survey, one week and one month after the initial invitation. As an incentive, participants could choose to opt-in to a prize draw for a £20 gift voucher for each questionnaire completed.

**Measures**

A summary of the measures used in the study and evidence of permissions can be found in Appendix F. Evidence of permission to use these measures, where relevant, can be found in Appendix G.
Individual factors

Psychological flexibility. Psychological flexibility (PF) was measured using the Comprehensive Measure of Acceptance and Commitment Therapy (CompACT), a relatively new measure which has an alpha of .91 in normative samples. It has been shown to have good internal consistency and correlates highly with related measures of experiential avoidance and cognitive fusion including the AAQ-II (Francis, Dawson, & Golijani-Moghaddamb, 2016). It consists of 25 items (rated from 0 = strongly disagree to 6 = strongly agree) which cover three subscales (Openness to Experience, Behavioural Awareness and Valued Action) and combine to a total maximum score of 138. Higher scores indicate greater PF. An example item is: “My values are really reflected in my behaviour”.

Job satisfaction. Job satisfaction (JS) was measured using the Generic Job Satisfaction Scale (Macdonald & MacIntyre, 1997) which has an alpha of .77. The scale consists of 10 items (rated from 1 = strongly disagree to 5 = strongly agree) which combine to a total score of maximum 50. Higher scores indicate greater JS. An example item is: “All my talents and skills are used at work”.

Job control. Job control (JC) was measured using the Work Control Scale (Dwyer & Ganster, 1991) which has an alpha of .87. The scale consists of 22 items (rated from 1 = very little to 5 = very much) which produces subscale scores for General Control and Predictability, and a total maximum score of
Higher indicate greater JC. An example item is: “How much control do you have over how quickly or slowly you have to work?”

**Psychological wellbeing factors**

Mental health. Mental health was measured using the CORE-10 (Barkham et al., 2013), a validated measure commonly used by health services to screen for psychological distress and mental health difficulties. The scale asks participants to rate their experience of the last week over 10 questions (rated from 0 = not at all to 5 = most or all of the time) to a total score of maximum 40. The CORE-10 has an alpha of .90 in normative samples and is highly correlated with the CORE-OM (35 item measure of psychological distress) in clinical and non-clinical samples. Higher scores indicate greater levels of distress and mental health symptoms, with scores above ten considered to be in the clinical range. An example item is: “Over the last week I have felt despairing or hopeless”. As this is the only negatively scored measure in the battery, throughout this paper the terms ‘better mental scores’, ‘lower mental health scores’ and ‘fewer mental health symptoms’ will be used interchangeably.

Mental wellbeing. Mental wellbeing was measured using the Short Warwick-Edinburgh Mental Wellbeing Scale (SWEMWBS). The SWEMWBS is drawn from the longer WEMWBS with which it is well correlated and has an alpha of .91 in normative samples (Stewart-Brown et al., 2009). The scale asks people to rate their experience over the last two weeks on 7 items (rated
from 1 = none of the time to 5 = all of the time) with a total maximum score of 35. Higher scores indicate greater wellbeing. An example item is: “I’ve been feeling optimistic about the future”.

Quality of life. Quality of life was measured using the Brief version of the World Health Organisation Quality of Life Measure (WHOQOL_BREF; (Skevington, Lotfy, & O’Connell, 1996). This validated questionnaire includes 25 items (rated using a range of scales from 1 – 5) which produce scores for four domains: Physical; Psychological; Social Relationships and Environmental. The domains have alphas of .84, .77, .69 and .80 respectively in cross-cultural normative samples. Each domain produces a maximum score of 20, with higher scores indicating higher quality of life. The four domains will hereafter be referred to as Physical QoL, Psychological QoL, Social Relationships QoL and Environmental QoL. An example question is: “How satisfied are you with the conditions of your living place?”

**Analysis**

Three stages of analysis were carried out. Firstly, correlation coefficients were used to explore associations between the independent variables (PF, JS and JC), and between the independent and dependent variables (mental health, wellbeing and quality of life) at T1. Secondly, paired-sample t-tests were used to look for significant changes in scores from T1 to T2. Thirdly, multiple linear regression analysis was used to examine the predictive power of PF, JS and JC on changes in mental health, wellbeing and quality of life.
scores.

To determine the required sample size, recent studies using similar methodologies which successfully achieved adequate samples were consulted (N.J. Hulbert-Williams, Storey, & Wilson, 2015; Lloyd, Bond, & Flaxman, 2013), and the implications of under-powered samples in clinical research (Faber & Fonseca, 2014) were considered. It was decided that an a priori power calculation based on a medium effect size would be most appropriate. A power calculation assuming three predictors (PF, JS and JC) indicated a minimum sample size of 76 would be required to perform regression analysis (Table 2.1). This would be the minimum required to detect the overall significance of \( R^2 \), based on the rule of thumb of 50 + 8M (where M is the number of the predictor variables; Green, 1991). Green advises that while this would be sufficient to detect overall significance, it would not be sufficiently powered to detect differences between predictors. To have enough power to detect significant \( \beta \) values – rather than the overall \( F^2 \) – Green’s formula of 104 + M would be required, resulting in a required sample size of 107.

Table 2.1 A priori power calculation for regression analysis

<table>
<thead>
<tr>
<th>Descriptor</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipated effect size ( (F^2) )</td>
<td>0.15</td>
</tr>
<tr>
<td>Desired statistical power level</td>
<td>0.80</td>
</tr>
<tr>
<td>Number of predictors</td>
<td>3</td>
</tr>
<tr>
<td>Probability level</td>
<td>0.05</td>
</tr>
<tr>
<td>Minimum required sample size</td>
<td>76</td>
</tr>
</tbody>
</table>
Results

Demographics

Response rates

51 participants completed the T1 measures with no missing data, and 53% of these participants completed the T2 measure \( (n = 27) \). The small sample size occurred as a result of recruitment issues concerning the introduction of new European Union General Data Protection Regulations (GDPR) during the recruitment period. This new legislation prevents organisations from using individuals’ information for any purpose for which specific consent has not been given. Several organisations who had agreed to identify and contact potential participants for the project advised they could no longer do so due to the potential implications of using their employees’ information for a purpose they had not consented to. As a result, the pool of individuals the researcher was able to access was significantly reduced and the majority of successful recruitment was the result of social media and community advertising.

Demographics at T1

The T1 sample (65% female) ranged in age from 55 – 69, with no participants selecting the 70+ category. Of the ten occupational categories available (Appendix E), 73% of the sample identified as managers or professionals. A summary of the T1 participant demographics can be found in Table 2.2, and descriptive information regarding retirement issues can be
found in Table 2.3. The majority of the group had been offered some sort of retirement preparation by their employing organisation (76.5%), and reported they felt at least slightly prepared for retirement (96.1%).

**Associations of independent and dependent variables at T1**

**Testing normality**

Levels of skewness and kurtosis across the data were within the acceptable range of -3 to 3 (George & Mallery, 2010) with the exception of CORE-10 scores at T1, and CORE-10 change scores [kurtosis = 3.75, 3.88 respectively]. These leptokurtic values indicate the presence of outliers in the dataset, and a risk that ‘more of the variance could be the result of infrequent extreme deviations, as opposed to frequent modestly sized deviations’ (Westfall, 2014, p. 193). Field (2013) advises that in this situation applying a transformation to the data is unlikely to make any difference to kurtosis, and suggests the alternative of bootstrapping. Bootstrapping was carried out on the data in question, however all values of kurtosis remained unchanged as a result (Appendix E) and therefore this was not included in the final analysis.

An alternative option would be to remove any outliers, identified by observing the frequency distribution of the data. While removing an outlier may reduce the likelihood of a Type I error (a false rejection of the null hypothesis or false positive), within a small sample this is also likely to reduce power across variables and increase the likelihood of Type II error (a failure to reject a false null hypothesis or false negative). After careful consideration, it was decided
that the outlier would be included, the data would be treated as normally
distributed, and results relating to CORE-10 scores would be interpreted with
cautions.

Table 2.2 Participant demographic information

<table>
<thead>
<tr>
<th>Participant information</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age bracket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>55 – 59</td>
<td>27</td>
<td>52.9</td>
</tr>
<tr>
<td>60 – 64</td>
<td>22</td>
<td>43.1</td>
</tr>
<tr>
<td>65 – 69</td>
<td>2</td>
<td>3.9</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>33</td>
<td>64.7</td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>35.3</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>33</td>
<td>64.7</td>
</tr>
<tr>
<td>Part-time</td>
<td>19</td>
<td>37.7</td>
</tr>
<tr>
<td>Job category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managers</td>
<td>7</td>
<td>13.7</td>
</tr>
<tr>
<td>Professionals</td>
<td>31</td>
<td>60.8</td>
</tr>
<tr>
<td>Technicians and associate professionals</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td>Clerical support workers</td>
<td>6</td>
<td>11.8</td>
</tr>
<tr>
<td>Service and sales workers</td>
<td>4</td>
<td>7.8</td>
</tr>
<tr>
<td>NHS status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHS employee</td>
<td>23</td>
<td>45.1</td>
</tr>
</tbody>
</table>
Table 2.3 Retirement demographic information

<table>
<thead>
<tr>
<th>Retirement information</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reason for retiring</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reached retirement age</td>
<td>15</td>
<td>29.4</td>
</tr>
<tr>
<td>Taking early retirement</td>
<td>25</td>
<td>49.0</td>
</tr>
<tr>
<td>Voluntary redundancy</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td>Choosing to retire past retirement age</td>
<td>6</td>
<td>11.8</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td><strong>Offered by organisation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-retirement meeting</td>
<td>27</td>
<td>52.9</td>
</tr>
<tr>
<td>Pension and/or financial advice</td>
<td>25</td>
<td>49.0</td>
</tr>
<tr>
<td>Access to retirement network/group</td>
<td>7</td>
<td>13.7</td>
</tr>
<tr>
<td>Signposting to voluntary organisation</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td>Signposting to online advice/support</td>
<td>5</td>
<td>9.8</td>
</tr>
<tr>
<td>Written information</td>
<td>14</td>
<td>27.5</td>
</tr>
<tr>
<td>None offered</td>
<td>12</td>
<td>23.5</td>
</tr>
<tr>
<td><strong>Preparedness for retirement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully prepared</td>
<td>10</td>
<td>19.6</td>
</tr>
<tr>
<td>Mostly prepared</td>
<td>31</td>
<td>60.8</td>
</tr>
<tr>
<td>Slightly prepared</td>
<td>8</td>
<td>15.7</td>
</tr>
<tr>
<td>Slightly unprepared</td>
<td>2</td>
<td>3.9</td>
</tr>
<tr>
<td>Unable to say, mostly unprepared or completely unprepared</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Associations between independent variables**

Pearson’s correlation coefficient \( r \) was used to examine associations between the independent variables of PF, JS and JC (Table 2.4). Using Cohen’s guidelines (1992) correlations were designated small, medium or large [when \( r = 0.1, 0.3 \) and 0.5 respectively]. A strong correlation was found...
between JS and JC \([r = .717, p < .001]\), indicating these attributes are likely to be found together. PF was not correlated with JS \([r = .227, p = .255]\) or with JC \([r = .173, p = .388]\).

Table 2.4 Pearson’s correlation coefficients \([r]\) for independent variables

<table>
<thead>
<tr>
<th></th>
<th>Psychological flexibility</th>
<th>Job satisfaction</th>
<th>Job control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological flexibility</td>
<td>1</td>
<td>.227</td>
<td>.173</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>.227</td>
<td>1</td>
<td>.717**</td>
</tr>
<tr>
<td>Job control</td>
<td>.173</td>
<td>.717**</td>
<td>1</td>
</tr>
</tbody>
</table>

* \(p < .05\), ** \(p < .01\)

**Associations between independent and dependent variables**

Higher PF was significantly associated with better outcomes across all psychological wellbeing measures at T1 (Table 2.5). A strong negative correlation was found with mental health, meaning higher PF was associated with fewer symptoms \([r = -.646, p < .001]\). Strong positive correlations were found with wellbeing \([r = .686, p < .001]\) and Psychological QoL \([r = .679, p < .001]\). Moderate positive correlations were also found between PF and the Physical, Social Relationships and Environmental QoL domains \([r = .412, p < .05; r = .480, p < .05, r = .446, p < .05]\). JS was moderately associated with better mental health \([r = -.471, p < .05]\) and higher scores in the Psychological and Social Relationships QoL domains \([r = .427, p < .05; r = .409, p < .05]\). Finally, there was a strong association between JC and better
mental health \[ r = -.526, p < .01 \].

**Changes in psychological wellbeing outcomes from T1 – T2**

Mean scores and direction of changes can be found in Table 2.6. Paired samples \( t \)-tests were used to detect significant changes in mean scores from T1 – T2 (Table 2.7). Effect sizes were calculated according to Cohen (1988).

Table 2.5 Pearson’s correlation coefficients \([r]\) for independent and dependent variables

<table>
<thead>
<tr>
<th>Psychological flexibility</th>
<th>Mental health</th>
<th>Wellbeing</th>
<th>Physical QoL</th>
<th>Psychological QoL</th>
<th>Social Relationship QoL</th>
<th>Environmental QoL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological flexibility</td>
<td>-.646**</td>
<td>.686**</td>
<td>.412*</td>
<td>.679**</td>
<td>.480*</td>
<td>.446*</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>-.471*</td>
<td>.369</td>
<td>.131</td>
<td>.427*</td>
<td>.409*</td>
<td>.235</td>
</tr>
<tr>
<td>Job control</td>
<td>-.526**</td>
<td>.204</td>
<td>.242</td>
<td>.291</td>
<td>.172</td>
<td>.258</td>
</tr>
</tbody>
</table>

* \( p < .05 \), ** \( p < .01 \)

Wellbeing significantly increased for participants and the effect size for this result was notably large \([t = 10.283 (DF = 26), p < .001, d = 1.95]\). A significant improvement in mental health with moderate effect size was also reported \([t = -3.148 (DF = 26), p < .05, d = .528]\) along with improvements in the Physical \([t = 2.965 (DF = 26); p < .01, d = .571]\), Psychological \([t = 2.068 (DF = 26), p < .01, d = .398]\) and Environmental \([t = 2.313 (DF = 26), p < .05, d = .445]\) QoL domains. There was no significant change in Social
Relationships QoL \( [t = 2.313 \ (DF = 26), \ p = .903, \ d = .445] \).

Table 2.6 Descriptive statistics of changes from T1 – T2

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Meaning of high score</th>
<th>T1</th>
<th></th>
<th></th>
<th>T2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Mental health</td>
<td>More symptoms; poorer mental health</td>
<td>27</td>
<td>7.741</td>
<td>5.289</td>
<td>27</td>
<td>4.592</td>
</tr>
<tr>
<td>Wellbeing</td>
<td>Greater wellbeing</td>
<td>27</td>
<td>19.022</td>
<td>2.714</td>
<td>27</td>
<td>27.511</td>
</tr>
<tr>
<td>Physical QoL</td>
<td>Better quality of life</td>
<td>27</td>
<td>77.630</td>
<td>14.262</td>
<td>27</td>
<td>85.181</td>
</tr>
<tr>
<td>Psychological QoL</td>
<td>Better quality of life</td>
<td>27</td>
<td>71.922</td>
<td>15.567</td>
<td>27</td>
<td>76.851</td>
</tr>
<tr>
<td>Social Relationships QoL</td>
<td>Better quality of life</td>
<td>27</td>
<td>74.692</td>
<td>21.246</td>
<td>27</td>
<td>74.371</td>
</tr>
<tr>
<td>Environmental QoL</td>
<td>Better quality of life</td>
<td>27</td>
<td>81.7259</td>
<td>11.098</td>
<td>27</td>
<td>87.16</td>
</tr>
</tbody>
</table>

Interpretation:
- Decrease in mental health symptoms
- Increase in wellbeing
- Increase in physical QoL
- Increase in psychological QoL
- No change in social relationships QoL
- Increase in environmental QoL
Table 2.7 Results of paired samples t-tests of changes from T1 – T2

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Mean difference</th>
<th>SD</th>
<th>t</th>
<th>DF</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental health</td>
<td>-3.148</td>
<td>5.966</td>
<td>-2.742*</td>
<td>26</td>
<td>.528</td>
</tr>
<tr>
<td>Wellbeing</td>
<td>8.489</td>
<td>4.29</td>
<td>10.283**</td>
<td>26</td>
<td>1.956</td>
</tr>
<tr>
<td>Physical QoL</td>
<td>7.552</td>
<td>13.233</td>
<td>2.965**</td>
<td>26</td>
<td>.571</td>
</tr>
<tr>
<td>Psychological QoL</td>
<td>4.93</td>
<td>12.387</td>
<td>2.068*</td>
<td>26</td>
<td>.398</td>
</tr>
<tr>
<td>Social Relationships QoL</td>
<td>-.319</td>
<td>13.382</td>
<td>.124</td>
<td>26</td>
<td>.024</td>
</tr>
<tr>
<td>Environmental QoL</td>
<td>5.433</td>
<td>12.209</td>
<td>2.313*</td>
<td>26</td>
<td>.445</td>
</tr>
</tbody>
</table>

Effect sizes interpreted as small (.2) medium (.5) or large (.8)
* p < .05, ** p < .01

To explore whether there were any significant differences in either individual factors or wellbeing factors between those who completed both T1 and T2, and those who completed T1 only and did not choose to complete T2, independent t-tests were used. No significant differences were found between these groups across factors. This analysis can be found in Appendix H.

**Individual factors as predictors of change from T1 – T2**

Multiple linear regression analysis was used to explore whether PF, JS and JC function as predictor variables for changes in psychological wellbeing outcomes from T1 to T2. In order to ensure that any confounding factors in the regression analyses were controlled for, potential confounders were
initially identified: age, gender, work status (full-time or part-time) and preparedness for retirement. Independent t-tests and one-way ANOVA were used to test for significant differences in dependent variables associated with these factors. No significant confounding variables were identified (Appendix I).

The forced entry method was selected as the evidence base does not clearly indicate that either of the three should account for more variance (Field, 2013). For each outcome two models were produced. Model 1 determined how well the T2 score was predicted by the T1 score of that outcome. Model 2 predicted how well the T2 score of that outcome was predicted by the T1 score, PF, JS and JC. The R² scores indicate how much of the variance within the model is accounted for by the predictor variables and can be expressed as a percentage. The Adjusted R² scores indicate how much this proportion would decrease if this was applied to the general population, rather than this sample [Adjusted R²]. The significance of the F value indicates how much better the model is at predicting the outcome compared to using the mean value as a best guess.

For all dependent variables Cook's distance, Mahalanobi's distance, VIF rates, mean central leverage, tolerance statistics and Durban Watson statistic were checked and found to be within acceptable parameters (Table J1, Appendix J). The results of the regression analyses can be found in Tables 2.8 – 2.13. A visual representation of the Model 1 findings can be found in Appendix K.
### Table 2.8 Linear model of predictors of mental health (CORE-10 scores)

<table>
<thead>
<tr>
<th>Mode</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error</th>
<th>F</th>
<th>Predictors</th>
<th>B [CI]</th>
<th>Std. error</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.006a</td>
<td>-.034</td>
<td>3.255</td>
<td>.151</td>
<td>(Constant)</td>
<td>4.229 [1.912, 6.546]</td>
<td>.121</td>
<td>.078</td>
<td>.389</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CORE10 T1</td>
<td>.047 [.202, .296]</td>
<td>.121</td>
<td>.078</td>
<td>.389</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CORE10 T1</td>
<td>-.201 [-.573, .170]</td>
<td>.046</td>
<td>-</td>
<td>-2.403*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PF</td>
<td>-.111 [-.207, -.015]</td>
<td>.064</td>
<td>.103</td>
<td>.623</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JS</td>
<td>.064 [-.149, .276]</td>
<td>.103</td>
<td>.170</td>
<td>.623</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JC</td>
<td>-.037 [-.162, .088]</td>
<td>.060</td>
<td>.180</td>
<td>-.616</td>
</tr>
</tbody>
</table>

95% bias corrected and accelerated confidence intervals reported in brackets

* Predictors: (Constant), CORE10 T1  
** Predictors: (Constant), CORE10 T1, PF, JS, JC

* p < .05, ** p < .01

### Table 2.9 Linear model of predictors of wellbeing (SWEMWB scores)

<table>
<thead>
<tr>
<th>Mode</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error</th>
<th>F</th>
<th>Predictors</th>
<th>B [CI]</th>
<th>Std. error</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SWEMWB T1</td>
<td>.820 [1.174, 1.467]</td>
<td>.314</td>
<td>.463</td>
<td>2.612*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SWEMWB T1</td>
<td>.643 [.403, .363]</td>
<td>.403</td>
<td>1.598</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PF</td>
<td>.067 [.059, .245]</td>
<td>.134</td>
<td>.128</td>
<td>.536</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JS</td>
<td>.072 [.134, .128]</td>
<td>.072</td>
<td>.536</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JC</td>
<td>-.176 [-.566, .020]</td>
<td>.070</td>
<td>.536</td>
<td></td>
</tr>
</tbody>
</table>

95% bias corrected and accelerated confidence intervals reported in brackets

* Predictors: (Constant), SWEMWB T1  
** Predictors: (Constant), SWEMWB T1, PF, JS, JC

* p < .05, ** p < .01
Table 2.10 Linear model of predictors of physical quality of life (WHOQOL Physical Domain scores)

<table>
<thead>
<tr>
<th>Mode</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error</th>
<th>$F$</th>
<th>Predictors</th>
<th>B [CI]</th>
<th>Std. error</th>
<th>$\beta$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WHOQOL Phys T1</td>
<td>.333 [.067, .598]</td>
<td>.129</td>
<td>.459</td>
<td>2.581*</td>
</tr>
<tr>
<td>2</td>
<td>.277b</td>
<td>.146</td>
<td>9.564</td>
<td>2.112</td>
<td>(Constant)</td>
<td>64.933 [37.003, 92.863]</td>
<td>13.46</td>
<td>8</td>
<td>4.821</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WHOQOL Phys T1</td>
<td>.314 [.006, .622]</td>
<td>.148</td>
<td>.433</td>
<td>2.117*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PF</td>
<td>.060 [.086, .306]</td>
<td>.119</td>
<td>.103</td>
<td>.505</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>JS</td>
<td>- .399 [-1.065, .267]</td>
<td>.321</td>
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<tr>
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<td></td>
<td></td>
<td>JC</td>
<td>- .073 [-.296, .443]</td>
<td>.178</td>
<td>.110</td>
<td>.412</td>
</tr>
</tbody>
</table>

95% bias corrected and accelerated confidence intervals reported in brackets.  
a Predictors: (Constant), WHOQOLPhys T1  
b Predictors: (Constant), WHOQOLPhys T1, PF, JS, JC  
*p < .05, ** p < .01

Table 2.11 Linear model of predictors of psychological quality of life

(WHOQOL Psychological Domain scores)

<table>
<thead>
<tr>
<th>Mode</th>
<th>$R^2$</th>
<th>Adjusted $R^2$</th>
<th>Std. Error</th>
<th>$F$</th>
<th>Predictors</th>
<th>B [CI]</th>
<th>Std. error</th>
<th>$\beta$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>WHOQOL Psych T1</td>
<td>.501 [.246, .756]</td>
<td>.124</td>
<td>.629</td>
<td>4.042**</td>
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<td>2</td>
<td>.597b</td>
<td>.524</td>
<td>8.559</td>
<td>8.160**</td>
<td>(Constant)</td>
<td>45.847 [23.374, 68.320]</td>
<td>10.836</td>
<td>4.231</td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>WHOQOL Psych T1</td>
<td>.398 [.068, .728]</td>
<td>.159</td>
<td>.5</td>
<td>2.504*</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>PF</td>
<td>.247 [-.023, .516]</td>
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<td>.352</td>
<td>1.9</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>JS</td>
<td>-.008 [-.629, .613]</td>
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<td>-.006</td>
<td>-.027</td>
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<td>JC</td>
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<td>-1.912</td>
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</table>

95% bias corrected and accelerated confidence intervals reported in brackets.  
a Predictors: (Constant), WHOQOLPsych T1  
b Predictors: (Constant), WHOQOLPsych T1, PF, JS, JC  
*p < .05, ** p < .01
Table 2.12 Linear model of predictors of social relationships quality of life

(WHOQOL Social Relationships Domain scores)

<table>
<thead>
<tr>
<th>Model</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error</th>
<th>F</th>
<th>Predictors</th>
<th>B</th>
<th>Std. error</th>
<th>β</th>
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<td>10.27</td>
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<td>(Constant)</td>
<td>30.664</td>
<td>[15.523, 45.804]</td>
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<td>4.171</td>
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<td>WHOQOL SocRel T1</td>
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<td>[.390, .780]</td>
<td>.095</td>
<td>6.173**</td>
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<td>WHOQOL SocRel</td>
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<td>[.285, .771]</td>
<td>.117</td>
<td>4.508**</td>
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<td>PF</td>
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<td>JS</td>
<td>-.227</td>
<td>[-.992, .537]</td>
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<td>JC</td>
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95% bias corrected and accelerated confidence intervals reported in brackets

a Predictors: (Constant), WHOQOLSocRel T1
b Predictors: (Constant), WHOQOLSocRel T1, PF, JS, JC

*p < .05, **p < .01

Table 2.13 Linear model of predictors of environmental quality of life

(WHOQOL Environmental Domain scores)

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<tr>
<th>Model</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. Error</th>
<th>F</th>
<th>Predictors</th>
<th>B</th>
<th>Std. error</th>
<th>β</th>
<th>t</th>
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<td>[44.747, 96.295]</td>
<td>12.514</td>
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<td>[-.109, .516]</td>
<td>.152</td>
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</tr>
<tr>
<td>2</td>
<td>.154b</td>
<td>.000</td>
<td>8.718</td>
<td>1.003</td>
<td>(Constant)</td>
<td>63.859</td>
<td>[34.927, 92.791]</td>
<td>13.951</td>
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<td>WHOQOL Env T1</td>
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<td>[.276, .454]</td>
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<td>.507</td>
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<td></td>
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<td>PF</td>
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<td>[-.084, .369]</td>
<td>.109</td>
<td>1.305</td>
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<td></td>
<td>JS</td>
<td>.154</td>
<td>[-.448, .756]</td>
<td>.290</td>
<td>.530</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>JC</td>
<td>-.041</td>
<td>[-.372, .290]</td>
<td>.160</td>
<td>-.258</td>
</tr>
</tbody>
</table>

95% bias corrected and accelerated confidence intervals reported in brackets

a Predictors: (Constant), WHOQOLEnv T1
b Predictors: (Constant), WHOQOLEnv T1, PF, JS, JC

*p < .05, **p < .01
Overall fit of models

Across wellbeing outcomes the $R^2$ scores are generally below 50% other than in the Social Relationships QoL domain [$R^2 = .604$; Adjusted $R^2 = -.588$, SE = 10.27] and significant shrinkage can be seen between $R^2$ and Adjusted $R^2$ scores. This shrinkage indicates that the small sample size has reduced the predictive power of the model (Field, 2013).

Significant findings

Across outcomes, five significant results were identified.

Mental health. In the mental health models (Table 2.8), CORE10 scores at T1 were not a significant predictor of T2 scores; the model accounted for only 6% of the variance and the F value was not significant. When PF, JS and JC were added into Model 2, this accounted for more of the variance [$R^2 = .471$, Adjusted $R^2 = .222$, F = .151, p = .217]. At the predictor level, PF was a significant negative predictor of CORE-10 scores (meaning better mental health) at T2 [$\beta = -.613$, t = -2.403, p < .05].

Wellbeing. In the wellbeing models (Table 2.9) Model 1 accounted for 46.3% of the variance [Adjusted $R^2 = .214$] and the F value indicates the model was significantly better at predicting outcomes than a best guess [$F = 6.825$, p < .05]. At the predictor level, SWEMWBS scores at T1 were a significant predictor of T2 scores [$\beta = -.463$, t = 2.612, p < .05]. When PF, JS and JC were added in Model 2 the accounted for 68.1% of variance [Adjusted $R^2 =$}
.464] with a highly significant F value [F = 4.763, p .06]. At the predictor level, JC was a significant negative predictor of wellbeing at T2 [β = -.566, t = .020, p < .05].

Physical QoL. In the Physical QoL domain (Table 2.10), Model 1 accounted for 21% of the variance with significant F scores [Adjusted R² = .179, F = 6.661, p < .05]. WHOQOL Physical scores at T1 were a significant predictor of scores at T2 [β = .459, t = 2.581, p < .05], meaning that those with higher physical QoL at T1 reported higher physical QoL at T2. This remained significant in Model 2 [β = .433, t = 2.117, p < .05].

Psychological QoL. In this domain (Table 2.11) Models 1 and 2 accounted for 39.5% [Adjusted R² = .371] and 59.7% [Adjusted R² = .524] of the variance and both had highly significant F scores, indicating the models were significantly better at predicting variance than a best guess [F = 16.344, p < .01; F = 8.16, p < .01]. At the predictor level T1 scores were a significant predictor of T2 scores in both models [β = .629, t = 4.042, p < .01; β = .5, t = 2.504, p < .05].

Social Relationships QoL. The Social Relationships models had the highest R² and Adjusted R² values of all the models presented and had highly significant F values [Model 1 R² = .604, Adjusted R² = .588, F = 38.106, p < .01; Model 2 R² = .658, Adjusted R² = .595, F = 10.565, p < .01]. This indicates that the models were a reasonably good predictor of outcomes. At
the predictor level T1 scores were a strong predictor of T2 scores in both models $[\beta = .778, t = 6.173, p < .0; \beta = .702, t = 4.508, p < .01]$. These scores indicate that those with higher scores in the Psychological and Social Relationships at T1 were a significant predictor of higher scores at T2.

Environmental QoL. The environmental QoL models showed a poor level of fit, accounting for only 6.7% [Adjusted $R^2 = .30$] and 15.4% of the variance [Adjusted $R^2 = .00$] and producing insignificant F values [Model 1 $F = 1.799$, $p = .192$; Model 2 $F = 1.003$, $p = .427$]. No significant predictors were found.
Discussion

Hypothesis 1: Higher PF will be associated with higher JS and JC at T1

In this sample having higher PF was not associated with higher JS or JC. However a strong correlation was found between JS and JC, indicating these attributes are likely to be found together. This supports previous findings by Karasek (1979, 1990) that job satisfaction and job control interact to influence employee wellbeing. Understanding the demographics of the sample may help to contextualise this result. 74.5% of the sample identified as Managers or Professionals, roles which traditionally involve higher earnings, more autonomy and greater opportunity for variety and control within the job role compared to other categories e.g. Service and Sales workers. This could mean employees have high levels of JC and are able to maintain higher JS regardless of their level of PF. It would be of interest to replicate this study with a larger sample from a wider range of occupations, to determine whether PF would be more strongly associated with JS.

Hypothesis 2: Higher PF, JS and JC will be associated with better psychological wellbeing outcomes at T1

A key finding from this study is that PF is associated with better outcomes in mental health, wellbeing and all quality of life domains in a population of workers approaching retirement. In this context, PF can be understood as a protective factor which may act as a buffer for the stresses and strains of
working life. The framework of functional contextualism would not suggest that individuals with high PF encounter fewer stressful events or are less likely to be predisposed to experiencing mental health difficulties, but rather that individuals with high PF are better able to accept their experiences, adapt accordingly and pursue their values despite obstacles. The protective nature of PF has been demonstrated in many previous studies, however most of these have focused on populations experiencing illness or work stress and it is important to differentiate retirement as a normative life event.

Individuals in this study with higher levels of JS reported significantly better mental health, in line with the findings of Faragher, Cass & Cooper’s recent meta-analysis (2013) that across 500 studies employees with higher job satisfaction were consistently less likely to experience mental health issues, stress, burnout and low self-esteem. Considering the strong association between job satisfaction and control discussed above, it follows that higher JC was also associated with higher wellbeing, and with higher scores in the Psychological and Environment QoL domains.

It is important to note that the associations with mental health scores should be interpreted with caution due to the slightly leptokurtic nature of the CORE-10 data; it is possible that the presence of outliers has inflated their size and significance, causing a Type 1 error. However based on the pattern in the data, it appears that the individual factors discussed – particularly PF - are protective for those still in work. If this result were to be replicated in a larger and more robust sample this knowledge would be valuable for
employers, HR departments and anyone whose main concern is the health and wellbeing of employees. With 15.4 million working days lost to stress, anxiety and depression in the UK every year (Health and Safety Executive, 2019) there is a clear need for organisations to actively support their employees in maintaining good mental health. The findings of this study indicate that organisations might reap long-term benefit from investing resources in increasing PF in their employees, and indeed evidence has begun to emerge in this area (Biglan, Hayes, & Pistorello, 2008). More large scale studies are needed to determine the efficacy of ACT as a preventative intervention in the workplace, and to consider how to operationalise such interventions on a large scale e.g. through a web-based service (Levin, Pistorello, Seeley, & Hayes, 2014).

It appears there is an important role in the workplace for interventions which increase PF to improve worker wellbeing, and that offering such interventions to individuals approaching retirement may also confer some benefit to them during and after this transition. In particular employees with low PF would be likely to benefit from such interventions - both while in work and in retirement - and increased PF may act as a protective buffer in the long-term. In addition, interventions to increase PF may be effective for improving wellbeing in the older population in general, and the potential decrease in burden on mental health and other services might make this an attractive option for policymakers and health services.
Finally, the T1 responses of those who opted to complete the T2 questionnaire were compared to those who did not, to consider whether any of the factors in question were associated with attrition from the study. This analysis found no significant differences between the groups and therefore no evidence that the individual or psychological factors explored were associated with attrition or likelihood to complete both questionnaires.

Hypothesis 3: There will be significant changes in psychological wellbeing from T1 to T2

Another key finding of this study is the significant increase in wellbeing from T1 to T2. The large effect size in this result indicates that this finding is particularly robust. The findings also indicate significant improvements in mental health and physical quality of life, though these effect sizes were small and medium respectively. As before, the mental health findings should be interpreted with caution due to the risk of a Type I error presented by leptokurtic data. However if these findings were to be replicated with a larger sample, they would provide strong evidence that retirement can lead to positive changes in mental health and wellbeing.

Significant improvements were also reported in the Physical, Psychological and Environmental QoL domains. These improvements could be understood as retirees benefiting from being freed from the physical and mental demands of their working life, having more time available for leisure activities, and having increased choice in how they spend their time and attend to their health. It is of note that in the Social Relationships QoL
domain, there was a trend of decreased quality of life; this trend did not reach significance, possibly as a result of a Type II error due to the small dataset. If this finding were to be replicated in a larger sample, it could be interpreted as retirees experiencing the loss of relationships and connections from their working life as they adjust to a new social world. It would also be helpful to examine this over a longer follow-up period, to explore whether this trend continued or adjust over time as retirees build a new network; there is some evidence that while retirement can impact negatively on social relationships, pre-retirement planning is beneficial for building and maintaining supportive social networks (Yeung & Zhou, 2017; Yeung, 2018). With this in mind, it may be helpful for employees who are approaching retirement to be made aware of these patterns to enable them to better prepare for the transition. However it is also important to consider that all quality of life domains will be affected by many additional factors other than retirement. Quality research, like quality clinical work, should try to take into account the potential impact of all aspects of the individual’s life on their wellbeing, and findings like these should not be considered in isolation.

**Hypothesis 4: PF, JS and JC will be predictors of changes in psychological wellbeing from T1 – T2**

Overall the results of the regression analyses were mixed with generally low levels of fit across models with some exceptions. This is likely due to the small sample size, and this issue is discussed further in the Limitations section. However the results did generate some findings of note. PF was a
significant negative predictor of CORE10 scores at T2, indicating that having high PF can account for some of the improvement in mental health during retirement. This finding is in line with the current ACT literature which shows that increasing PF can lead to reductions in a range of mental health difficulties and distress. If this finding were replicated in a larger sample, this would indicate that increased PF is associated with improved mental health over the retirement period and would provide important evidence for the need to develop ACT-based interventions for workers approaching retirement.

Overall significant changes were seen in wellbeing scores during retirement, and having high wellbeing at T1 appeared to make individuals more likely to maintain or improve their overall wellbeing across retirement. However this result is more complex than it initially appears, as higher JC at T1 was also a significant predictor of poorer wellbeing at T2. Through a functional contextualism lens, this could be understood as individuals who were used to high levels of control in their working life experiencing a significant change to their personal context which could make it difficult for them to move towards their values resulting in lower wellbeing. This may also be evidence of an initial adjustment period as individuals become used to the different demands and routine of retired life, and a longer follow-up would help to explain this further. This is a helpful example of the complexity of trying to understand the retirement experience at a population level, and the inherent difficulty in attempting to offer support for a transition which is unique to each individual.
In the Physical, Psychological and Social Relationships QoL domains T1 scores were predictive of T2 scores indicating that most participants maintained their quality of life in these domains across retirement. On the surface, these results appear to fit with continuity theory, which suggests that most individuals will strive to maintain their wellbeing across the retirement transition. However again, the complexity of the data demonstrates that this is not necessarily a good explanation as significant changes were seen in other outcomes (particularly wellbeing and mental health). Within the framework of functional contextualism, this could be interpreted as an overall increase in wellbeing due in part to greater freedom to pursue a values-led life without the restrictions of work, but the absence of tangible change in specific domains of life (e.g. social relationships). This could be because individuals already felt satisfied in these areas, or alternatively that psychological inflexibility prevented them from considering or making changes.

Further investigation of the predictive role of the psychological flexibility in adjustment to the retirement transition is needed, particularly as in this population the chance of both Type 1 and Type II errors is increased due to the sample size. A replication of this study with a larger sample may provide more clarity around whether PF, JS and JC are significant predictors of wellbeing outcomes. However the growing evidence clinical evidence concerning the role of PF in adjustment indicates that greater PF can be a key protective factor across individuals, and it therefore follows that it could
play a protective role in normative life transitions such as retirement; PF could be understood as a valuable psychological resource within the resource theory framework.

**Limitations and strengths**

As indicated, the main limitation of this study is the small sample size. Carrying out regression analyses with small samples greatly increases the risk of a Type II error. Risk of Type I error is also increased, as estimates are less reliable and more prone to bias in the presence of outliers. Hackshaw (2008) warns of the risks of over-interpreting small studies but advises that, rather than dismissing their findings, small-sample studies should be used to inform and design larger, potentially confirmatory studies. The small sample was a result of unforeseen difficulties with timely recruitment and learning from this would be integrated to any future replications of this study; the primary aim of such a replication would be to provide more robust findings to explain how PF, JS and JC impact psychological wellbeing pre and post retirement.

Another limitation of this study is the relatively short follow-up period of three months. While the data provided by a short follow-up could still be viewed as superior to that drawn from a cross-sectional or comparative cohort design, there is inherent risk that the individuals who have transitioned from employment to retirement may still be in the honeymoon period and therefore their reports may not be indicative of their experience of retirement in the long-term. A future replication could incorporate longer follow-ups to
track the progress of individuals further into retirement. Future studies would also benefit from recruiting a more diverse and representative population; the vast majority of participants in this cohort were managers or professionals who retired aged 64 and younger. These factors limit how well the findings can be generalised to the whole working population, including the oldest workers.

A strength of the study is the fact that a longitudinal cohort was established, as opposed to the use of cross-sectional data. While the sample is small, there are significant benefits to follow-up data including the ability to control for bias and increased generalisability of findings (Caruana, Roman, Hernández-Sánchez, & Solli, 2015). In this case a cohort of retired individuals has now been established who have reported comprehensive baseline measurements, and who have given their consent to be contacted for future assessments. It would therefore be possible to follow this small group through their retirement journey, as well as to add new waves of new participants to increase the overall sample size and power.

Another strength of the study is the comprehensive battery of psychological wellbeing measures used, in contrast to other studies which state the intention of exploring the impact of retirement on ‘mental health’ but apply only one measure, generally of depression (Airagnes et al., 2016; Calvo et al., 2013; Shiba et al., 2017). The WHO defines mental health not as the absence of symptoms, but as ‘a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses
of life, can work productively and fruitfully, and is able to make a contribution
to her or his community’ (World Health Organization, 2014). This study
considers a comprehensive definition of mental health not limited to the
presence or absence of symptoms, and takes into account the importance of
individual context in retirement experience.

**Directions for future research**

A key direction for future research is replication of the study design on a
larger scale, with larger samples which would allow for more robust analysis.
Building on the finding of this study that higher PF is significantly associated
with better psychological wellbeing outcomes in older workers, a helpful
study design would be an RCT involving two groups of workers approaching
retirement. Both groups would complete a comprehensive battery measures
as in this study, and both would be provided with information and education
about managing retirement. One group (the intervention group) would also
be given an ACT-based intervention. Both groups would be followed-up long-
term to determine whether increasing PF prior to retirement was related to
better psychological wellbeing outcomes. The findings of such a study would
provide vital information for HR departments and organisations about the
potential benefits of increasing PF in their workers. The findings would be
important for policy makers and health services to understand what kind of
preventative interventions might help those approaching retirement, and how
ACT-based interventions could be effective to improve wellbeing in the
retired population and, in the longer-term, reduce pressures on the services
provided to this group.

The findings of this study suggest that relationships exist between the individuals factors identified and wellbeing across retirement, and has attempted to address this issue at a population level, however as discussed the results are far from clear. An alternative approach to understanding these relationships and the mechanisms begin them is a mixed-method design. A small- \( n \) study focused on the impact of PF, JS and JC on psychological wellbeing at distinct points in time over a longer follow-up could provide a clearer picture of the progression of a smaller number of individuals through retirement. These individuals could be interviewed periodically about their experiences, and qualitative analysis could then be used to build a richer picture of the retirement experience. An approach of this kind would provide greater insight to the individual experience, and these findings could in turn shape further larger scale studies.
Conclusions

In a longitudinal study, psychological flexibility was associated with fewer mental health symptoms, higher wellbeing and higher quality of life in older workers approaching retirement. Job satisfaction was also associated with fewer mental health symptoms, and job control was associated with fewer mental health symptoms and higher quality of life. From pre to post retirement there were significant increases in wellbeing across participants, small decreases in mental health symptoms and increases in the Physical, Psychological and Environmental QoL domains. Higher psychological flexibility was a significant predictor of improved mental health scores across the retirement transition, and higher job control was a significant predictor of decreased wellbeing across the transition. Baseline Physical, Psychological and Social Relationships QoL scores were significant predictors of their respective follow-up scores, indicating that participants were likely to maintain their QoL in these domains. Directions for future research include replications of the design with larger samples, and trials of ACT-based interventions to increase psychological flexibility both in workers preparing for retirement, and in the older population in general. The potential benefits of such interventions are discussed, with particular reference to the potential for reduced burden on health services, an essential consideration in the context of the aging population.
References


chronic disease and long-term conditions. *Clinical Psychology Review, 46,* 46–58.


training and multicultural training on the stigmatizing attitudes and professional burnout of substance abuse counsellors. *Behaviour Therapy, 35*, 821–835.


Appendices

Appendix C: Instructions for Authors from European Journal of Work and Organisational Psychology

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Updated 24-05-2018
**Appendix D: Evidence of bootstrap analysis**

Table D1 Results of kurtosis in original distribution and with bootstrap

<table>
<thead>
<tr>
<th>Score</th>
<th>Original distribution</th>
<th>Distribution with bootstrap (based on 1000 bootstrap samples)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kurtosis</td>
<td>Standard error</td>
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<tr>
<td>CORE-10 T1</td>
<td>3.75</td>
<td>.87</td>
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<tr>
<td>CORE-10 T2</td>
<td>-1.01</td>
<td>.87</td>
</tr>
<tr>
<td>Change T1 – T2</td>
<td>3.88</td>
<td>.87</td>
</tr>
</tbody>
</table>
Appendix E: List of occupation groups presented to participants

Table E1 Occupations taken from International Classification of Occupations (International Labour Office, 1990).

<table>
<thead>
<tr>
<th>Group Number</th>
<th>Master group</th>
<th>Example occupations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Managers</td>
<td>Chief executives; Hospitality, retail and other services managers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Science and engineering professionals; Teaching professionals</td>
</tr>
<tr>
<td>2</td>
<td>Professionals</td>
<td>Health associate professionals; Business and administration associate professionals</td>
</tr>
<tr>
<td>3</td>
<td>Technicians and associate professionals</td>
<td>Genereal and keyboard clerks; Customer service clerks</td>
</tr>
<tr>
<td>4</td>
<td>Clerical support workers</td>
<td>Genereal and keyboard clerks; Customer service clerks</td>
</tr>
<tr>
<td>5</td>
<td>Service and sales workers</td>
<td>Personal service workers; Sales workers</td>
</tr>
<tr>
<td>6</td>
<td>Skilled agricultural, forestry and fishery workers</td>
<td>Market-oriented skilled forestry, fishing and hunting workers; Subsistence farmers, fishers, hunters and gatherers</td>
</tr>
<tr>
<td>7</td>
<td>Craft and related trades workers</td>
<td>Building and related trades; Metal and machinery workers</td>
</tr>
<tr>
<td>8</td>
<td>Plant and machine operators and assemblers</td>
<td>Plant and machine operators; Drivers and mobile plant operators</td>
</tr>
<tr>
<td>9</td>
<td>Elementary occupations</td>
<td>Cleaners and helpers; Food preparation assistants</td>
</tr>
<tr>
<td>10</td>
<td>Armed forces occupations</td>
<td>Commissioned armed forces officers; Non-commissioned armed forces officers</td>
</tr>
</tbody>
</table>
### Appendix F: List of measures used

Please note: For evidence of permission received from authors to use measures in study, please see Appendix G.

#### Table F1 Details of measures used in study

<table>
<thead>
<tr>
<th>Factor</th>
<th>Measure</th>
<th>Author and permissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>The Generic Job Satisfaction Scale</td>
<td>Macdonald, S. &amp; McIntyre, P. D. (1997) Permission received directly from author to use</td>
</tr>
<tr>
<td>Job control</td>
<td>Job Control Scale</td>
<td>Ganster, D. (1989) Permission received directly from author to use</td>
</tr>
<tr>
<td>Mental wellbeing</td>
<td>Short Warwick-Edinburgh Wellbeing Scale (SWEWS)</td>
<td>NHS Health Scotland, University of Warwick and University of Edinburgh (2007) Permission received from University of Warwick to use</td>
</tr>
<tr>
<td>Quality of life</td>
<td>WHO Quality of Life – Brief (WHOQOL-BREF)</td>
<td>Programme on Mental Health, World Health Organisation (1996) Permission received from WHO to use</td>
</tr>
</tbody>
</table>
Appendix G: Permissions obtained for using measures

Comprehensive assessment of Acceptance and Commitment Therapy processes (CompACT)

Submitted by n.moghaddam

The CompACT was developed as a general measure of psychological flexibility (and constituent sub-processes) as conceptualized within the ACT model. The development and initial validation of the measure is reported in the manuscript attached below, which has been published in the Journal of Contextual Behavioral Science (accessible here).

The CompACT is free to use for clinical and research purposes: we have attached the CompACT response form and a scoring calculator below. We hope it will prove to be a useful measure, building on the promise of our initial findings.

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CompACT manuscript (for archiving).pdf</td>
<td>547.81 KB</td>
</tr>
<tr>
<td>CompACT form.pdf</td>
<td>367.85 KB</td>
</tr>
<tr>
<td>CompACT scoring.xls</td>
<td>57.5 KB</td>
</tr>
</tbody>
</table>

RE: Permission to use the Generic Job Satisfaction Scale

From: Peter MacIntyre <Peter_MacIntyre@cbus.ca>
Sent: 22 September 2017 15:02:11
To: GillISON Kara
Cc: Scott MacDonald
Subject: RE: Permission to use the Generic Job Satisfaction Scale

Dear Kara,

It certainly is fine to contact us this way (I am copying Scott Macdonald on this message).

Your project sounds fascinating, and we are happy to give you permission to use the scale in your research.

Might we ask that you share a summary of your results when they become available, if possible – it is always nice to see how the scale is being used in research projects.

Best wishes for success in your research,

Peter

Peter MacIntyre
Psychology, Cape Breton University
1250 Grand Lake Road,
Sydney, Nova Scotia, CANADA
NEW book: Optimizing Nonverbal Communication
http://tinyurl.com/MacIntyreBooks
Re: Research query: Permission to use Job Control Scale for doctoral research

From: Ganster,Dan <Dan.Ganster@colostate.edu>
Sent: 29 September 2017 15:56:17
To: GIBSON Kara
Subject: RE: Research query: Permission to use Job Control Scale for doctoral research

Dear Kara,

I have attached a paper that describes our control scale as well as a file that contains the scale with some additional information. You are free to use the scale and I just ask for proper citation, which would be the Dwyer & Ganster (1991) article.

Best of luck on your research.

Daniel C. Ganster, Ph.D.
Partnership for Excellence Professor
Department of Management
235A Rockwell
Colorado State University
Fort Collins, CO 80523
970-491-2719

From: GIBSON Kara [mailto:s0786407@sms.ed.ac.uk]
Sent: Thursday, September 28, 2017 5:59 AM
To: Ganster,Dan <Dan.Ganster@colostate.edu>
Subject: Research query: Permission to use Job Control Scale for doctoral research

FW: Permission to use WHOQOL-BREF in research study

attached

From: whoqol [mailto:whoqol@vwho.int]
Sent: 20 September 2017 10:37
To: GIBSON, Kara (NHS DUMFRIES AND GALLOWAY)
Subject: RE: Permission to use WHOQOL-BREF in research study

Dear Kara,

Thank you – I received the form. Please find attached the English version of the WHOQOL-BREF, along with related materials.

Best regards,

Sibel

Sibel Volkos (Mrs)
WHOQOL
Information, Evidence and Research (IER) Department
The World Health Organization
20 Avenue Appia
CH-1211 Geneva 27
Switzerland

From: GIBSON, Kara (NHS DUMFRIES AND GALLOWAY) [mailto:kara.gibson@nhs.net]
Sent: 19 September 2017 15:01
To: whoqol
Subject: RE: Permission to use WHOQOL-BREF in research study
Submission (ID: 420115354) receipt for the submission of /fac/med/research/platform/wemwbs/researchers/register

no-reply@warwick.ac.uk
Thu 28/09/2017 12:54

GIBSON Kara

Thank you for completing this registration. You now have permission to use WEMWBS in the manner detailed in your submission.

Question: Name:
Answer:
Kara Gibson

Question: Email address:
Answer:
kara.gibson@nhs.net

Question: Institution/Organisation
Answer:
University of Edinburgh/ NHS Dumfries & Galloway

Question: Name:
Answer:
Dr. David Gillanders

Question: Email address:
Answer:
david.gillanders@ed.ac.uk

Question: Institution/Organisation
Answer:
**Appendix H: Comparison of T1 scores of completers and non-completers**

Table H1 shows the results of the independent \( t \)-tests comparing the T1 results of completers (\( n = 27 \)) and non-completers (\( n = 24 \)). For all factors, Levene’s test indicated that equal variance could be assumed.

**Table H1 Results of independent \( t \)-tests comparing completers and non-completers**

<table>
<thead>
<tr>
<th>Factor</th>
<th>F</th>
<th>Sig.</th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean difference</th>
<th>Std. error</th>
<th>95% confidence interval</th>
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<td>Psychological flexibility</td>
<td>2.3</td>
<td>.958</td>
<td>.315</td>
<td>4</td>
<td>.608</td>
<td>.80</td>
<td>1.55</td>
<td>-2.32, 3.92</td>
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<tr>
<td>Job satisfaction</td>
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<td>.982</td>
<td>.246</td>
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<td>.731</td>
<td>.32</td>
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<td>Job control</td>
<td>1.0</td>
<td>.315</td>
<td>.842</td>
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<td>.355</td>
<td>-.367</td>
<td>3.93</td>
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<td>Mental health</td>
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<td>.875</td>
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<td>Wellbeing</td>
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<td>Physical QoL</td>
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</tbody>
</table>
Appendix I: Checking for confounding variables in regression analysis

The tables below show the results of analysis to determine whether the demographic factors of age, gender, employment status and preparedness for retirement function as confounding variables in the regression analysis. For each factor, group statistics are followed by the results of independent t-tests or one-way ANOVA to identify any significant differences. Levene’s Test indicated that equal variances could be assumed on all tests but one which is indicated by *. For this test, equal variances were not assumed.

Table I Group statistics for age bracket, sub-groups “60 - 64” and “65 - 69”

<table>
<thead>
<tr>
<th>Factor</th>
<th>Age bracket</th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
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<tr>
<td>Mental health</td>
<td>60 - 64</td>
<td>13</td>
<td>7.615</td>
<td>2.631</td>
<td>0.730</td>
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<tr>
<td></td>
<td>65 - 69</td>
<td>14</td>
<td>7.857</td>
<td>7.03</td>
<td>1.881</td>
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<tr>
<td>Wellbeing</td>
<td>60 - 64</td>
<td>13</td>
<td>18.762</td>
<td>2.155</td>
<td>0.598</td>
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<tr>
<td></td>
<td>65 - 69</td>
<td>14</td>
<td>19.264</td>
<td>3.212</td>
<td>0.858</td>
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<tr>
<td>Physical QoL</td>
<td>60 - 64</td>
<td>13</td>
<td>76.292</td>
<td>14.280</td>
<td>3.961</td>
</tr>
<tr>
<td></td>
<td>65 - 69</td>
<td>14</td>
<td>78.871</td>
<td>14.667</td>
<td>3.920</td>
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<td>Psychological QoL</td>
<td>60 - 64</td>
<td>13</td>
<td>72.131</td>
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<td>76.923</td>
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<tr>
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<td>65 - 69</td>
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<td>72.621</td>
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Table I2 Results of independent t-tests for significant differences by age bracket

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<th>Mean difference</th>
<th>Std. error</th>
<th>95% confidence interval</th>
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Table I3 Group statistics for gender, sub-groups “Male” and “Female”

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<td>df</td>
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Table I5 Group statistics for employment status, sub-groups “Full Time (FT)” and “Part Time (PT)”

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Table I6 Results of independent t-tests for significant differences by employment status

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<th>Std. error</th>
<th>95% confidence interval</th>
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Table I7. Group statistics for preparedness for retirement, sub-groups “Fully prepared”, “Mostly prepared”, “Slightly prepared” and “Unprepared”

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Table I8 Results of ANOVA for significant differences by preparedness for retirement

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<td>0.127</td>
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<tr>
<td>Within Groups</td>
<td>4943.656</td>
<td>23</td>
<td>214.942</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6300.927</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Social Relationships QoL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>2255.294</td>
<td>3</td>
<td>751.765</td>
<td>1.824</td>
<td>0.171</td>
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<tr>
<td>Within Groups</td>
<td>9481.064</td>
<td>23</td>
<td>412.22</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
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<td></td>
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<tr>
<td>Environmental QoL</td>
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<td>Between Groups</td>
<td>519.15</td>
<td>3</td>
<td>173.05</td>
<td>1.484</td>
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<tr>
<td>Within Groups</td>
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<td>23</td>
<td>116.647</td>
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<td></td>
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<tr>
<td>Total</td>
<td>3202.032</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix J: Testing distribution of regression

Table J1 shows the outcome of the relevant tests of normality for the forced entry multiple regression analyses. Acceptable parameters for Durban Watson’s statistic, VIF rates, Cook’s distance, tolerance statistics and central leverage values were taken from Field (2013). Mahalanobi’s distance was determined using guidance from Barnett & Lewis (V. Barnett & Lewis, 1978).

Table J1 Testing distribution of regression data

<table>
<thead>
<tr>
<th>Measurement [acceptable parameter]</th>
<th>Mental health</th>
<th>Wellbeing</th>
<th>Physical QoL</th>
<th>Psychological QoL</th>
<th>Social Relationship QoL</th>
<th>Environmen t QoL</th>
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</thead>
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<tr>
<td>Durban Watson [Between 1 – 3]</td>
<td>1.819</td>
<td>1.457</td>
<td>1.84</td>
<td>1.314</td>
<td>1.783</td>
<td>1.347</td>
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<tr>
<td>VIF rates [Approximately 1]</td>
<td>1.715</td>
<td>1.89</td>
<td>1.205</td>
<td>1.857</td>
<td>1.299</td>
<td>1.248</td>
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<td></td>
<td>1.285</td>
<td>.158</td>
<td>1.017</td>
<td>1.223</td>
<td>1.201</td>
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<td></td>
<td>1.382</td>
<td>1.044</td>
<td>1.062</td>
<td>1.092</td>
<td>1.031</td>
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<td>Tolerance statistics [Above .2]</td>
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<td>.529</td>
<td>.83</td>
<td>.528</td>
<td>.77</td>
<td>.801</td>
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<td>Cook’s distance [Below 1]</td>
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<td>.048</td>
<td>.057</td>
<td>.05</td>
<td>.079</td>
<td>.057</td>
</tr>
</tbody>
</table>
Appendix K: Visual representation of regression analysis

Figure 1 K1 shows the scatterplots and relevant regression lines of the regression models for each psychological wellbeing variable.
The diagram shows a scatter plot with the WHOQOL Physical Domain score (1 - 100 scaled score) on the Y-axis and the WHOQOL Physical Domain score (1 - 100 scaled score) on the X-axis. The line of best fit has the equation $y = 59.34 + 0.33x$. The coefficient of determination, $R^2$, for the linear model is 0.216.
Figure K1 Scatterplots and regression lines for psychological wellbeing variable regression models
Whole Thesis References


chronic disease and long-term conditions. *Clinical Psychology Review, 46,* 46–58.


handbook of contextual behavioural science (pp. 1–6). Chichester, UK: John Wiley & Sons, Ltd.


Lindwall, M., Berg, A. I., Bjalkebring, P., Buratti, S., Hansson, I., Hassing, L., Henning, G., Kivi, M., Konig, S., Thorvaldsson, V., & Johansson, B.


functioning? Whitehall II longitudinal study of civil servants. *Journal of Epidemiology and Community Health, 57*, 46–49.


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climate perceptions and work outcomes: A meta-analytic review.  

Mindfulness-based interventions for adults who are overweight or obese: A meta-analysis of physical and psychological health outcomes. *Obesity Reviews, 18*, 51–67.


Whole Thesis Appendices

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Appendix L: NHS Dumfries & Galloway ethics approval and amendment approval

Dear Kara

Thank you for sending me details of your study with a request for management approval. I can confirm that the study review team has reviewed the documentation and on this basis I am pleased to inform you that your study has management approval for commencement within NHS Dumfries and Galloway.

It is a condition of this approval that everyone involved in this study abides by the guidelines/protocols laid down by this Health Board in respect of confidentiality and Research Governance. It is your responsibility to ensure you are familiar with these; please do not hesitate to seek advice if you are unsure. Copies of Research Governance Framework documents are available via the website www.scoh.scot.nhs.uk/eco and then use the publications link.

We also note that it is the sponsor’s responsibility to ensure that appropriate training is in place for all local investigators. It is important that all research must be carried out in compliance with the Research Governance Framework for Health and Community Care and the new EU Clinical Trials Directive (for clinical trials involving investigational medicinal products).

As part of the Health Board’s responsibilities under Research Governance a sample of studies will be monitored, and it is therefore important that all records in connection with the study are kept up to date and available for review. We are also required to inform you that details of your study will be entered onto our R&D database. As custodian of the information collated during this research project, you are responsible for ensuring the security of all personal information collected, in line with NHS Scotland IT Security Policies, until the destruction of this data.
If your study is adopted by UKCRN into a portfolio then please advise this department of recruitment figures by adding accrual data to that database on a monthly basis.

Please notify the R&D office immediately you become aware of any serious adverse events associated with this research.

You must contact the R&D Department if/when the project is subject to any minor or substantial amendments so that these can be appropriately assessed, and approved, where necessary. I understand that performance of this study will not infringe on NHS Dumfries and Galloway’s ability to deliver our usual level of service.

May I take this opportunity to wish you every success with your project. Please do not hesitate to seek help and advice from the R&D Support Unit (ext 33165/33815) if there is anything you feel you require assistance with. I look forward to hearing about your work and would appreciate a short annual report and a final report when the study is complete.

Yours Sincerely

[Signature]

Mrs Janie Candlish
Clinical Trials/Research Project Manager

c: SREDA Database; Charlotte Smith, Research Sponsor (Edinburgh University), Dr David Gillanders, Academic Supervisor (Edinburgh University), Ana Slim (Price), Consultant Clinical Psychologist, NHS Dumfries and Galloway.
Dear Kara,

I have reviewed the amendment in connection with the above project and am pleased to inform you that this amendment has management approval for commencement within NHS Dumfries and Galloway.

It is a condition of this approval that everyone involved in this study abides by the guidelines/protocols laid down by this Health Board in respect of confidentiality and Research Governance. It is your responsibility to ensure you are familiar with these; please do not hesitate to seek advice if you are unsure.

If your study is adopted by UKCRN into a portfolio then please advise this department of recruitment figures by adding accrual data to that database on a monthly basis.

Thank you for keeping us informed about your study.

Yours sincerely,

[Signature]

Jane Candlish
Clinical Trials & Research Projects Manager

Cc Charlotte Smith, University of Edinburgh

Copies of Research Governance Framework document available via the website www.sehd.scot.nhs.uk/cso and then use the publications link.
Appendix M: University Ethics Research Panel project approval amendment by email and approval of amendment by email

Kara Gibson  
Trainee Clinical Psychology  
School of Health in Social Science  
University of Edinburgh

12 December 2017

Dear Kara,

Application for Level 2 Approval

Reference:  CLIN431  
Project Title:  The Psychological Impact of Retirement  
Academic Supervisor:  David Gillanders

Thank you for submitting the above research project for review by the Department of Clinical and Health Psychology Ethics Research Panel. I can confirm that the submission has been independently reviewed and was approved on the 29th November 2017.

Should there be any change to the research protocol it is important that you alert us to this as this may necessitate further review.

Yours sincerely,

Kirsty Gardner  
Administrative Secretary  
Clinical Psychology
Re: Approved application CLIN431
Title: The psychological impact of retirement
Supervisor: Dr. David Gillanders

I am contacting you to submit an amendment to my existing approved application. Please find attached the following documents:
- Updated REA Level 2 form with amendment indicated in yellow highlight
- Additional Appendix 6 with relevant supporting information
- Updated Research Protocol with amendment indicated in yellow highlight

I look forward to hearing from you.

Best wishes,

Kara Gibson

Dear Kara,

I'm happy to approve this.

Best wishes,

Angus

Angus MacBeth
Lecturer in Clinical Psychology
Ethics Tutor
Appendix N: Research Protocol (Version 2)

The Psychological Impact of Retirement

Researcher and Protocol Author: Kara Gibson (0786407)

s0786407@sms.ed.ac.uk

Version 2 May 2018 (updated and approved to reflect Amendment)

Research Protocol

Background to study

Impact of retirement

Retirement is defined as 'the action or fact of leaving one's job and ceasing to work'. Retirement represents a significant time of transition for many people, as they experience changes to their routine, activities, demands, relationships, and purpose. Until now, a range of research has studied the impact of some of these changes on the health and wellbeing of retired people, and some of these results are summarised below.

The existing literature indicates that the relationship between retirement and health and wellbeing is complex, and studies often produce contradictory results. In general, there are two interpretations found across the literature. The first is that retirement is a positive transition which brings decreased stress, greater autonomy, and more time for people to do the activities they value (Bosse et al., 1991; Midanik, Soghikian, Ransom & Tekawa, 1995; Mein et al., 2003). The opposing view is that retirement represents a loss of purpose and identity, a decrease in sense of control day-to-day, and can cause financial difficulties for the individual (Butterworth et al., 2006; Maes & Stammen, 2011).
Importantly, some researchers have identified methodological issues – or issues with how the studies have been conducted and therefore how valid they are – with the existing literature. These include lots of variance in the concepts explored and the measured use, which make it difficult to compare across different studies (Drentea, 2002; Minkler, 1981). The existing evidence base therefore indicates that different individuals respond differently to retirement, but no unified theory regarding what that impact looks like. Further research is required to understand this better. There are two main reasons why this study is different from the existing research. Firstly, there are few studies which have followed a large group of people consistently from pre- to post-retirement focusing exclusively on their psychological wellbeing (rather than their physical health). Secondly, there are no other studies we are aware of which have looked at the role of psychological flexibility in how people manage retirement.

**Choice of individual factors**

There is evidence that individual factors may impact on a person’s experience of retirement. This study will focus on three: psychological flexibility; job satisfaction and job control.

*Psychological flexibility*

Acceptance and Commitment Therapy (ACT) is a third-wave cognitive behavioural therapy which frames the human experience of suffering as the result of psychological inflexibility (Hayes, Strosahl & Wilson, 1999). Within ACT, psychological flexibility is defined as follows:

“the measure of how a person:

(1) adapts to fluctuating situational demands,
(2) reconfigures mental resources,
(3) shifts perspective, and
(4) balances competing desires, needs, and life domains.”
The overall purpose of ACT is to increase psychological flexibility by addressing and increasing the following six processes: acceptance; cognitive defusion; committed actions; self as context; contact with the present moment, and values. This has been found to be effective for treating anxiety and depression, chronic pain and other long-term health conditions (A-Tjak et al., 2015). Research has also explored how psychological flexibility is related to employee and organisational performance, showing that higher levels of psychological flexibility were related to better mental health outcomes and job performance (Bond & Flaxman, 2006) and more effective learning of new skills (McCrackern & Yang, 2008). Some evidence therefore appears to indicate that psychological flexibility can mediate mental health difficulties and work performance, but as yet no known studies have specifically focused on the impact of psychological flexibility on individuals’ experiences of retirement.

**Job satisfaction and control**

Herzog, House & Morgan (1991) found that retirement status was not related to physical or psychological wellbeing, however the individual’s attitude to work was crucial (whether they chose to work, and how much control they had over that work). Those who worked by choice and had greater control at work reported lower depression scores, higher quality of life and greater physical wellbeing than those who reported low control over work, or whose work status did not match their preference. In addition Ryser and Wernli (2016) found that job satisfaction and job precariousness both impacted on retirement; those whose jobs were precarious prior to retirement experienced fewer negative emotions once retired, and those who reported high job satisfaction prior to retirement experienced poorer mental health once retired. These studies indicate that factors to do with the employment the individual has left may impact on their experience of retirement.

There is therefore evidence to indicate that psychological flexibility, job satisfaction and job control impact retirement, and therefore merit further investigation. The proposed research
aims to investigate the potential role of psychological flexibility, job satisfaction and job control as influences on the experience of retirement.

**Real world impact**

Retirement is one of the most significant transitions faced by the older adult population, and as discussed above the impact of this transition on the individual is not fully understood. However the evidence indicates that at least some proportion of the retired population report a negative impact of retirement on their mental health and wellbeing. It can therefore be assumed that a proportion of the current working population will, in the future, notice a negative impact of or have difficulty adjusting to retirement.

To understand who the most vulnerable individuals are, it is crucial that more robust studies are carried out which follow large groups of people from a range of work settings and socioeconomic groups through their retirement experience. This way, the results can be more generalisable to the rest of the population, and easier for future researchers to repeat.

If these individuals could be identified by their organisation prior to retirement, it could be possible for the organisation to provide support for them to cope with the upcoming transition. Discussion of this concept will be informed by the results of the study.

**Study objectives**

The primary aim of the study is to explore the impact of retirement on the psychological wellbeing of a group of participants. Psychological wellbeing will be measured using three factors: mental health, mental wellbeing, and quality of life. The study will compare participants’ results on measurements of these three factors pre- and post-retirement and then analyse any differences found. The working hypothesis of the study is that some individuals will show changes in their scores (for better or worse) pre- and post-retirement, as they adjust to the transition.
The secondary aim of the study is to explore the impact of three individual factors (job satisfaction, job control and psychological flexibility) on the experience of retirement. These three factors will be measured at the beginning of the study, and this will allow the researcher to create sub-groups for comparison. For example, the changes from pre- to post-retirement in psychological wellbeing can be compared for individuals who reported high levels of psychological flexibility, and individuals who reported low levels of psychological flexibility. The working hypothesis is that these factors may influence results for some individuals, e.g. those with higher levels of psychological flexibility may report more positive changes from pre- to post-retirement as they find themselves more able to cope with the transition.

As this is not a clinical trial, endpoints have not been identified.

**Study population**

**Sample size**

The aim is to recruit 200 participants to the study; this should ensure the required number of 107 is achieved allowing for attrition. The required number was arrived it following a power calculation using Green's method (Green, 1991).

**Inclusion/exclusion criteria**

**Inclusion:**

- Individuals over the age of 55 who are employed in a paid capacity who are preparing to retire in the next six months
- Individuals who are taking medical retirement (providing they do not meet the exclusion criteria detailed below)
- Individuals who are retiring from working full-time or part-time hours
- Individuals who are retiring following a phased reduction in their hours

**Exclusion**

- Individuals under the age of 55
- Individuals who have already retired
• Individuals who are being forced to retire due to a significant problem with cognition that might influence their capacity to consent or to answer questions. This could include individuals who have experienced a head injury, stroke, neurological illness or other
• Individuals who are not fluent English speakers (as all questionnaires are not validated for non-English speakers)

Recruitment

Direct recruitment

The researcher will approach organisations with an HR department in Dumfries & Galloway and across the central belt to introduce the project. These organisations will include the Integrated Health & Social Care Board of NHS Dumfries & Galloway. The following organisations have also been identified for approach:

• The University of Edinburgh
• Napier University
• Tesco Retail
• Santander
• University of Glasgow (Dumfries Campus)
• Standard Life
• Tesco Bank
• Edinburgh Leisure
• Dumfries and Galloway Leisure Club
• Third sector organisations e.g. Support in Mind
• Care homes including Alba Care

Interested organisations will be asked to identify employees who are approaching retirement and contact them to advertise the project. These individuals will then have the following options: a) contact the researcher directly to take part b) give consent for their HR department to pass their contact details to the researcher or c) decline to take part.

Those who choose to contact or be contacted by the researcher will be provided with the Participant Information Sheet (see supporting document: Participant Information Sheet.Version 1.12th Feb 2018.Kara Gibson.DClinPsy.Impact of Retirement).

All individuals whose details are passed to the researcher, or who contact the researcher directly, will be provided with the Participant Information Sheet and given the opportunity to
ask questions. Those who decide to take part in the study will then be considered Participants.

Indirect recruitment

Advertising information (see supporting document: Advertising Flyer. Version 1.12th Feb 2018. Kara Gibson. DClinPsy. Impact of Retirement) will be placed in relevant community locations e.g. libraries, community centres, supermarkets, and advertised on social media (E.g. Twitter, Facebook). This will include introductory information about the project, the Participant Information sheet, and contact details to contact the researcher to find out more. Any individual who contacts the researchers will be provided with the Participant Information Sheet and given the opportunity to ask questions.

Participants will also be recruited through ‘Call for Participants’ (CFP) [https://www.callforparticipants.com/researcher]. This is an online service which holds a database of active academic research projects requiring participants. These studies are available for all potential participants who visit the site to opt-in to, provided they meet the inclusion criteria. CFP does not give the researcher access to any participant information/contact information and CFP does not have access to participants’ responses; the platform simply directs relevant participants who chose to opt-in to the survey page. There is a charge of £20 for a one-off study page which will be funded by the researcher. The use of this platform has been approved by The University of Edinburgh Information Security Service.

Those who decide to take part in the study will then be considered Participants.

Consenting process

All participants will be asked to read the consent form (see supporting document: Consent Form. Version 1.12th Feb 2018. Kara Gibson. DClinPsy. Impact of Retirement) prior to
taking part in the survey (this will be shown to them as one of the first pages of the online survey, prior to them completing any of the questions). The consent form outlines the process of the study and how their information will be used, as well as outlining any potential risks. It will inform participants that they have the right to withdraw from the research at any time, without consequence. This consent form will be repeated at each measurement point.

At the end of the study, participants will be asked to give consent for their details to be retained on a secure database so that they may be contacted about future research projects.

**Study Design**

The study will use a prospective longitudinal design. Comparisons will be made between the results of the same individuals at different time points.

**Measurement timescale**

Participants will be asked to complete an online survey (Jisc Online Surveys) at four timepoints: Pre-retirement (within six months of retiring); and then 3, 6 and 12 months post-retirement.

**Content of survey**

*Pre-retirement measurement*

The following demographic information will be collected:

- Gender
- Age bracket

The following employment factors will be measured:

- Size of organisation
- Whether the organisation has formal retirement preparation process
- Reason for retirement (i.e. choice, forced, medical)
- Planned date of retirement

The following individual factors will be measured:
- Psychological flexibility (measured using CompACT; Francis, Dawson & Golijani-Moghaddam, 2016)
- Job satisfaction (measured using Generic Job Satisfaction Scale; Macdonald & McIntyre, 1997)
- Job control (measured using Work Control Scale; Dwyer & Ganster, 1991)

The following psychological wellbeing variables will be measured:

- Mental health – to capture any specific mental health difficulties the person has experienced (measured using CORE-10; Connell & Barkham, 2007)
- Mental wellbeing – to capture the individual's general sense of how they are and how they feel, as distinct from psychological distress (measured using SWEMWBS; NHS Health Scotland, 2008)
- Quality of life – to capture the person's sense of the meaning, purpose and satisfaction derived from life (measured using WHOQOL-BREF; Skevington, Lofty & O'Connell, 2004)

It is estimated that this online survey will take participants 30 – 40 minutes.

Post-retirement measurements (at 3, 6 and 12 months)

The psychological wellbeing variables only will be measured. It is estimated that this survey will take around 20 minutes.


Analysis and interpretation of results

One option for analysis is to use a regression based design. The independent variables would be psychological flexibility, job satisfaction and job control. The primary dependent variable would be 'successful adjustment to retirement', which would be operationalised using the following dependant variables:

- Not meeting threshold for a mental health disorder (within healthy – mild range on CORE-10) at follow-up
- Good well-being scores at follow-up
- Good quality of life scores at follow-up

Regression analysis would allow the researcher to compare baseline measurements from participants to follow-up. This will ensure that participants are compared to their own norm
and increase the chance of detecting change specifically related to retirement. This should reduce the chance of the ambiguity discussed in many of the papers in the literature review, where participants may score significantly on wellbeing measures post-retirement but it is unclear whether this was caused by retirement, or whether these issues were present prior to retirement.

Standard multiple regression would be used for wellbeing and quality of life scores, as these scales are continuous variables. To analyse the categorical CORE-10 results – which categorise individuals in the healthy or disordered range – logistic regression would be used. The statistical analysis package SPSS Statistics would be used to carry out this analysis.

A more sophisticated approach to analysis involves using MLM. In MLM individuals are seen as one level of sampling; individuals are also part of various contextual variables or groupings which may influence their responding. In the proposed research, these nestings may include the size of organisation worked for. MLM is a versatile approach to analysis; with sufficient numbers recruited to each group the analysis can then identify variance in responding due to the individual, time and the group they come from (Hayes, 2006). Compared to regression, MLM would allow the researcher to analyse patterns of change over time, and to see if they vary according to the different groups participants are nested in. MLM would require use of the statistical analysis programme ‘R’.

As the researcher is currently familiarising themselves with the MLM approach, both methods of analysis have been included in the proposal to ensure that a realistic alternative is available should the MLM analysis turn out not to be appropriate.

**Interpretation of results**

Interpretation of the results will focus on the hypotheses described above. Comparisons will be made between pre-retirement and post-retirement measurements of the psychological
wellbeing factors (mental health, mental wellbeing and quality of life); separate comparisons will be made for pre-retirement vs. 3-month follow-up, pre-retirement vs. 6-month follow-up and pre-retirement vs. 12-month follow-up.

Further comparisons will be drawn according to individual factors (e.g. psychological wellbeing outcomes of those with high vs. low psychological flexibility). Using the existing evidence base, the researcher will then propose potential explanations for any significant differences found, and explore the implications of these differences. This will lead to recommendations for future research, and discussion of potential interventions or actions which could be taken to identify and support those who may struggle to manage the retirement transition.

List of abbreviations

CompACT – Comprehensive Assessment of Acceptance and Commitment Therapy processes
CORE-10 – Clinical Outcomes in Routine Evaluation
HR – Human Resources
MLM - Multi-Level Modeling
NHS – National Health Service
SPSS Statistics – Statistics Package for the Social Sciences
SWEMWBS – Short Edinburgh-Warwick Wellbeing Scale
WHOQOL-BREF – World Health Organisation Quality of Life – Brief Measure

References


NHS Health Scotland, University of Warwick and University of Edinburgh. (2008). Short Warwick Edinburgh Mental Well-Being Scale (SWEMWBS). Retrieved with permission from: http://www2.warwick.ac.uk/fac/med/research/platform/wemwbs/ on 25/05/17

Appendix O: Participant Information Sheet (Version 3)

Participant Information Sheet
Version 3/November 2017

Who is the researcher?
Kara Gibson is a trainee Clinical Psychologist working as a clinician in NHS Dumfries & Galloway while studying for a Doctorate in Clinical Psychology at The University of Edinburgh. This research project is the largest piece of work involved in this qualification. An experienced academic researcher from the university is supervising the project.

What is the purpose of the project?
The project will try to understand how retirement affects the retiree’s psychological wellbeing. By psychological wellbeing, we mean people’s mental health (whether they are experiencing distress or symptoms of mental illness), mental wellbeing (whether they feel that they are well and content) and quality of life (how satisfied/pleased they are with how their life is going).

We want to understand:

- Overall, do people see an improvement, deterioration or no change in their psychological wellbeing after they retire?
- Do different types of people experience retirement differently?
- Do people who do different types of jobs experience retirement differently?
- Does how much you enjoy/feel satisfied by your job affect how you experience retirement?
- Does your style of thinking affect how you experience retirement?

By understand this better, we hope that in the future we can help organisations to better support their employees in preparing for retirement.

Can I take part in the study?
In the study we’re going to identify a large group of people who are approaching retirement in the next few months. You are eligible to take part in the study if:

- You are currently in employment
- You are planning to retire in the next 6 months
- You are a native English speaker
- You have not experienced any significant illness or injury which would prevent you from giving consent or answering questions (some examples of this might be a stroke, neurological disorder or head injury). If you are unsure whether this applies to you, and you are interested in taking part in the study, please contact us to discuss.
What will I have to do?
Participants will be asked to complete a questionnaire which asks about their mental health, mental wellbeing and quality of life on five occasions: before they retire, and then 3, 6, and 12 months post-retirement. This will help us to understand if changes happen in the short- or long-term.

Pre-retirement, we will also be gathering information about participants’ current employment: what their job is, how much satisfaction they get from it, and how much control they have over it. This will help us to understand whether people’s experience of work affects their experience of retirement.

We will also ask some questions about why participants are retiring, and what support is available from their employer. While we will ask general questions about the pension infrastructure of the organisation, we will not ask participants to divulge personal details about their finances.

Finally, participants will be asked to answer some questions pre-retirement about what we call psychological flexibility – this includes how you think about and cope with change, how open you are to different experiences, and what gives your life meaning and purpose. This will help us to understand if thinking style affects how participants experience retirement.

The questionnaires will be sent by email to be completed online; they can also be sent on paper if this is your preference. They should take about 20 – 30 minutes to complete each time.

How will you use my information?
All of the information gathered will be kept privately and securely, according to the University’s data protection guidelines. It will never be passed on to any third-party organisation. If you choose to take part, you will be provided with more detailed information on how the research data will be stored and used.

What’s in it for me?
As a thank-you for your time and contribution to the research, participants can choose to be entered into a prize draw for each questionnaire they complete for the chance to win a £30 Amazon gift voucher.

At the close of the study, all participants will receive a summary of the findings. Organisations who have supported the study will also have access to these results, and we hope the information we gather will help them in their future Human Resources practice to identify employees who might potentially struggle with retirement.

In the long-term, we hope that the findings of this research will contribute to our understanding of how retirement affects different people, and how we can identify and support people who are more likely to find retirement difficult.

If I say yes, does that mean I have to take part?
If you choose to take part in the project, you can change your mind and withdraw at any time without consequence, until the study has closed. You don’t have to tell us why, and your information would be removed from the study.

This sounds interesting – I’d like to take part, or find out more…
Great! Please contact the researcher on the details below. The researcher will then contact you to provide some more information, and answer any questions you might have.
Kara Gibson (Trainee Clinical Psychologist)
School of Health in Social Science, The University of Edinburgh
Email: s0786407@sms.ed.ac.uk
Tel: 07581578039

When emailing, it would be extremely helpful if you could use “Retirement research participant enquiry” in the subject line, to make sure your message is prioritised.

I know a few other people who are retiring. Can I pass this information on to them?

Please do! We would be delighted to hear from anyone who meets the criteria identified above.

Thank you and we look forward to hearing from you!
Appendix P: Participant Consent Form (Version 2)

Online Participant Consent Form
Version 2/September 2017

By checking the box at the end of this page, you are agreeing with all of the following:

- I understand the purpose of the study I am taking part in.
- I have given my consent for the researcher to contact me by email, text or telephone to remind me to take part in the study.
- I understand that some of the questions will ask about my mental health and wellbeing, and that some participants may find this distressing.
- I have been provided on the previous page with information on where to go if I am concerned about mental health or need support.
- I understand that I have the right to withdraw from the study at any time without penalty.
- I understand that the information I submit to the study will be kept confidential within the research team and stored in accordance with the University of Edinburgh’s data management policy.
- I understand that no personal information will be published as a result of this project. I understand that my information will be published in an anonymous format as part of a larger sample.
- I have had the opportunity to ask questions about my participation in the study.

I understand and give my consent
PARTICIPANTS NEEDED!
ARE YOU PREPARING FOR RETIREMENT?

What is the study?

We are interested in the psychological impact of retirement – in short, how are people affected by the changes in their life when they retire? We want to find out:

- Does peoples’ mental health and wellbeing get better, worse or stay the same when they retire?
- Do working conditions affect retirement?
- Do people with different thinking styles experience retirement differently?

The study involved completing four online questionnaires – one before you retire and three after. For each questionnaire completed, you will have the chance to enter a prize draw to win a £20 Amazon voucher.

Who is running the study?

The researcher is a trainee Clinical Psychologist from the University of Edinburgh, working as a clinician in NHS Dumfries & Galloway. The University of Edinburgh Ethics Committee and NHS Dumfries & Galloway Research & Development Committee have approved the study.

Can I take part?
- Are you currently in paid employment, and approaching retirement in the next six months?
- Are you a native English speaker?
- Are you over the age of 55?

If you answered **yes** to the questions above, you could be eligible to take part in this exciting study.

**What do I do next?**

Get in touch! Take one of the slips below to contact us and find out more.