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FACULTY OF MEDICINE

<u>Human Development and Health</u>

THE ROLE OF MODIFIABLE WORK-RELATED FACTORS IN RETIREMENT DECISIONS. THE HEALTH AND EMPLOYMENT AFTER FIFTY, FACTORS INFLUENCING RETIREMENT STUDY (HEAF FIRST). A MIXED METHODS STUDY IN THE UK

by

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Thesis for the degree of Doctor of Philosophy

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UNIVERSITY OF SOUTHAMPTON

<u>ABSTRACT</u>

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Increased left expectancy coupled with decreased birth rates has resulted in an 'ageing society' with increases in the proportion of older people compared to traditional 'working age' people. Therefore, many countries are seeking to encourage working to older ages.

This thesis explored the role that work-related factors play in individuals' retirement decision-making, with a focus on factors that employers could potentially modify. Mixed-methods research was conducted in three phases.

Phase one: Qualitative interviews were conducted with 17 recent retirees asking about factors which influenced their retirement. Thematic analysis showed that work-related factors were important, and both 'pushed' the retirees towards retirement, but also 'pulled' back towards work.

Phase two: A systematic review was conducted to explore the evidence as to which work-related factors affected the decision to retire (since 2000). Over 150 factors had been investigated but the literature was heterogeneous. Overall, the most consistent evidence was for increased levels of job control and more appreciation at work being factors which reduced risk of retirement.

Phase three: A nested case-control study was conducted within the Health and Employment After Fifty study. Questionnaires, informed by results from the two previous phases, were sent to incident retirees and age and sex-matched workers. After adjustment for age, sex, financial position, socio-economic position and marital status, the results showed that: job dissatisfaction; irregular hours; unhappiness with hours; effort reward imbalance; perception of declining standards; isolation at work; feelings of 'us vs them'; the demand-control-support model; being in a workplace that was not perceived to encourage later working; kneeling/squatting; commuting for more than 30 minutes; overnight stays; less flexibility; being constantly available; and work-life conflict were all factors associated with an increased risk of being retired.

HEAF FIRST suggests that work-related factors are important in retirement decisions and the factors identified could be investigated in further studies and/or employer-led interventions.

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Academic Thesis: Declaration Of Authorship

I, Martin John Stevens, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

The role of Modifiable Work-Related Factors in Retirement Decisions. The Health and Employment after Fifty, Factors Influencing Retirement Study. (HEAF FIRST). A mixed methods study in the UK

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. Parts of this work have been published as a preprint:
   https://www.researchsquare.com/article/rs-537101/v1.

Signed: ....

Date: 11/11/2021...

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I'd like to dedicate this thesis to the people who believed I was capable of obtaining a PhD, even when I myself doubted it:

My wife Dr Sarah Airdrie who supported me throughout this recent life phase and several other major life phases; my mother Theresa Doherty and my sister Louisa Stevens who shared my early academic experiences in what seems a previous life.

My supervisors Professor Elaine Dennison and Professor Mary Barker for being supportive throughout. My colleagues Dr Clare Harris and Dr Catherine Linaker for assisting at all stages, especially with study design and data collection. Dr Holly Syddall and Stefania D'Angelo for being great statistics mentors (even if we can't find a fool proof way of copying a table between Stata and Word).

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Julie Coleman	Assistance with mail-out of questionnaires and data entry
Janet Comley	Assistance with mail out of questionnaires and data entry
Vanessa Cox	Assistance with dataset manipulation
James Gifford-Hull	Data entry of questionnaires

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Definitions and Abbreviations

BHPS   British Household Panel Survey

BL   Baseline data collection (questionnaire) in the HEAF cohort 2013/14

CH   Dr Clare Harris (team member)

CL   Dr Catherine Linaker (team member)

COPSOQ   Copenhagen Psychosocial Questionnaire

DB   Defined Benefit (type of pension)

DC   Defined contribution (type of pension)

DCSQ   Demand Control Support Questionnaire

DoB   Date of birth

DWP   The Department for Work and Pensions

ECHP   European Community Household Panel survey

ELSA   English Longitudinal Study of Ageing

ERI   Effort Reward Imbalance

FU   Follow-up data collection (questionnaire) in the HEAF cohort

GP   General Practitioner

HEAF   Health and Employment after 50 study

HEAF FIRST Health and Employment after 50, factors influencing retirement study (the present study)

HR   Human Resources

HRA   Health Research Authority (ethics body)

HRS   Health and Retirement Study (US based older worker cohort)

IFS   Institute for Fiscal Studies

I-deals   Idiosyncratic or individually negotiated deals.

Definitions and Abbreviations

JDC	Job Demand Control Model
JDR	Job Demands Resources Model
KWB	Professor Karen Walker-Bone
MESH	Medical Subject heading (Medline search classifications)
MJS	Martin John Stevens (author)
MRC	Medical Research Council
MRC LEU	Medical Research Council, Lifecourse Epidemiology Unit, Southampton
NADS	Nordic Age Discrimination Scale
NHS	National Health Service
NI	National Insurance
NIDI	Netherlands Interdisciplinary Demographic Institute Work and Retirement Panel
NS-SEC	Office of National Statistics, The National Statistics Socio-economic classification (NS-SEC)
ONS	Office of national statistics
OADR	Old age dependency ratio
OAWAR	Old age to working age ratio
OECD	The Organisation for Economic Co-operation and Development
OR	Odds ratio
PPE	Personal Protective equipment
PPI	Patient and public involvement
SES	Socio Economic Status. If referring to HEAF FIRST participants, this will be based on the NS-SEC
SHARE	Survey of Health, Ageing and Retirement in Europe (Europe wide older worker cohort)
SIGN	Scottish Intercollegiate Guidelines Network

SOC 2010   Office of National statistics, Standard occupational classification for the UK 2010

SPA   State pension age

STREAM   Study on Transitions in Employment, Ability and Motivation, (Netherlands based older worker cohort)

STROBE   Strengthening The Reporting of OBservational Studies in Epidemiology

UN   The United Nations

WASPI   Women Against State Pension Age Inequality

WHO   World Health Organization

Summary Diagram of Thesis

Chapter 1: Background	Ageing populations, What is Retirement?, Thesis aims
Chapter 2: Methodological overview	The HEAF study, Retirement definition, Overview of three phase study,
Chapter 3: Phase 1, Qualitative interviews	Methods, Findings, Conclusion
Chapter 4: Phase 2 Systematic Review	Methods, Results, Discussion, Conclusion
Chapter 5: Phase 3, Case-control study, methods	Case-control methods
Chapter 6: Phase 3, Results (whole cohort)	Power calculations, Descriptive results, Adjusted results, Mutually adjusted results
Chapter 7: Phase 3, Results (women)	Descriptive results, Adjusted results, Mutually adjusted results
Chapter 8: Phase 3, Results (men)	Descriptive results, Adjusted results, Mutually adjusted results
Chapter 9: Phase 3, Summary and Discussion	Summary of results, Discussion, Conclusion
Chapter 10: Thesis Discussion	Summary of results, Discussion, Limitations, Strengths, Recommendations for future studies, Conclusion

Chapter 1 Background

This thesis concerns the transition from being 'economically active' in paid work, through to relative economic inactivity in later life. In many cases this transition is called 'retirement' from paid work. However, as we shall see, this process is not a straightforward progression from one state to another and can be a highly individualised process.

The rationale for focusing on this transition has been driven by acute changes in society and longevity. People are living substantially longer lives whilst at the same time birth rates have declined. The result is a reducing number of 'economically active' people relative to those at older ages who are no longer economically active. Policy makers have realised that the resources necessary to fund pension provisions are already inadequate and that, if these trends are maintained, there will be an enormous shortfall of funds to support future generations of 'retired' people.

Therefore, this thesis seeks to understand what it is like to work to older ages, what the challenges are for individuals, how people make their decisions to retire, and what employers and policy makers could do to enable people to work in good health and comfort into older ages.

Figure 1-1 is a summary of the topics covered in this chapter of the thesis.
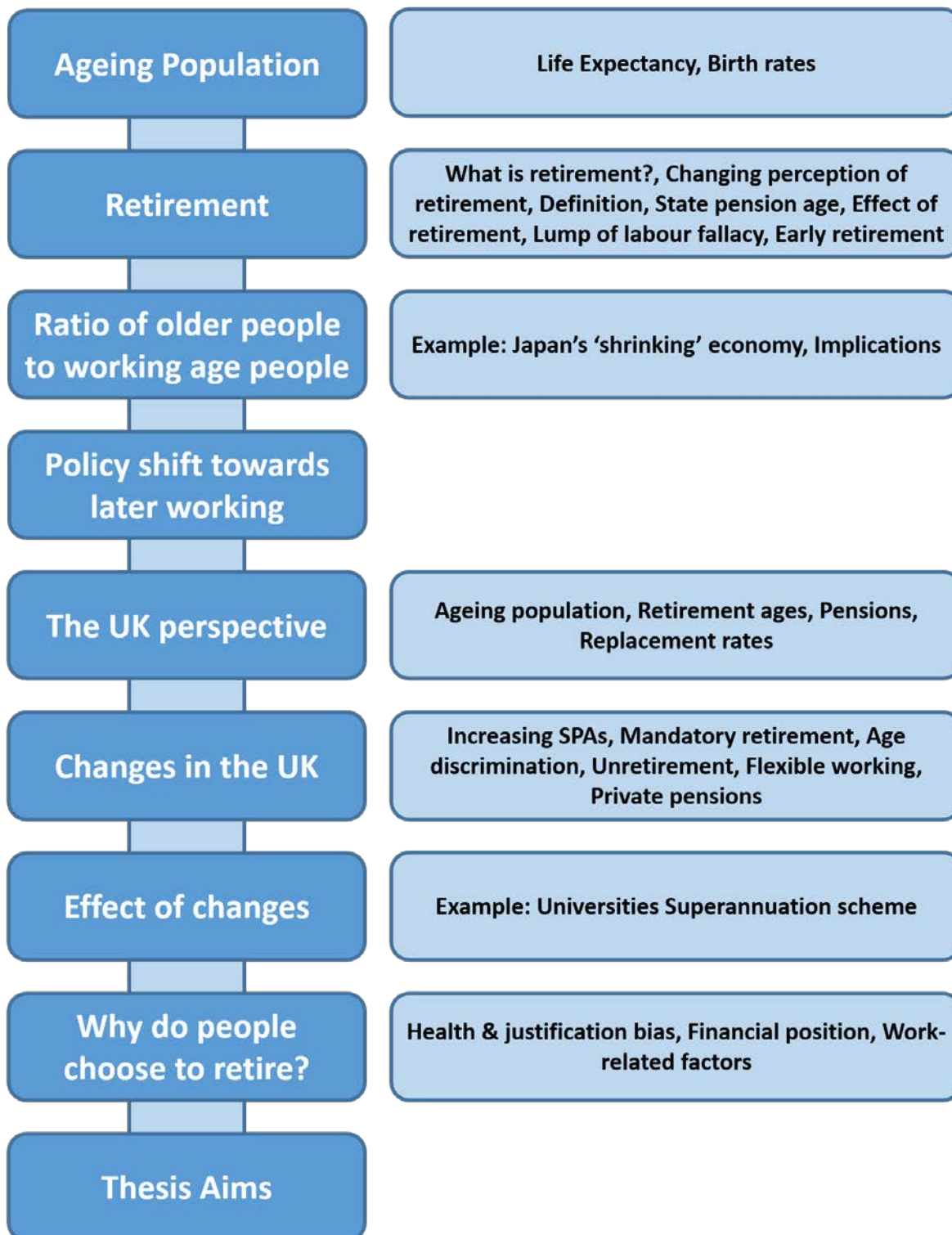
Figure 1-1   Diagram to show summary of Chapter 1

1.1   Ageing Populations

In high-income countries like the UK, the shape of population demographics is changing favouring an increase of older people relative to younger.

1.1.1 Life Expectancy

Globally, life expectancy is generally increasing with rapid worldwide increases in longevity. In 1990 a person could expect to live to 64.6 years, by 2020 this increased to 72.2 years whilst according to an estimate by the United Nations, it will reach 77.3 years by 2050,[1] see Table 1-1. In Europe and North America life expectancy in 1950 was well above average and has been projected to continue to increase throughout the next century.

Table 1-1   United Nations, average life expectancy in the World, Europe, UK and Japan: 1950-2055

Area	Life expectancy at birth, both sexes (years)			
	1950-1955	1990-1995	2015-2020	2050-2055
World	46.96	64.56	72.28	77.35
Europe & North America	64.97	73.50	78.53	83.52
Europe	63.69	72.67	78.53	83.31
United Kingdom	69.41	76.24	81.15	85.81
Japan	62.80	79.42	84.43	88.52

*Source United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

1.1.2 Birth rates

In the same time period, many country's birth rates have declined. A birth rate of 2.1 live births per woman is roughly equivalent to maintaining a population level (excluding immigration). Table 1-2 shows that rapid population growth evident in 1950, was not maintained, especially in Europe. By 1990, in many locations, birth rates had dropped off to a level that would not maintain the population, a trend that is predicted to continue until 2050.

Table 1-2   United Nations, birth rate in the World, Europe, UK and Japan: 1950-2055

Area	Birth rate, live births per woman in her lifetime			
	1950-1955	1990-1995	2015-2020	2050-2055
World	4.97	3.01	2.47	2.18
Europe & North America	2.80	1.70	1.66	1.75
Europe	2.66	1.57	1.61	1.73
United Kingdom	2.18	1.78	1.75	1.77
Japan	2.96	1.48	1.37	1.57

*Source United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

The combination of longer lives alongside declining birth rates has caused a demographic shift, the result of which is that populations across Europe and North America are ageing.

In Europe, the United Nations (UN) estimate that, in 1950, people 65 or older numbered 8% of the total population. In 2020 that percentage had grown to 19.1%. by 2050 they estimate it will grow to 28.1%. Worldwide in 2018, the UN estimated that people aged over 65 outnumber children under five for the first time in history.[1]

The demographic shift can be seen by reference to Figure 1-2, and Figure 1-3 (data and images reproduced from United Nations,[2] made available under a creative commons licence[3]). These population pyramids show the age and sex profiles of two populations in 2019, the world and the United Kingdom respectively. The world population pyramid suggests an expanding population with a wider base indicating a greater proportion of young people in comparison to older people. In contrast the UK's pyramid has a narrower base indicating a greater population of older people. Overall, the UK's pyramid suggests an ageing and potentially contracting population, with several wider bands further up the graph indicating larger birth cohorts in specific periods that were not matched by those above or below them. Note that the classic 'pyramid' shape is not necessarily optimal or to be preferred, however the images do demonstrate the current and future demographic changes in the UK.
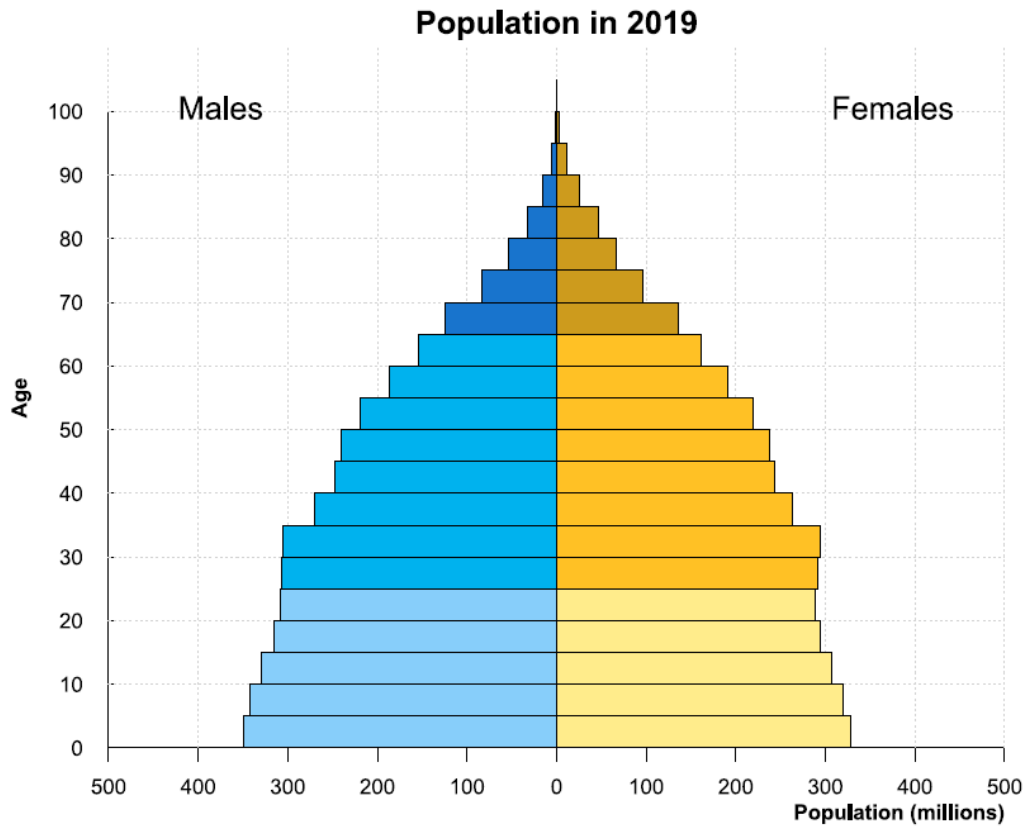
Figure 1-2   Graphical representation of the population of the world in 2019
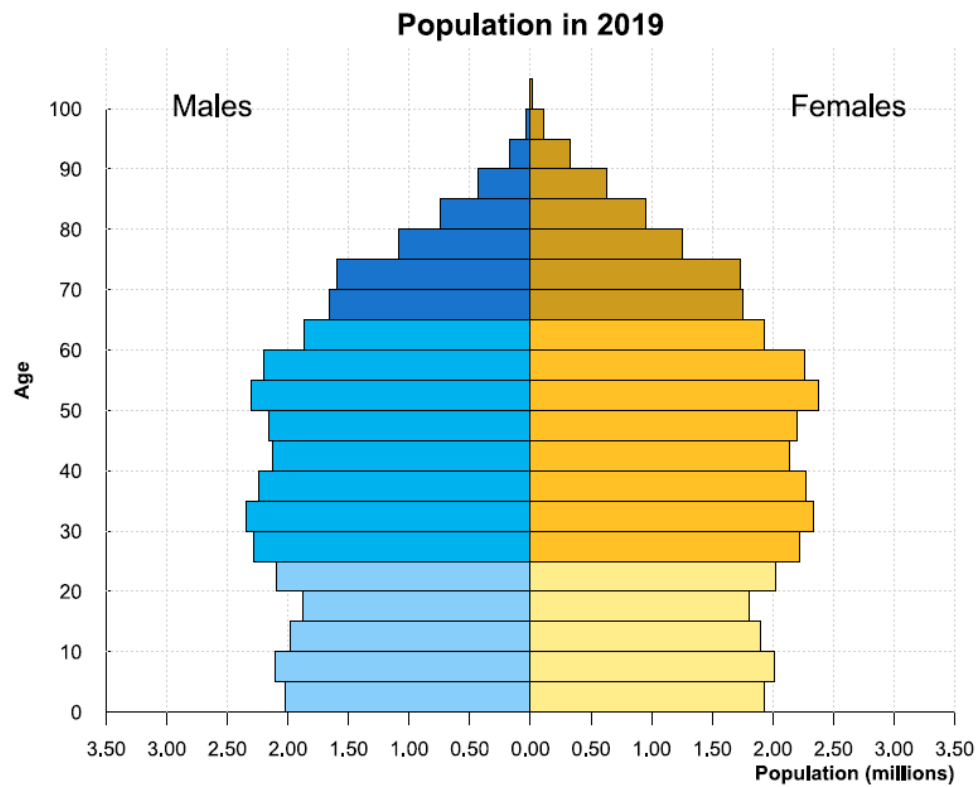
Figure 1-3   Graphical representation of the population of the UK in 2019

1.2 Retirement

Longer life expectancy and reduced birth rates are demonstrably changing the overall demography of many high-income countries, increasing the relative proportion of older people. These changes also have the capacity to fundamentally alter the proportions of working populations, as larger numbers of older workers exit the workforce without a corresponding influx of younger workers to replace them. This change is potentially exacerbated by the concept of retirement which removes older workers from working populations.

1.2.1 What is retirement?

The term 'retirement' is used in several different ways, dependent on the context. For example, retirement could be an administrative status, used to determine whether age-based state-benefits are due. In this case, retirement is usually a binary status based on being above or below a certain age. It is also clear that retirement has a social meaning, mostly categorising older people who have moved into another phase of their life, often having ceased working. However, such definitions are not without contradictions and imprecision, for example:

- A competitive sportsperson may 'retire' at age 30 when they feel they can no longer perform at a level they have previously
- An office worker, leaving a job of 40 years' duration to spend time with their family may also be described as 'retired'
- A homemaker may commence claiming a state pension and may be considered 'retired'
- A labourer who develops medical complications that forces them to leave the workforce may be described as 'retired'

Wide classifications of retirement are used extensively in everyday contexts. However, a precise, universal definition of retirement is noticeably elusive. This is perhaps unsurprising given the overlapping and sometimes contradictory nature of wider definitions. For the purposes of this thesis, I will concentrate on retirement as a process during which older workers reduce participation in paid work (including employment and self-employment in this overarching definition).

1.2.2 Changing perception of retirement

The perception of retirement has also changed over time. Beehr and Bennett[4] characterise retirement in the 21st century as markedly different from retirement prior to that date. They suggest that retirement was previously regarded as a short period of decline after working lives

had ended. However, this contrasts with a more contemporary view that retirement could be viewed as a potentially long and active period of life. Active ageing policies as advocated by Foster[5] also reject the 'decline and loss paradigm,' that was previously associated with older people and retirement, in favour of encouraging active participation in society.

1.2.3   Definition of retirement

The work and occupational scientific literature places importance on retirement from paid work as both a topic in its own right and as an outcome and/or exposure in empirical studies. A crucial and ongoing consideration in any definition of retirement is whether a person must leave the workforce absolutely, therefore having no paid work, in order to be considered retired. For example, if a police officer were to retire after a career of 50 years and cease paid work completely, they would, under most definitions, be considered to be retired. However, if an architect left work after 40 years but returned on occasion to consult on difficult projects for a few hours a week, the categorisation is less clear cut. The complexities of defining retirement are clear from the work of Fisher et al[6] (citing Denton and Spencer[7]) which identified eight possible definitions of retirement in their narrative review. Importantly, Fisher et al[6] argued that defining retirement as leaving a main/career job and simultaneously ceasing work completely would not necessarily constitute a contemporary description of retirement.

In a widely used definition, Feldman[8] describes retirement as:

> *'the exit from an organizational position or career path of considerable duration, taken by individuals after middle age, and taken with the intention of reduced psychological commitment to work thereafter.'*

This definition was formulated in 1994, in the context of early retirement research for the purposes of analysis of worker decisions. As such it specifies a job exit as a pre-requisite, therefore excluding people who were never in paid work, such as homemakers. Feldman stated that job exits can be characterised as retirement when three main conditions are satisfied:

a) Organisational position or career path of considerable duration: Using this condition, retirement is distinguished from ordinary job turnover. Consequently, if a person leaves a job after only a year, this would not generally be considered as retirement. Feldman[8] suggests a period of 10 years as a possible definition of a career path of considerable duration. However, this definition is not without drawbacks, taken to an extreme, a worker with many career paths of less than 10 years could be deemed to have never retired, even if they leave the workforce.

b) After middle age: This condition contextualises retirement into later career stages, thereby excluding job transitions at younger ages. The Organisation for Economic Co-operation and Development (OECD) is an international collaboration of 36 different countries with members in Europe, Asia-Pacific and North and South America. The OECD currently uses a definition of age 50 plus to define an 'older worker,'[9] whilst stressing that this was not a definition of what it means to be old but as a cut-off beyond which there is a drop-off in labour force participation rates. The age of 50 has also been used as a cut-off by a number of retirement researchers.[10-13]

c) Intention of reduced psychological commitment to work thereafter: This third condition requires an intention on the part of the employee to reduce their commitment to work, perhaps by working less intensively or by doing no work at all, a state the worker expects to continue. Feldman[8] specifies that *'Although many people who leave long-term positions or career paths continue to work, implicit in the concept of retirement is the notion that work involvement somehow will be less in the future than it has been in the past.'* Therefore, it is clear that a person can fulfil this criterion and still be in paid work, albeit in a reduced form (often called 'bridge' employment by modern commentators).

Feldman's definition combines objective and subjective elements into the concept of retirement with conditions (a) and (b) being assessed objectively, but condition (c) being more subjective and based upon worker's intentions. Note that I will revisit the Feldman definition in Chapter 2 in order to adopt a definition of retirement for this thesis.

The Feldman definition provides a practical and useable definition of retirement. Stated simply for the purposes of this introduction, I define retirement as a concept by which older people leave the workforce but without necessarily ceasing to work absolutely.

1.2.4   State pension age (SPA)

A further important concept in retirement research in high income countries is that of state pension age (SPA), which is both relevant to retirement but distinguishable from it. SPA is the age beyond which a country's governing body will pay an amount of benefits (a state pension). In the UK this is a binary status defined by age alone. Therefore, the age at which financial support is available is of clear relevance and importance for those making the decision to retire. In the UK, SPA remained constant for a relatively long period between 1948–2010, at 60 years old for women and 65 years old for men. Moreover, in the UK the SPA was often incorporated into employment contracts as the standard or expected (or even compulsory) age of retirement, making the concepts of SPA and retirement easy to conflate. UK SPAs and a number of recent changes to them, are explained in detail in para 1.6.1.

1.2.5   The effect of retirement on working populations

The working population, i.e. the number of people who constitute the workforce, are bounded by age ranges. In high income countries, the young will be in full time education before filtering into the workforce. This creates a threshold age; below which people would not be expected to be employed in paid work. The upper age range of the working population will be influenced by retirement behaviour (and life expectancy) as people exit the workforce at older ages. The age at which people choose to retire is therefore a crucial determinant of both the quantum of people in the workforce and the age range and age balance of the working-age population.

Data from the UK's Department for work and pensions (DWP) suggest that although the proportion of older people in work has increased gradually over time[14] there remains a stark drop off in employment rates at older ages see Table 1-3 and Figure 1-4.

Table 1-3   UK employment rates by age-band 1990-2020

Age-range	Year			
	1990	**2000**	**2010**	**2020***
35-49	81.7%	81.8%	80.9%	85.5%
50-54	74.6%	76.5%	79.0%	84%
55-59	63.1%	63.5%	70.7%	74.8%
60-64	35.0%	36.6%	43.7%	55.9%
65-69	10.2%	11.3%	19.8%	24.9%
70-74	5.1%	4.7%	7.2%	9.6%
75+	1.7%	1.5%	1.7%	4.6%

*Quarter 1
Source DWP Economic labour market status of individuals aged 50 and over, trends over time: September 2020

UK employment rate by age 1990-2020 (all sexes)
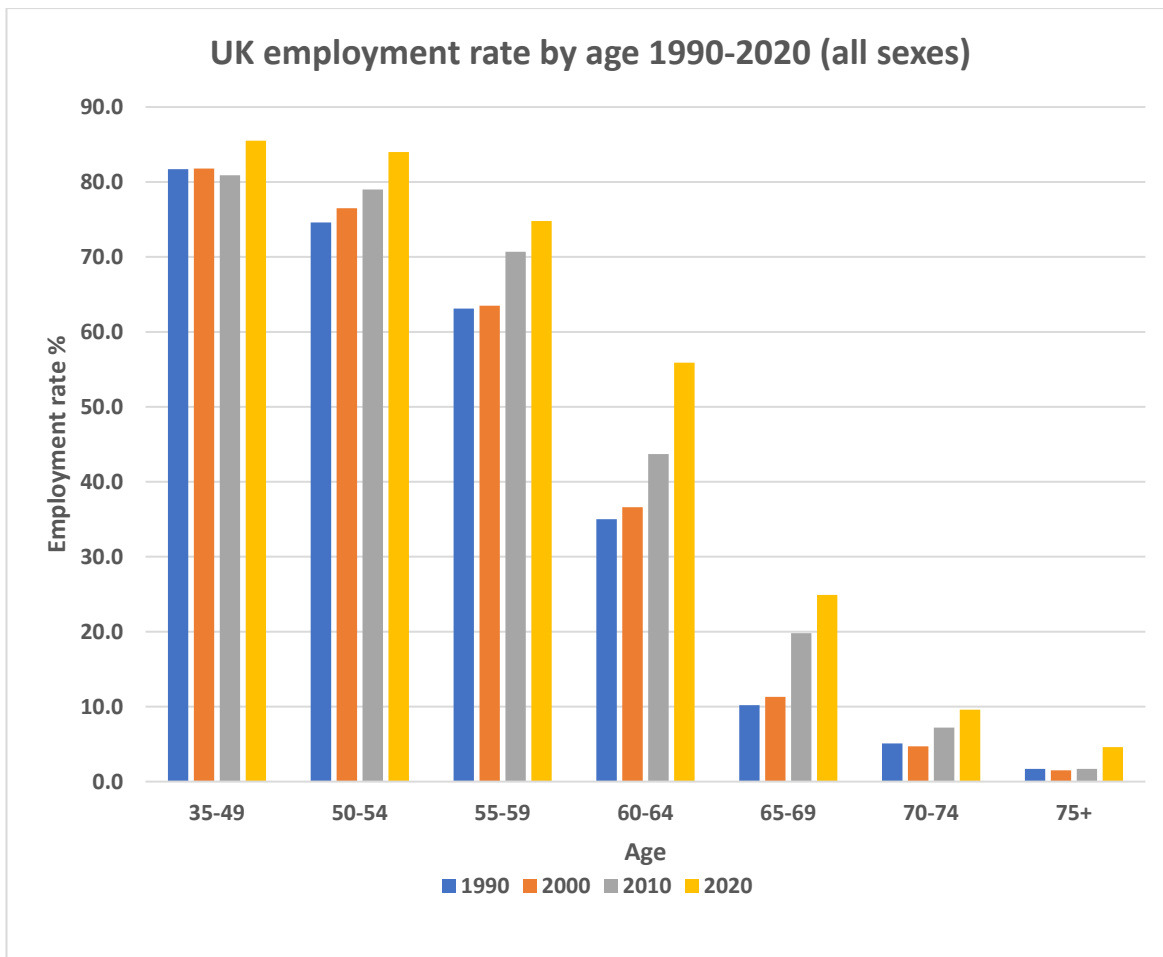
Figure 1-4   Graphical representation of the UK employment rate by age, 1990-2020 (all sexes)

Further DWP data,[14] indicate that amongst those aged 50-64 in the UK who were no longer in work in 2020, 36.1% stated the reason for leaving their last job as 'retirement'. Therefore, retirement clearly plays a crucial role in employment rates at older ages.

1.2.6   Lump of labour fallacy and retirement

High rates of unemployment, especially amongst younger people in the 1980s, led to a series of policy reforms including early retirement schemes across Europe and north America.[15] Incentivised early retirement was often motivated by a desire to release jobs for younger people, an approach based on reasoning which is now termed the 'lump of labour fallacy'[16] or 'boxed economy'[17] theory. The theory went that, as an older worker retired, their job would be filled by an unemployed younger worker, which would reduce the unemployment rate.

The lump of labour was a politically attractive concept and drove policies encouraging early retirement throughout Europe (see Mirkin[15] and Wise[17] at p s139). More recently the reasoning behind the 'lump of labour' has been widely debunked[16-18] with several studies demonstrating that reduced employment in older workers has no association with the employment rate of

younger workers. In turn, encouraging older workers to remain in the labour force does not reduce employment opportunities for the young, if anything an increase in workers at older ages seems to increase job opportunities for younger people.[16, 17, 19]

Nonetheless the lump of labour concept and the policies created around it, added to a general trend of early retirement throughout Europe. Lump of labour type reasoning also penetrated into personal choices. Loretto[20] reported in a UK qualitative study that some participants felt they should retire to 'make room' for younger employees (referred to as 'bed blocking' in that study). Similarly Wainwright et al[21] in qualitative work with managers and workers in the UK again found an intention to 'make room' for younger people as a factor supporting the belief in an optimal retirement age. Early retirement became normalised and was regarded as a *much appreciated social claim that increases personal satisfaction and well-being.'*[22] Additionally, the 'lump of labour' fallacy initially chimed with the historic view of retirement being a period of decline described at para 1.2.2. In this narrative, older workers (in decline) should clear the way for more able younger workers by retiring as soon as possible.

1.2.7   Early retirement

'Early' retirement could be defined as retirement which occurred before SPA. During a period when longevity was increasing and birth-rates were decreasing described in paras 1.1.1 and 1.1.2, many countries experienced an increase in rates of early retirement, which effectively removed people from the workforce at earlier ages. This trend is shown in Figure 1-5 of data about retirement ages in OECD countries.[23] However, there has been a change in this since the early 2000s.
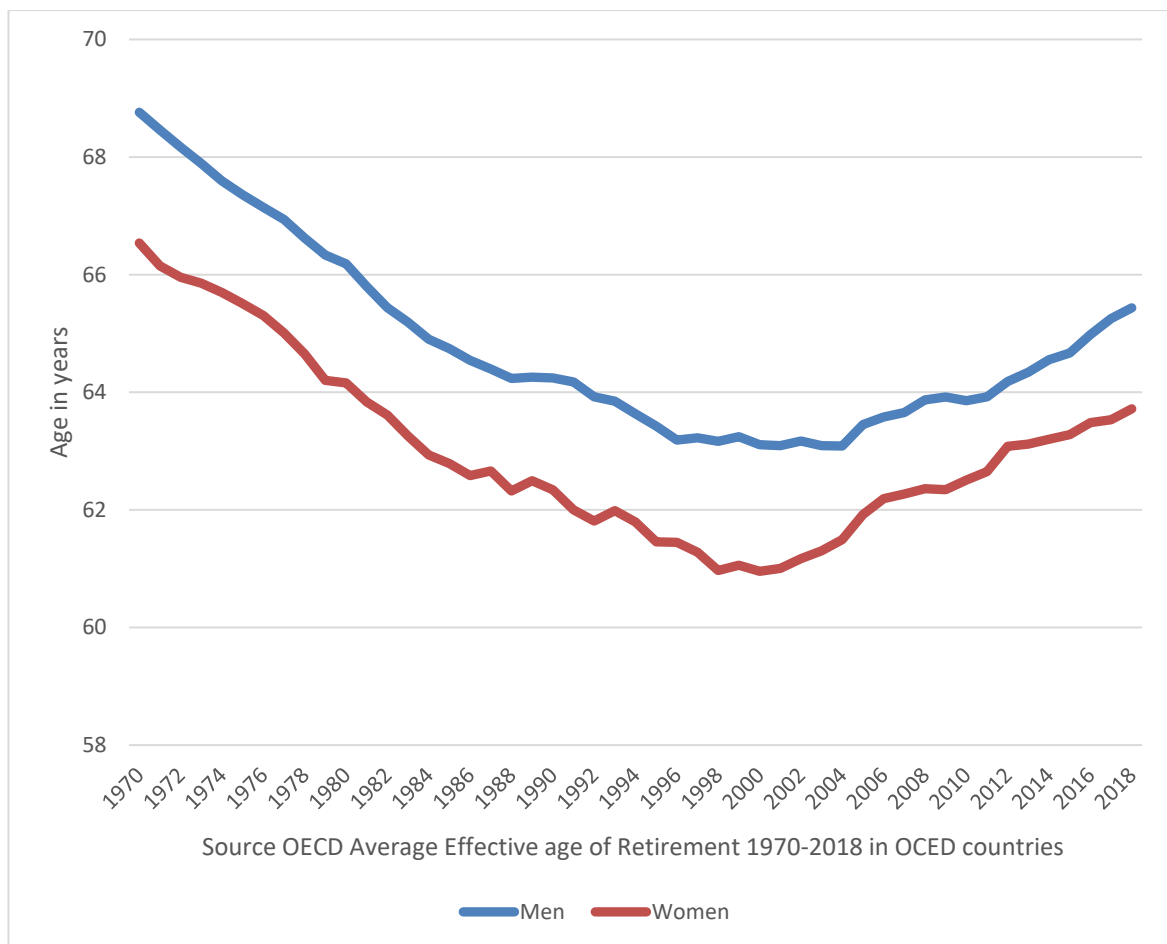
Figure 1-5   Graphical representation of the average effective age of retirement in OECD 36
           countries

Schnalzenberger et al described Europe as *'A continent of early retirement'*[24] and this is
unsurprising given that early retirement was often incentivised[25]. Social security systems in many
high income countries e.g. Italy, Belgium and France provided incentives to retire early
throughout the 1960s to the mid-1990s[17]. Such incentives effectively encouraged early
withdrawal from the workforce. Similarly, in the UK, Blundell et al[26] in 2002 found *'significant
retirement incentive effects'* in the pension system.

Additionally, in some cases, early retirement might be facilitated or actively encouraged by
employers. For example, employers under economic strain may have targeted older workers with
redundancy or early retirement packages as a relatively simple method of reducing the size of
their workforce.[21] Likewise, organisational change caused by relocations or outsourcing[25] may
have actively encouraged early retirement in lieu of layoffs/redundancies.

The impact of early retirement schemes on the shape of the workforce started to be questioned
as far back as 1987. Mirkin[15] for example, wrote:

'From a long-term perspective, the advisability of encouraging premature retirement seems highly questionable. Given falling birth rates and subsequent future contractions in the working-age population, labor force growth will come to a virtual standstill in developed countries by the turn of the century.'

1.3   Ratio of older people to working age people

Old age dependency ratio (OADR) is a ratio of working age people, who are notionally economically active, compared with the current population of older people, who are notionally economically inactive, usually synonymous with, or assumed to be, retirees. The basic premise is that the OADR expresses an estimation of the number of workers versus those who are not (or are not expected to be) working in later life. There is no agreed ratio which is regarded as optimal, as economies differ over time and by location. What can be said is that the number of retirees, or potential retirees, is growing at an ever-increasing rate whilst there will be fewer workers paying into social security systems to support them. The ratio is calculated in different ways by different statistical bodies and, as such, caution should be applied in interpretation. For the purposes of this thesis, I will drop the word 'dependency' from the synonym, as it is a perhaps unhelpful way of characterising the relationship between those who are notionally retired from those notionally working, and will refer to the relationship as old age to working age ratio (OAWAR) as per the OECD definition.[27]

The OECD expresses OAWAR as the number of individuals aged 65 or over compared with every 100 people of working age (defined as ages 20-64). Figure 1-6 represents a historical plot of the OAWAR in the OECD countries[27] and shows a rapid rise in the amount of older people relative to people of working age. OECD data showed that in 1950 there were 13.9 people over 65 years, per 100 people of working age. By 2050, it has been projected that the number will reach 53.4 people, an increase of over 400%. Similar large increases in OAWAR are projected for the 28 EU member states as a group and other large economies such as China, Russian Federation and India.[27]

Source: OECD 'Demographic Old-Age to Working-Age Ratio,' in Pensions at a Glance 2019: OECD
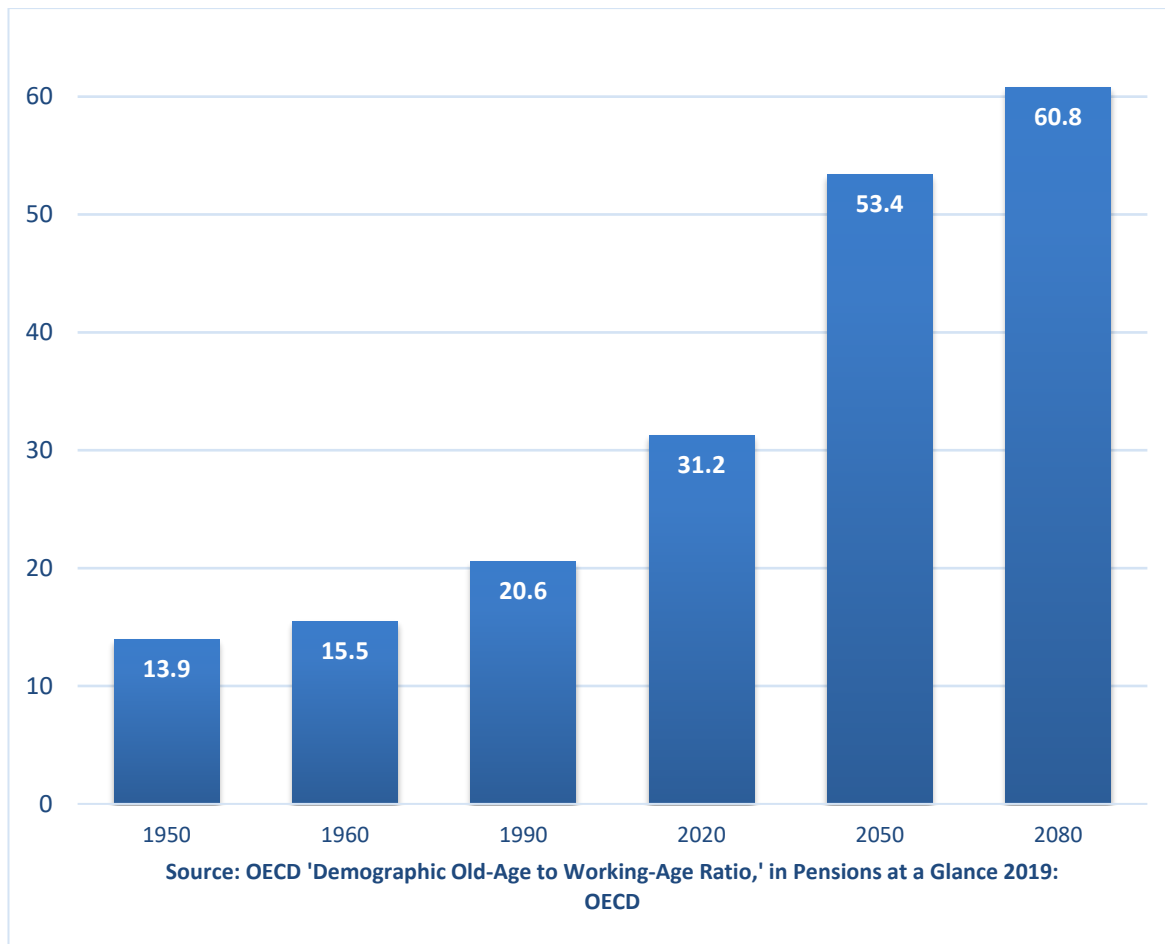
Figure 1-6   Graphical representation of old age to working age ratio (number of individuals aged 65+ per 100 persons of working age) in OECD countries, 1950-2080

These comparisons are based on age alone, ignoring the effects of retirement, especially early retirement, which could exacerbate the population shift even further.

1.3.1   Example: Japan's shrinking economy

Japan is a stark example of this, as seen in Table 1-4. Since 1950, Japan has experienced a rapid increase in life expectancy with a projected increase of 40% between 1950 and 2050. Japan has also experienced a simultaneous large decrease in birth rates across the same time period, so that it has changed from an expanding population to a contracting one.

Table 1-4   Japan life expectancy and birth rate 1950-2050

	Life expectancy at birth, both sexes (years)			
Area	**1950-1955**	**1990-1995**	**2015-2020**	**2050-2055**
Japan	62.80	79.42	84.43	88.52
	Birth rate, live births per woman			
Area	**1950-1955**	**1990-1995**	**2015-2020**	**2050-2055**
Japan	2.96	1.48	1.37	1.57

*Source United Nations, Department of Economic and Social Affairs, Population Division (2019). World Population Prospects 2019, Online Edition.

The effect on the population can be seen in Japan's population pyramid Figure 1-7, (data and images reproduced from United Nations,[2] made available under a creative commons licence[3]). The extremely narrow and receding base demonstrates a reduction in the proportion of children, in comparison to a widening upper end, indicating a higher proportion of older people both in relative proportions and absolute numbers.
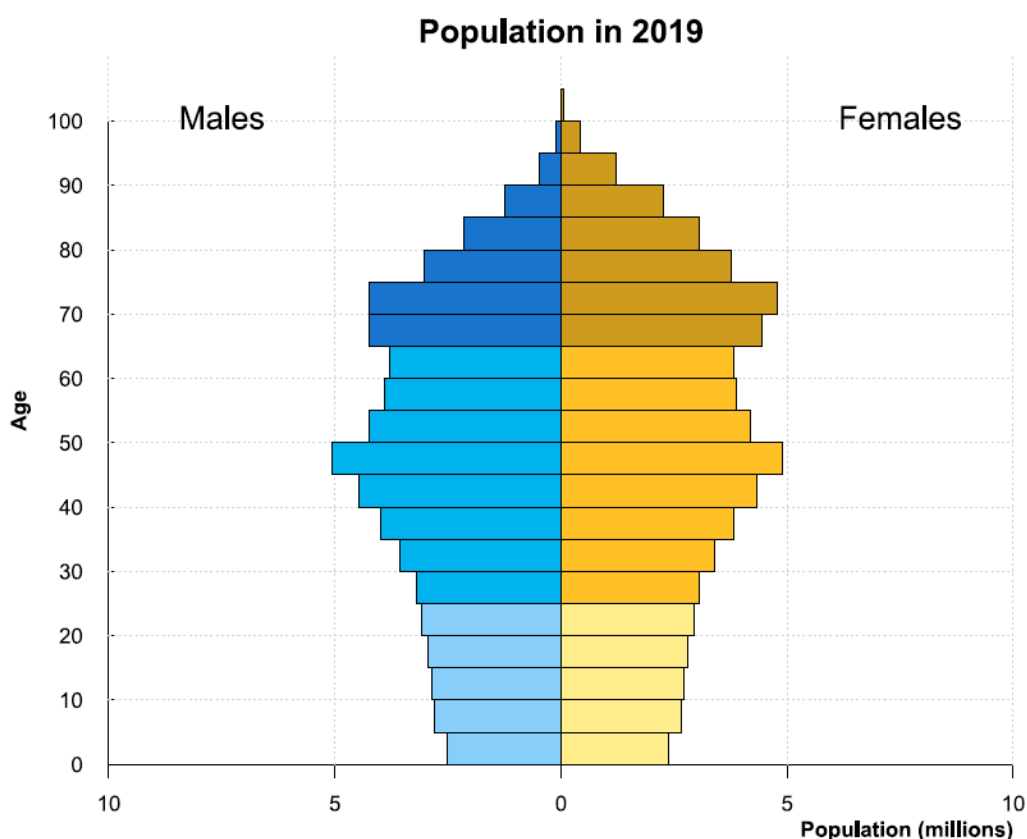
Figure 1-7   Graphical representation of the population of Japan in 2019

These demographic changes have had an effect on the characteristics of the workforce. According to United Nations data, the OAWAR in Japan was 9.9 in 1950, and is projected to increase to 80.7 by 2050[1] an increase of over 780%.

This population change has caused a concern over a 'shrinking economy,' in which businesses may struggle to find workers. Additionally the solvency of the national pension system is now questionable.[28, 29] Although Japan may not yet be suffering economic decline, it is acknowledged that public finances are under considerable strain with a high likelihood of increased taxes and/or reduced state benefits in retirement.[30]

1.3.2   Implications

The dual stimuli of longer lives and lower birth rates has the potential to greatly increase the proportion of people in retirement compared with the proportion of people in paid employment. This could cause strain on pension systems and the wider economy. Already aware that the resources necessary to support the current generation of pensioners are inadequate, governments are looking ahead with greater concern as birth rates have dropped and smaller future generations seem to be even less able to sustain future growth in numbers of older non-economically inactive adults.

1.4   Policy shift towards later working

With the growing recognition of the above, there have been trends in most European countries to put measures in place to increase the age at which people choose to retire.[31] This has been variously described as:

'*a generalized shift from "pro-retirement" to "pro-work"*' (Topa[22]) and a

'*paradigm shift in public policy*' by the EXTEND project.[32]

In the UK, this shift has been operationalised by several changes in national policy alongside other general factors which will be discussed in the following sections. These changes are on both a legal/procedural level as well as changes in the perception of, and social understanding of, retirement and retirees.

1.5   The UK perspective

Ageing populations are a widespread phenomenon. However, when considering work and retirement structures, it is important to bear in mind local issues.[33] In each country, the concept

of retirement both as an administrative and social status will be different. It is likely that different types of welfare and health systems, longevity, concepts of ageing and social meaning attached to retirement will all have relevance to defining or predicting the work transition. These aspects can span many years of developments and as we shall see, the background in the UK has been subject to many changes relatively recently.

1.5.1   The ageing population in the UK

The UK is experiencing similar trends to those of most European countries in terms of increasing longevity and decreasing birth rates as shown in Table 1-1 and Table 1-2. This has caused a similar problem with an ageing population and a change in workforce demographics. As the relatively large post-war birth generation (also known as 'baby boomers') enter retirement, the UK's OAWAR subsequently increases.

The UK's OAWAR has been steadily increasing since the 1950s[27]. According to OECD data, in 1950 there were 17.9 people over the age of 65 for every 100 people of working age, (defined as ages

20-64). By 2020 this figure had risen to 32 and by 2050, it is predicted that there will be 47.1 people over the age of 65 for every 100 people of working age, see Figure 1-8.

United Kingdom
Number of Individuals Aged 65+ per 100 persons of working age

Source: OECD 'Demographic Old-Age to Working-Age Ratio,' in Pensions at a Glance 2019: OECD
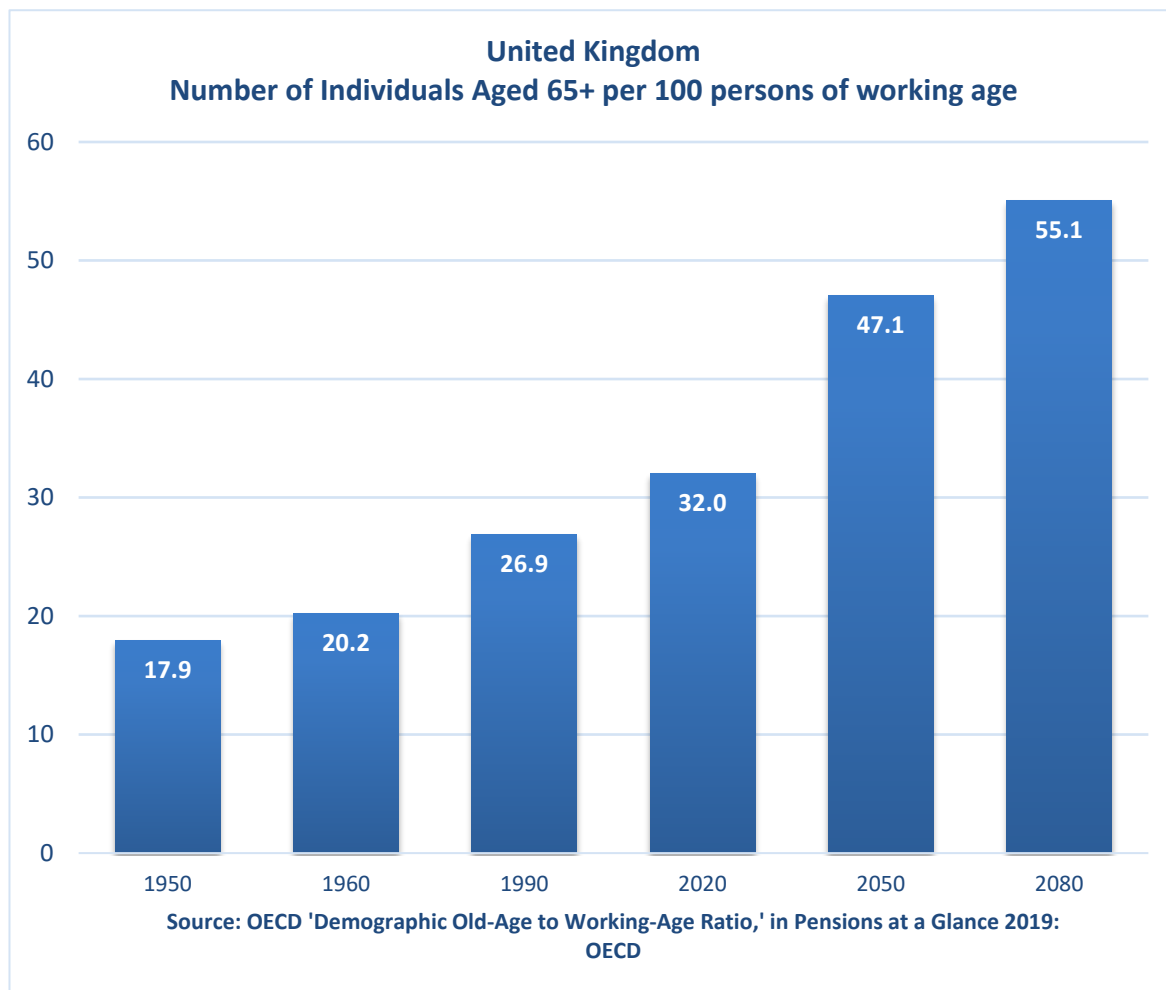
Figure 1-8   Graphical representation of old age to working age ratio in the UK, 1950-2080

1.5.2   UK retirement ages

Whilst life expectancy was increasing, retirement ages in the UK were decreasing from the 1970s through to the early 2000s.[23] This decrease halted in the period 2000-2018 with retirement ages increasing slightly and moving closer to the UK state pension age. However, the overall trend of

lower retirement ages up until then has increased the number of years that a person may expect to spend in retirement, see Figure 1-9.
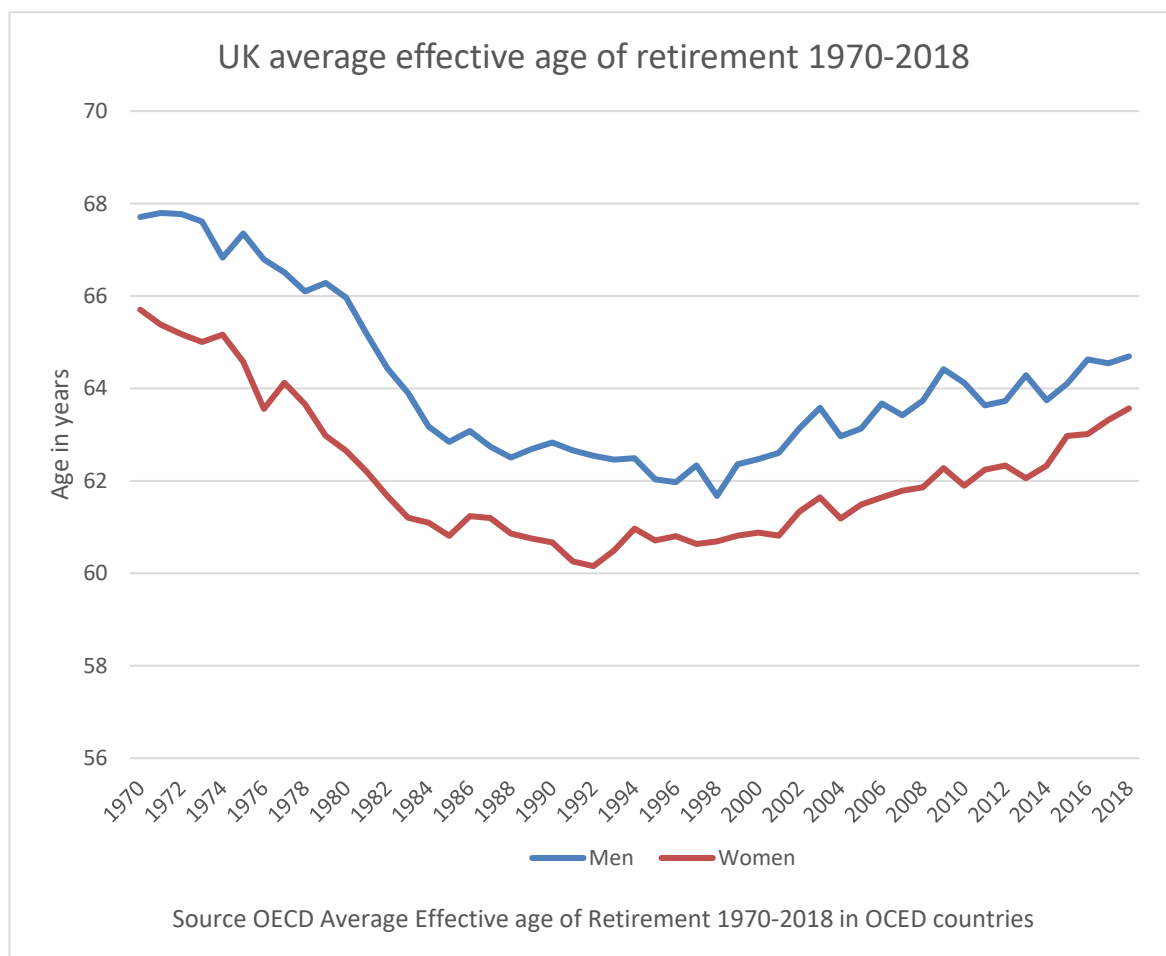
Figure 1-9   Graphical representation of the UK average effective age of retirement: 1970-2018

Lump of labour type arguments did lead to policies such as the UK's Job Release Scheme[17, 18] which ran from 1977-1988 (curtailed in 1985) and was designed to allow early retirement if the retiree was replaced by an unemployed person. However the retired employees were only replaced 70-75%[15] of the time. Similarly in an attempt to reduce unemployment from 1981, the UK allowed some older workers who were unemployed for over one year to claim supplementary benefit provided that they did not claim unemployment benefit, in effect an early retirement pension.[15] The Institute for Fiscal Studies (IFS[18]) reports that UK age policies were not wholly driven by the lump of labour reasoning and notably the UK did not adopt an embedded national early retirement system. However, as can be seen above, the desire to reduce unemployment drove some adjustments to the retirement landscape.

1.5.3   UK state pension

In the UK, a basic state pension is paid weekly by the government to eligible people whether the person is working or not. A person in receipt of the pension is therefore not necessarily retired utilising the definition given in para 1.2.3. The two conditions for state pension eligibility are that a person should:

- exceed the state pension age (SPA, described in detail at para 1.6.1)

and

- have made national insurance contributions for a minimum period of years[34]

The UK taxation and state pension system operates on a *'pay as you go basis'*[35, 36] such that taxation taken from current workers pays for the pensions of people currently above the SPA.

The main elements of individual taxation in the UK are income tax and National Insurance (NI) contributions. NI contributions are paid by both employees and employers and are the main factor in determining eligibility for the state pension. Prior to 2010, the qualifying period of NI payments for most full-time workers was 35 years in order to qualify for a full state pension. After 6 April 2010 this was reduced to 30 years[34] only to revert back to 35 years after April 2016.[37] Reduced pensions are available on a pro-rata basis for those who do not fulfil the full NI contribution period requirements[34] but a minimum of 10 years of NI contributions must be made.[37]

The focus on NI contributions has led to a belief that NI pays for public pensions and/or is a form of contributory benefit pension scheme. In fact NI does not, in reality, pay for pensions and this misapprehension has been described as an *'accounting fiction'*[35] in the House of Lords discussion of intergenerational fairness. This perception may well be exacerbated by the fact that NI contributions cease for those who have reached SPA even if they are still in work (see para 1.5.6). Similarly the legacy taxation rules previously allowed a worker to 'contract out'[38] elements of their state pension, paying a lower rate of NI whilst investing in an employer pension, again conceptually linking NI payments to the provision of state pension. Therefore, the impression that NI contributions are a form of pension scheme is clearly understandable, although factually incorrect.

There are currently two main forms of state pension[39]:

The basic state pension: for those who reached SPA prior to 06 April 2016. This scheme also allowed several extra pension entitlements based on increased contributions collectively known

as Additional State Pension. This consists of three legacy schemes: State Earnings-Related Pension Scheme (SERPS) contributions may have been made 1978-2002, Second State Pension (S2P) contributions could be made between 2002-2016, and State Pension Top-Up contributions may have been made from 2015-2017.[40] The Additional State Pension could also be 'contracted out' to an employer-based pension scheme.

The new state pension for those who reached SPA on or after 06 April 2016, does not allow 'contracting out', nor does it allow further build-up of any additional state pension (although prior contribution to additional state pension will be recognised in the payment and deferment of the pension can lead to higher payments). See Figure 1-10 for an overview of the UK state and private pension structure.
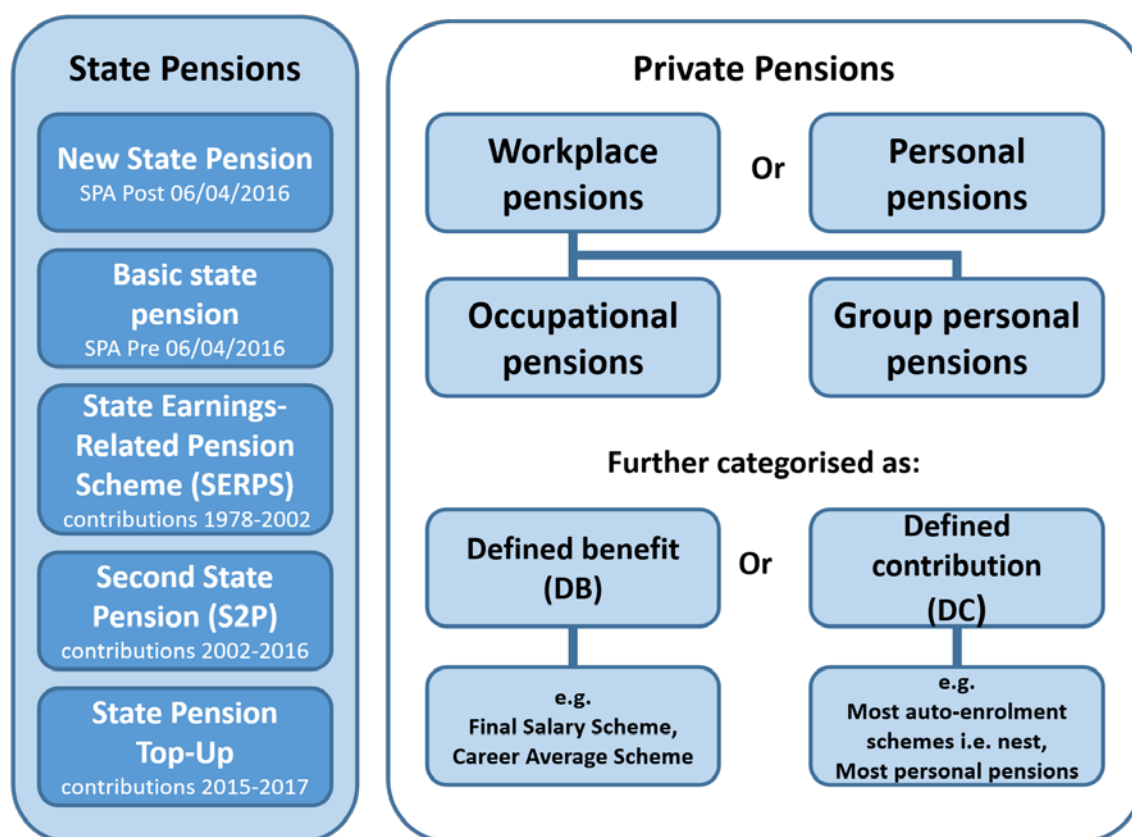
Note it is possible and indeed commonplace to receive state pension and a private pension meaning many different combinations of the above schemes are possible to constitute a pension package

Figure 1-10 Diagram of common categories of pensions in the UK

There are financial incentives to encourage deferral of the UK state pension. Prior to 2016 a person who deferred the state pension could choose to take a one-off lump sum or an increased weekly payment for the remainder of their life with approximately 10% increase per year of deferral.[41] Since 2016, a lump sum payment has no longer been possible and a one year deferral is now rewarded by approximately a 5.8% increase in weekly pension payments.[41, 42] This change is contrary to most other recent policy changes in that it is less generous to those taking the pension

later. However, it should be noted that taking the state pension is a financial decision and not necessarily linked to retirement from work, which may occur before or after the SPA.

Overall the UK state pension has declined in generosity since the early 1980s[5, 26] which at first seems to contrast with the overall decline in labour force participation of older workers in that period. However, Blundell[43] notes that whilst the state pension itself in the UK offered little incentive to retire early, generous occupational pension schemes and the availability of other social security measures such as invalidity benefit may have bridged the financial gap, allowing for the decline in work-participation.

The IFS reports[34] that the current UK state pension system was originally envisaged in the 1940s as a way to alleviate pensioner poverty rather than to provide an income on a par to a replacement of wages. Since then, the pension moved towards an income-based replacement, however the IFS conclude that recent changes in 2007 have moved the state pension back towards a universal flat rate payment designed to alleviate poverty.

Blundell[43] argued in 1997 that the high prevalence of employers' pensions in the UK lowers the importance of the state pension in the retirement system as a whole. This point is reinforced when considering the replacement rate discussed below at para 1.5.5.

1.5.4 Private pensions

Private pensions encompass workplace pensions and personal pensions adopting the terminology of the Office for National Statistics[44] (ONS) see Figure 1-10 for overview. Personal pensions are based on individual contracts between a person and a private insurance/investment company. Workplace pensions can be further split into occupational pension schemes which are organised by the employer, and group personal pensions where an individual will contract with a pension provider as part of a group of employees, although the contracts are legally on an individual basis. Additionally, private pensions can be categorised as defined benefit (DB) or defined contribution (DC) plans.

DB plans pay a guaranteed income based on several parameters such as years served with a particular employer and contribution rate. Usually, the scheme will pay a proportion of the worker's salary for every year the worker makes contributions. DB plans were often 'final salary' pension schemes meaning the amount paid to the pensioner would be based on a proportion of their salary when they exited their employment. For the vast majority of employees this would also be their highest salary during their working life, given standard career progression linked to experience. However final salary schemes are for the most part closed to new members and/or

have converted to career average schemes where the pension is based on the average wage earned by the worker throughout their employment. For most people this is significantly less generous in terms of pension eventually paid out and the conversion from final salary to career average represents an erosion of pension rights.

In DB schemes, income is guaranteed, to the extent that any investment downturns will be met by the pension scheme or employer, giving the worker certainty in return for contributions over the course of the employment. Worker contributions are often designed to be paid over a fixed amount of years and benefits will not increase once the fixed amount of years has been exceeded. Therefore DB schemes often offer no financial incentive for working to older ages, as the amount paid out will not increase once the contributions have been made for a fixed term of years.[6]

DC plans offer no guaranteed income and function more as a long-term savings plan. Accumulated contributions are invested on behalf on the member and are paid back with any investment returns at retirement date. In DC plans, the worker bears the risks for any fluctuations in investment values,[5] which contrasts with DB plans. Therefore, it is harder to plan retirement finances when paying into a DC plan as the eventual benefits will not be known until shortly before the retirement date.

Overall DB plans are usually more generous, in that the worker will obtain greater pension benefits in return for their contributions. However, importantly, access to DB plans has been steadily reducing over time. In 2002 Blundell et al reported that only 45% of employees in the UK had occupational pension schemes and that these were gradually changing from DB schemes to DC schemes.[26] Foster[5] also confirms in 2018 that the move to DC schemes has accelerated in the UK with only 4% of the workforce able to take up new DB schemes. ONS data also show a steady decline in active members (defined as workers currently contributing to the scheme)of DB pension schemes, whilst DC membership has risen[44] (see Figure 1-11). The increase in DC schemes is probably due to auto-enrolment described at para 1.6.6. Auto-enrolment has increased the amount of eligible workers with occupational pensions to 84%,[45] however the schemes into which people have been enrolled are overwhelmingly DC schemes.

UK, Private Sector Active membership of occupational pension schemes
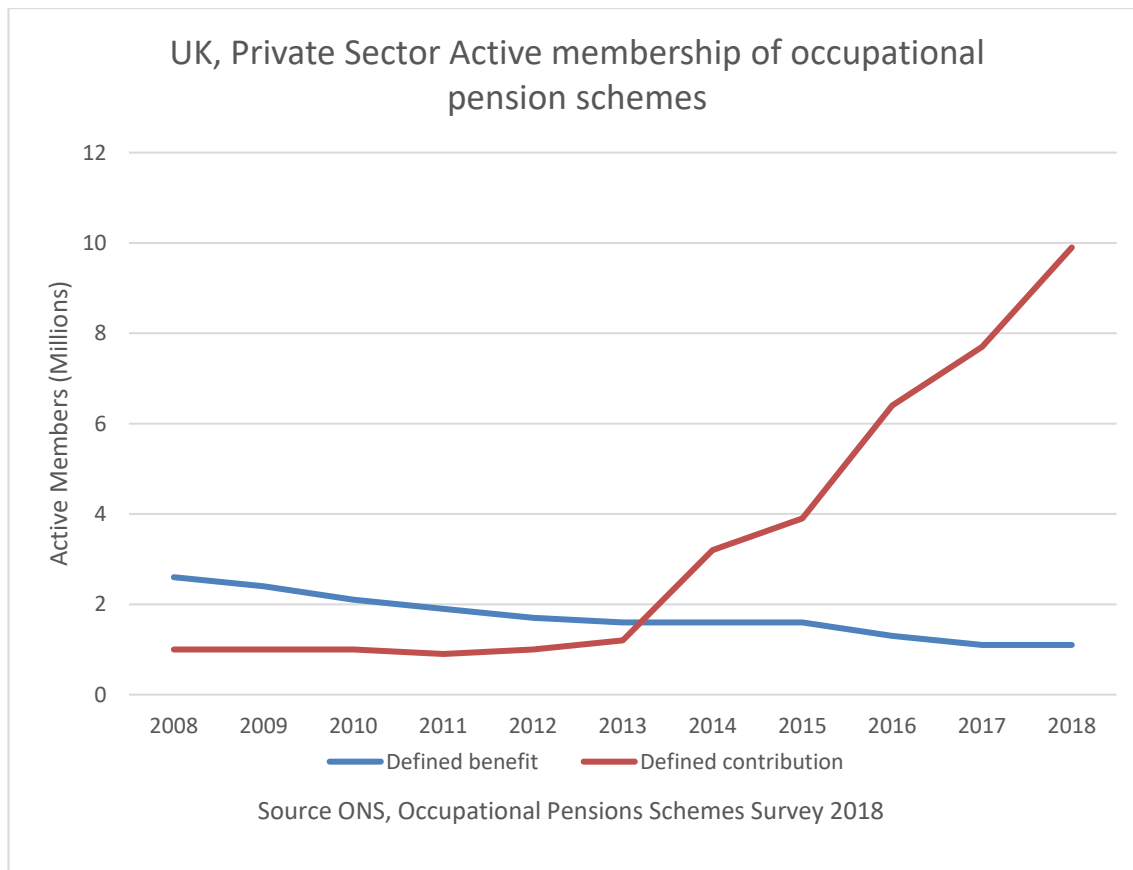
Figure 1-11   Graphical representation of active members of private sector occupational pension schemes in the UK, stratified by defined benefit and defined contribution schemes

It is also clear that overall contributions to DC schemes are substantially lower than contributions to DB schemes. The Pensions Policy Institute[46] report that, in 2018, the average combined contributions (employee plus employer contributions) to DC schemes amounted to 5.0% of salary, whilst combined contributions to DB schemes amounted to 25.6% of salary.

Overall, the trend from DB schemes to DC schemes can be viewed as a decline in overall benefits payable from workplace pension schemes. Grady[47] commented that this change also represents a mismanagement of pensions schemes on the part of employers and the government, which may well compel people to work for longer due to inadequate pensions.

1.5.5   UK replacement rates

In the UK, retirement is usually associated with a potentially large drop in personal income. Retirement usually means leaving paid work and replacing remuneration with a pension of some form. State pensions in the UK are relatively low when compared to average working incomes. The OECD report that the UK has the lowest 'net replacement rate' (the amount of income a pensioner can expect to receive as a percentage of their previous wage) of any OECD country when state pensions alone are compared. Under state schemes, UK pensioners can expect to

receive just 28.4% of an average working wage as compared with the OECD average of 58.6%.[48] This statistic is somewhat ameliorated for low earners who will receive 51.0% of a low wage as compared with an OECD average of 68.3%, see Table 1-5. Once workplace and other voluntary pensions are included, the income for average workers recovers with a replacement rate of 61.0% against an OECD average of 65.4%. However, this implies a reliance on private pensions schemes in order to retire comfortably.

Table 1-5   Net replacement rate % from pension schemes in OCED countries, 2019

	Mandatory pension scheme (net)		Mandatory pension scheme (net)+ Voluntary schemes	
	Low Earner	Average Earner	Low Earner	Average Earner
UK Average	51.0%	28.4%	82.3%	61.0%
OECD Average	68.3%	58.6%	75.0%	65.4%

Source OECD Pensions at a glance 2019 table 5.6 (p157). Low earner defined as earning 50% of average wage

Retirement is often socially equated with a need to economise and a necessity to settle major financial obligations such as mortgages beforehand. In fact, many standard mortgages must be paid off before retirement which highlights the close relationship between retirement and finances.

For many UK workers, deciding to retire will constitute a reduction in income and for many the decrease may prove prohibitive. This is not a universal rule, and in fact the House of Lords Select Committee[35] found that, generally, retirees have higher average incomes than several younger categories of workers. However the Department for Work and Pensions (DWP) have estimated that 12 million people in the UK below the SPA are heading towards inadequate retirement incomes[42] which could portend a level of social inequality in access to retirement.

1.5.6   National Insurance contributions for pensioners

People beyond the SPA do not pay NI on their incomes,[42] therefore anyone working past the SPA will effectively pay a reduced amount of taxation. This adds to the incorrect perception that National Insurance pays for state pensions (see para 1.5.3) and that this justifies ceasing to contribute when SPA is reached.[35] The contemporary focus on working to older ages has meant that some have called for this relief to be abolished, suggesting that it is perceived as unfair to younger workers.[35] Importantly however, this current relief from NI contributions does provide a financial incentive to work past the SPA.

1.5.7   **National Health Service**

Since 1948, the UK has operated the National Health Service (NHS) which provides comprehensive healthcare to all which is free at the point of use.[49] The NHS is funded from general taxation and provides healthcare for all, irrespective of work-status. Therefore, retirement and/or pension plans do not generally include separate provision for healthcare.

1.6   Changes in the UK retirement landscape

In step with the rest of Europe, UK policy makers have introduced many changes in response to the ageing population which are generally designed to encourage working to older ages and reduce early retirement.

1.6.1   **Increase in age of entitlement to UK state pension**

Like most European countries, the UK has chosen to increase the age at which people are entitled to claim old age pension (SPA). In the UK the SPAs were kept at the same level for a relatively long period of time from 1948–2010. These state pension ages were 65 years for men and 60 years for women.

However, since 2010 the UK state pension ages underwent several changes designed to increase SPA to 68 years for both men and women. This entailed an increase from

- Age 65 to 68 years for men
- Age 60 to 68 years for women

These legislative changes were introduced in phases, by multiple pieces of legislation[50-53] and will be fully implemented between 2010 and 2046, see Figure 1-12.

Ages at which the UK state pension becomes payable

Men 65 **Women 60**	1948-2010
Men 65 **Women 65 (+5)**	Pensions Act 1995, Accelerated by the Pensions Act 2011 Implemented 2010-2018
Men 66 (+1) **Women 66 (+1)**	Pensions Act 2007 Accelerated by Pensions Act 2011 To be implemented 2019-2020
Men 67 (+1) **Women 67 (+1)**	Pensions Act 2007 Accelerated by Pensions Act 2014, To be implemented 2026-2028
Men 68 (+1) **Women 68 (+1)**	Pensions Act 2007 To be implemented 2044-2046 Plus proposal to accelerate 2037-2039
5 year reviews of **pension ages**	Pensions Act 2014

Figure 1-12 Diagram of age of eligibility for state pension in the UK between 1948 and 2046

In summary, after a long period of continuity in state pension ages for the period 1948-2010, a series of rapid changes have been introduced. These changes are subject to transitional arrangements so that people born between April 1950–April 1978 have staggered SPAs which, in many cases, vary dependent on the month and year people were born.[54] So for example, a person born on 05 January 1954 reached SPA on 06 March 2019, whilst a person born on 06 January 1954 would reach SPA on 06 May 2019. In this case a single day difference in date of birth means a difference of two months in SPA. There is also a clear legislative pattern to the changes which involves proposing and formalising a rise in SPA for particular birth cohorts and then, at a later date, 'accelerating' the increase by applying it to earlier birth cohorts. There is also a proposal to accelerate the SPA move to 68 for earlier birth cohorts but this has yet to be formalised in legislation.[55]

1.6.2   Abolition of mandatory retirement

Before 2006, in the UK, employers were free to set mandatory retirement ages in employees' contracts. Meadows[56] reported that both employers and employees regarded this arrangement as embedded in employment contracts to such an extent that it was regarded '*as a given.*' The limited information available to Meadows suggested that around 50% of workers had a fixed upper retirement age in their contracts. Of these, around 75% reported that the state pension age was used to define the contractual retirement age.

In 2006 the government introduced the Employment Equality (Age) Regulations 2006[57]. Perhaps ironically, the equality provisions legally defined a default retirement age at 65 years old (a matter previously dictated by individual contracts). The regulations also gave a right to employees to formally request working beyond this default retirement age. In effect, these provisions gave employers a statutory basis to terminate employment, based on age alone. The introduction of a legal default retirement age proved to be of greater practical importance than the ability to request working beyond that age. Qualitative work by Flynn[58] with managers in the UK, suggested that requests from employees to work beyond the SPA were decided by individual line-managers rather than national policies. Therefore, the provisions merely formalised prior retirement practice, rather than changing it.

To encourage longer working lives in the UK, the 2006 provisions, which permitted age-based mandatory retirement, were mostly abolished via The Employment Equality (Repeal of Retirement Age Provisions) Regulations 2011,[59] implemented April–October 2011. This removed the power of employers to compel a person to enter retirement. Consequently, from 2011, retirement became a choice, empowering the employee to decide the timing of their withdrawal from the labour force, if indeed they chose to retire at all. In addition, this change meant that employers would need to accommodate increased numbers of workers at older ages with wider implications for the worker's health and welfare in the workplace. However, the end of mandatory retirement may also have led to a decrease in managed retirement.[21] Consequently managers may be more reluctant to discuss retirement options with employees for fear of breaching age discrimination laws, which could leave their employees less well informed about retirement choices. Wainwright et al[21] describe this as a *'well intentioned conspiracy of silence.'*

1.6.3   Age discrimination laws

Prior to 2006 there were few, if any, age discrimination laws enabling workers to maintain paid work over the state pension age.[60] The 2006 provisions that enabled employees to request working past pension age facilitated limited protection of workers' rights. However, as noted

above, the employer still had the right to terminate employment, based on age alone. However, the end of mandatory retirement in 2011[59] marked the effective commencement of full legal protection from age discrimination in the workplace for employees who wish to work past the state pension age.

1.6.4   Unretirement

Given that retirement is voluntary, it follows that contemporary retirement need not be a permanent state. Some people may want to return to the workforce and indeed it seems that a proportion do. In a UK cohort of 2,046 retirees originating from the British Household Panel survey (BHPS), Platts[61] found that 25% un-retired and re-joined the workforce, 9% within the first year. The participants who unretired tended to be healthier and better educated. However, unretirement was not more common in those with financial difficulties. The study covered the years 1991-2015, which as discussed above, encompassed a time of considerable change in the retirement landscape in the UK, so these data may not be typical of current retirement trends. In particular, a worker could not draw a pension from and work for the same company until 2006, see para 1.6.6. The financial downturn in 2008 may also have been a factor in people's decision to re-enter the workforce, even if the participant was not in immediate financial difficulties. In Platts' study, those born later (1950-1959) were 50% more likely to unretire that those born in the previous decade which suggests an upturn in unretirement in recent years. The ONS in the UK, reported that approximately 622,000 people entered into retirement in 2014.[62] In the same period 267,000 re-entered the workforce from retirement. Therefore, it is clear that for many retirement is not a fixed concept and returns to the workforce are both possible and indeed maybe necessary. In contrast, Banks[63] analysed data from the BHPS in 2006 and found that retirement in the UK was an '*absorbing state*' with more than 90% of the cohort staying retired. The contrast between 'absolute' retirement of the past and the less permanent nature of contemporary retirement may demonstrate the potentially dramatic effect of changes in recent years.

1.6.5   Flexible working

Alongside other changes, there has been legal recognition of the rights of workers to request flexible working. Flexible working could entail a variety of different approaches e.g. working from home, flexitime, term-time working, compressed hours and job-sharing.[64]

The right to request flexible working was introduced in 2002[65] for parents of young or disabled children and subsequently widened to encompass carers of older children and relatives. In 2014[66]

the law was expanded to allow all employees to request flexible work, provided that they had worked for their employers for at least 26 weeks.[67] However, in law, employers do not have to agree to the requests. Requests to work flexibly are grounded in the employee making a business case to the employer for such arrangements, which could give preference to those in senior positions who can more easily demonstrate links between their work and business outcomes.[64]

The permission-based nature of flexibility requests may mean that some employees feel they cannot ask for such arrangements, especially if the employer has been 'kind' to them in the past.[20] Parry[64] has highlighted the potential of flexible working provisions to enable retention of older workers. However, Parry also found that the main arbiter in deciding requests for flexible working was the individual line manager. This could be a barrier if the manager is unconvinced by the concept of flexible work. In addition the DWP[42] in qualitative research with UK employers found that that flexible working arrangements are more likely to be arranged with long-standing employees and less likely to be offered to those in physically demanding roles. In qualitative work with managers and workers in large organisations in the UK, Wainwright et al [21] also reported that the availability of flexible arrangements can depend on the value of the employee to the organisation. This implies therefore, that an older worker who could be easily replaced may not have flexibility requests accommodated.

Data from the DWP suggested that there was considerable demand for flexible work amongst older workers in the UK.[42] However, Loretto[20] reported *'substantial gaps between the rhetoric and reality of flexible working among older workers in the UK.'* The factors reported for the low uptake in flexible work included a perception of flexible work as low skilled and low paid, limited/no opportunities to work differently and the narrow ways in which flexible work has been conceptualised.

1.6.6   Changes to private pensions

Under the Pensions Act 2008[68] employers in the UK were obliged to auto-enrol most staff over the age of 22 into employers' pensions schemes. This started to take effect in 2012. As at 2018, this has resulted in 9.5 million people being auto-enrolled, mainly into DC schemes (such as the national nest[69] scheme), meaning that since then, 84% of eligible workers were participating in a workplace pension scheme.[45] Although this is obviously encouraging for future personal pension provision, there are concerns as to whether the total contribution rate of 8% (effective from April 2019, previously 5% in 2018/19[70]) will be enough to sustain all retirees in their retirement.[5]

Gielen[71] and Foster[5] reported that up to 2006, there were taxation restrictions on working for an employer, whilst simultaneously drawing a pension from that employer. Gielen[71] also states that

prior to the abolition of these rules, Banks[63] had shown that members of an employer's pension scheme were less likely to reduce hours at that employer, whilst workers who had pensions from other employments were more likely to enter part-time arrangements. These rules were an obvious barrier to most types of phased retirement, forcing people to move to another employer if they wished to phase into retirement. Abolition of these provisions potentially encouraged flexible working arrangements/phased retirement.

In 2010 the minimum age for withdrawing a private pension was increased from 50 to 55 thereby inevitably providing a financial barrier to early retirement[5]. Subsequently, HM Government UK have announced an intention[72] to raise this threshold to 57 years from 2028 and then periodically alter the threshold so that it is always 10 years below SPA (although, to date, no legislation has been passed).

1.6.7   Financial crisis 2008

The financial crash in 2008 precipitated by the collapse of sub-prime mortgage securities in the USA, caused many countries to re-think their spending, particularly regarding welfare payments. This arguably gave new impetus to reduce early retirement schemes[22] and increase SPAs. Further, it is possible that unpopular policies such as increasing SPAs might have been rendered more palatable in the general drive towards austerity following the crash.

Whilst some evidence shows that people aged 50+ did not change their intended retirement age because of the crisis[73] there may be a case for a 'National Hawthorne effect'[74] whereby the increased attention given to retirement ages affected retirement behaviour at a national level, although whether or not this has occurred has not been investigated.

1.7   Effect of the changes

Although there is a policy push to enable working to older ages and discourage early retirement, it is not clear that this will alleviate the unprecedented increase in the proportion of retirees compared to workers. Even adjusting for the increases in SPA, the Office for National Statistics (ONS) predicted in 2018[75] that the UK will have a relatively steady OAWAR of around 300 pensioners per 1000 workers until 2030. However, after 2030, they predicted a rapid increase to 361 by 2050 and 386 by 2060.[1] In their book chapter Loretto[20] also opined that although the

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[1] *Note that the ONS bases its estimates on the amount of people who pass the UK's SPA which varies between biological sexes and varies over time. This contrasts with the OECD calculations of OAWAR which are based on people over the age of 65.

proportion of workers aged 60+ has increased in the UK, these changes are 'modest and steady' and that little has changed in the uptake of part-time work which has remained steady or even fallen in older workers.

> 'All in all, it appears that the policy thrust and legal changes have not as yet, had a transformational effect on extending working lives'[20]

The main policy tool for extending working lives appears to be increases in the SPA. However, Blundell[43] stated in 1997 that the state pension is relatively unimportant in driving retirement behaviour in the UK due to the prevalence of workplace pension schemes and the availability of other benefits. Certainly, the state pension provides a low replacement rate in the UK (see para 1.5.5) suggesting that most pensioners do not rely on the state pension as their sole income. This would suggest that changes to the SPA may not have a decisive effect of encouraging working to older ages across the entire population.

Further evidence that changes to the SPA might not have the intended effect has become available from research and analysis conducted across five EU member states, including the UK, by the EXTEND project[32] which found that recent increases in the amount of people working to older ages could not be attributed to increases in SPA. Instead, they hypothesised that the increase could be attributed to multiple factors, including, for example changes in the public discourse around retirement and individuals' attitudes. Their report also highlighted that the universal increases in SPA, with no regard for occupational types or educational attainment could have significant potential to increase social inequalities. For example, in Denmark the wealthiest 10% may live 10 years longer than the poorest 10%. Any linear increase in the SPA would consequently affect these groups disproportionately. They conclude that policymakers should go beyond reforms to SPA to consider a wider range of methods of encouraging working to older ages.

In a recent systematic review of increases in ages of labour market exit Boissonneault et al [76] concluded that, where evidence was available, increasing SPA and reducing financial incentives for early retirement could increase workforce participation at later ages. However, they also concluded that the evidence available fails to consider the role of the nature of work that people are being asked to do to older ages and that the scope of evidence needs to be expanded:

> 'Increasing the scope of evidence to other potential causes of increases in ages of exit from the labor market, as well as to more countries, will provide scientific grounds for stimulating further increases in ages of labor market exit in OECD countries.'

The legislated changes to SPA have also caused uncertainty amongst workers. Where once a person may have been able to state their SPA with ease, the current SPA is increasing, with transitional arrangements providing for rolling, proportional increases. There is evidence that the increases have been received negatively by those most affected, for example some women workers who have been caught up in the transition from SPA of 60 years to that of 65 years have collectively formed a protest group: Women Against State Pension Age Inequality (WASPI)[77] and allege, amongst other things, that there was little or no personal notice of the changes to SPA.

Auto-enrolment has increased the amount of people in the UK with an occupational pension. However, there are also several factors working to erode the value of UK occupational pensions such as the move from final salary to career average schemes and the drift from DB schemes to DC schemes, which attract on average a much smaller contribution rate. For example, the new minimum 8% combined contribution in the NEST auto-enrolment scheme (DC, 4% employee, 3% employer, 1% tax relief) may not provide enough money to sustain retirement[5]. In their book chapter, Grady[47] writes that auto-enrolment has created only an 'illusion' of pension provision and therefore a possible consequence is that auto-enrolment may increase working life by compelling people in low-paid work to continue to older ages due to insufficient pension provision. It appears that the increase in availability and take up of inferior occupational pension schemes may not be enough to avert financial insecurity in retirement. Further, the UK government have considered allowing people to utilise the money saved into auto-enrolment schemes to fund housing deposits.[78] This may partially alleviate housing problems but further exacerbate retirement income problems. The often precarious state of UK private pensions has frequently been referred to as a 'pensions crisis' in newspapers[79, 80] and academic literature[81, 82] which reflects perceptions of major shortcomings in pension provisions.

In the Dutch working population, Oude Hengel et al[83] and Boot et al[84] reported that placing taxation restrictions on contributions to employer-based early retirement schemes had successfully enabled longer working lives. However, they found that the effects were heterogeneous so that women and people with chronic diseases were made more vulnerable to unemployment or moving onto benefits. Therefore, there is growing evidence that use of blunt tools such as increasing SPA or financially restricting retirement-based routes out of work may disproportionately affect the vulnerable and/or have distal effects on other aspects of social security. It's currently unclear whether restricting employer based early-retirement schemes would prolong working lives in the UK. However the Netherlands has, on average, a higher replacement rate (see para 1.5.5) than the UK, with an average earner there receiving 80.2% of their former wages after retirement, as compared with 61% in the UK.[48] Assuming similar effects

were to occur in the UK, reducing the value of employer-based schemes may have a disproportionate effect on vulnerable, low paid workers.

In a report on economic barriers facing the over 50s, the Prince's Initiative for Mature Enterprise (PRIME) reported[85] in 2014 that there was little evidence that government policy has made an impact in encouraging longer working. They estimated that one million people aged 50-64 had been made involuntarily jobless and that 1.2 million jobless people aged 50 plus would be willing to work if the right opportunity arose. The Department for Work and Pensions (DWP) have produced similar estimates, also suggesting that there are one million people out of employment who are willing to work in this age group.[42]

Retirement also features as a topic in the debate on intergenerational fairness. Intergenerational fairness assumes that each generation should contribute an equivalent amount to the community in which we participate. Tensions between generations may arise when this social contract breaks down. In their report in 2019, the House of Lords Select Committee highlighted retirement (specifically the burden it places on successive generations) as having the potential to unsettle intergenerational fairness:

> *'The tax and spending policies of successive governments have failed to pay sufficient regard to longer term policy consequences. This is an endemic failure of policy making. It has undermined intergenerational fairness, including for generations yet to be born. Successive governments have failed to make proper provision for the costs of social care in old age for the large post war cohort who are now entering a lengthy retirement and who will rely on smaller, younger generations to pay for them.'[35]*

Thus, the social expectations of retirement may conflict with the general economic need for people to work at older ages. Given that retirement is now a choice, there is a potential conflict between people who believe that retirement is a 'social claim[22]' and an active phase of life to be enjoyed, contrasted against the economics-based policy changes designed to lengthen working lives. Although the lump of labour fallacy is no longer manifestly part of policy-making, it is possible that the desire to 'make room'[21] still influences individuals towards retirement and, that freeing up jobs for younger people[20] may be perceived as both a responsibility and possibly even altruistic.

In a report on encouraging employment past 65, Lain[60] has reported an underlying policy tension between current ageing policies and those of the past. Previously there was a paternalistic approach to policymaking in which older people were characterised as vulnerable and not expected to be able to continue working. This approach starkly contrasts with the current view,

which emphasises individual responsibility and requires people to actively save and plan for their own retirement. In a report on active ageing, Foster[5] made a similar point but placed the shift towards individual responsibility earlier, with the rise of neoliberalism in the 1970s and 1980s. Grady[47] also described a similar financial policy change, but blamed mismanagement and restriction of DB pension schemes by employers and government, as a precursor to a shift away from state provision of pensions to individualised and marketised pension planning.

More recently, interestingly, there are signs that the shift from pro-retirement to pro-work has, in some countries, been slowed, with planned changes to increases in SPA being limited or delayed and some expansion of early retirement policies.[48] Between 2017-2019, according to a report from the OECD countries, only Estonia increased SPA.[48] This might suggest that the steps taken to encourage later working have, in some cases, been rolled back.

In summary, it seems that the pressures created by an ageing workforce and a perceived 'pensions crisis' are unlikely to be alleviated with current policy changes alone. Blunt tools such as increasing the SPA may have a disproportionate effect on the vulnerable, and there is some evidence that auto-enrolment is unlikely to resolve retirees' financial precarity. In addition, the policy shifts appear to contrast and conflict with prior policies and values, potentially creating a perception of unfairness, an increased risk of resentment and inter-generational conflict.

1.7.1   Example: Universities Superannuation Scheme 2021

The Universities Superannuation Scheme is the largest private pension provider in the UK, providing occupational pensions for University and higher education staff. The scheme is a hybrid scheme of DB and DC elements. The DB element changed to a career average scheme on 01 April 2016 with the previous final salary scheme closing on 31 March 2016. The USS scheme is funded by contributions from the employer and the employee. As of 2020, this amounts to 30.7% of salary, with members contributing 9.6% and employers contributing 21.1%. However, the contribution rates have been subject to several increases since 2016 with another scheduled in 2021.

As of 01 April 2016, members contributed 8% of their salary to the USS scheme. Following valuation exercises in 2017 and 2018, members were informed that they would need to increase contribution rates from 8% of salary to 11%.[86] The changes were staggered so that from the 01 April 2019 member contributions increased to 8.8% of salary[87], from 01 October 2019 this increased to 9.6% of salary and from 01 October 2021 this is set to rise to 11% of salary[88]. The changes from 8% to 11% represents an increase of 37.5% in payments in just 5.5 years (April 2016

to October 2021) see Figure 1-13. However, it would appear that even these rapid increases are not enough to sustain the current DB scheme.

	USS contributions to scheme (% of salary)				
	01 April 2016	01 April 2019	01 Oct 2019	01 Oct 2021 Scheduled increase	Notional rate including 2020 deficit of 7.4%*
Member	8%	8.8%	9.6%	11%	14.7%
Employer	18%	19.5%	21.1%	23.7%	27.4%
Combined	26%	28.3%	30.7%	34.7%	42.1%

◄ Member 20% increase, 04/2016-10/2019 ►

◄ Employer 17.2% increase, 04/2016-10/2019 ►

◄ Member 37.5% increase, 04/2016-10/2021 (scheduled) ►

◄ Employer 31.7% increase, 04/2016-10/2021 (scheduled) ►

◄ Member 83.8% (Notional) increase if 2020 deficit split evenly ►

◄ Employer 52.2% (Notional) increase if 2020 deficit split evenly ►
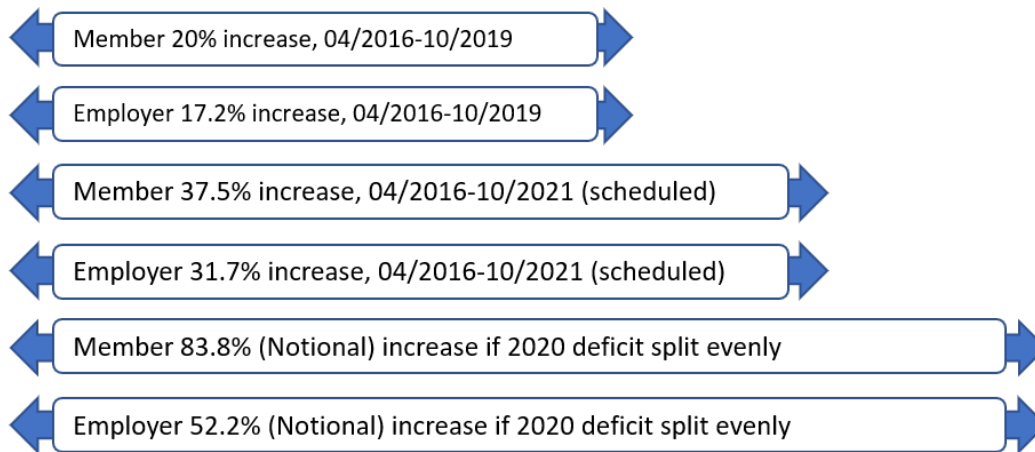
*Final column is calculated on a notional basis of splitting the 2020 deficit of 7.4% evenly between employer and member, 3.7% each

Figure 1-13 Diagram of Universities Superannuation Scheme actual and notional member and employer pension contribution rates 2016-2021 (% of salary)

The increases to October 2021, combined with a corresponding increase in employer contributions will raise the combined contribution rate to of members and the employer to 34.7%. However, even despite this increase, the scheme remains with a sizeable deficit. On 03 March 2021 the USS scheme further warned members that *'pension contributions will need to rise sharply if existing benefits are to be maintained,'*[89] due to a shortfall in funding. The reasons given for the shortfall were stated as follows:

> *'This increasing cost is down to a number of things, from members living longer and needing those pension payments for longer, to a poorer long-term outlook for investment growth driven by economic uncertainty and historically low interest rates.*[90]*'*

The most optimistic projection model in the USS actuarial report of 2020[91] suggests that the scheme requires a combined ongoing contribution rate of 42.1%. Even after the scheduled contribution increases to October 2021, the shortfall is 7.4% of salary. In ongoing discussions,

employers have indicated that their contributions are at the limit of what is sustainable for them.[91] If this is the case, then the scheme will need to either seek the contributions from active members or seek to reduce scheme benefits.

The consequences of the scheme's deficit are stark for employees. The 2021 increase alone amounted to an increased contribution of 3% of wages for the remainder of working life compared with 2016. If the remaining of 7.4% shortfall from 2020 is split evenly between the employer and member (3.7% of wages each) this would represent an increase of 83.8% in payments for the member from 2016 rates, see Figure 1-13. As the employers have already indicated that their contributions are already at the limit of what is sustainable it is possibly unrealistic to assume a further 3.7% from this source. These options are likely to be unaffordable. Therefore, other possible solutions include changing benefit structures which significantly reduce the end value of the pension to members[91] even further. The issues emanating from the 2020 actuarial report in the USS scheme is an example of the decline in value of workplace pensions. The ageing population has been cited as one of the factors driving this. Such financial restrictions could make later working a necessity for workers.

1.8   Why do people choose to retire?

Given the rapid changes to the retirement landscape described above, and that contemporary retirement is now a 'choice', it is important to know which factors influence the decision to retire amongst current older working adults. In the next section I will discuss what is currently known about the role of health, financial position, and work-related factors in the decision to retire.

1.8.1   Health

Of course, health impacts importantly on retirement decisions. Interestingly however, the relationship is not straightforward. De Wind et al[92] in qualitative work with Dutch early retirees found five pathways in which both good and bad health influenced the risk of early retirement. In that study, poor health appeared to encourage retirement when employees felt:

- unable to work at all due to the health problem
- a self-perceived decline in future ability to work
- afraid of a further decline in health
- that they were being pushed out by their employer

In contrast, good health also encouraged early retirement, as people reported that they wanted to enjoy life in retirement whilst their health permitted it. Overall, therefore, the study

demonstrated that both good and bad health could motivate towards retirement in several ways, albeit retirements that are likely to be experienced very differently for the respective workers.

In their review of the effects of health on work exit Van Rijn et al[93] found nine papers that specifically explored early retirement. Self-perceived poor health was associated with an increased risk of early retirement (pooled RR 1.27, 95% CI 1.17-1.38). These findings echoed those of an earlier review of by Van Den Berg et al[94] which reported that poor health had been investigated in six studies out of eight studies that fulfilled their eligibility criteria. Poor health influenced early retirement with risks ranging from 1.16-3.36 and four individual studies reported the associations to be significant. However, in a systematic review of retirement timing, Scharn at al[33] found examples of significant associations between health status and retirement timing. In a diverse and multi-disciplinary literature, the effects were not consistent and the authors encouraged taking into account country-specific contexts in further research.

Exploring the role of health in the other direction, Sewdas et al[95] undertook qualitative work with a cohort of Dutch participants from the STREAM cohort who worked beyond SPA and found that good health was a pre-condition to working past SPA. This was further reinforced by qualitative and quantitative findings from the STREAM cohort by Van Der Zwaan at al.[96] The qualitative study again suggested that good health was a precondition to working beyond SPA, whilst the quantitative study reported a significant association between good health and working beyond SPA.

In a review of retirement timing, Fisher[6] wrote:

> *'There is general consensus that healthier individuals are more likely to continue working, and individuals in poor health are more likely to retire early, as work becomes increasingly difficult with declining health. However, the relation between health and retirement timing is not linear, as good health is also related to early retirement, particularly among individuals at higher SES levels who can afford to retire.'*

The Van Rijn[93] et al review found no studies which reported the effects of common mental health conditions on early retirement. Contrastingly Fisher,[6] in a later review, reported that *' Many studies have found that poor mental health, and especially depression among women, is associated with early retirement.*' In a meta-analysis, published 2017, Topa at al[22] also reported that there was an association between poor mental health and increased risk of early retirement.

The practical effect of poor health in UK retirement behaviour is likely to be different than in other European countries because the UK does not have a specific mechanism for 'disability retirement.' In many European countries, disability retirement provides a route out of

employment for those who are physically unable to work. This route is typically available at a much younger age than SPA (For example Denmark, where from 2012, disability retirement is available from age 40 years [97] having previously been available to those aged 18-64 years[98]). There is patchy cover by insurance in the UK, paid for by individuals or employers for 'critical illness' which will pay salary payments if an individual becomes too ill to work, either short-term or longer-term, but this is certainly not universally available to all. In consequence, if a worker develops ill-health that impacts work ability to such an extent that they can no longer work at all, they are reliant upon their personal savings, income from others in their household. Alternatively, they may need to apply for welfare benefit payments such as universal credit or employment support allowance, which are state provided but are assessed based on savings and assets. In the case that an individual cannot work at all, they are subject to a work capability assessment designed to subsidise lost earnings only for those who are most incapacitated for work. Given these differences as compared with other European countries, the effect of health on exit from paid work in the UK can be more difficult to measure as people may define themselves as 'retired' even if their main reason for stopping was their personal health.

In a UK cohort, Stafford[99] found that physical limitations reported at age 53 increased the likelihood of retiring for a negative reason (health, caring responsibilities, bereavement, made redundancy, or problems at work); both before and after SPA, and decreased the likelihood of bridge employment (defined as any employment after retirement from main occupation). These findings suggest that poor physical capability at 53 could be associated with decreased work participation in later life in the UK. In the English longitudinal study of Ageing (ELSA), Rice[100] found that poor self-rated health, depressive symptoms or mobility limitations were all associated with early work exit.

Although health must influence retirement decisions, it is perhaps an area in which designing interventions to modify retirement age would be difficult, especially given the non-linear relationship detailed above. Any intervention designed to improve health, especially health at work, is obviously a very positive development and is to be encouraged However, as we have seen, this may not translate into all employees choosing to work to older ages in a linear fashion.

1.8.1.1   Justification bias theory

Most retirement studies utilise self-reported exposures, especially when measuring health. However, justification bias theory suggests that self-reported exposures and self-reported outcomes are prone to 'justification bias'. In this context, it suggests that retired individuals may overstate their poor health in order to retrospectively justify their decision to leave the workforce.

Chapter 1

In 1991 Bound[101] identified a possible overstating of self-reported health problems in a cohort of US men aged 58-63 in the period 1969-1979. However, the author also cautioned against more objective measures of health which may understate the effects of health on work-exit. Bound suggested that the over estimation may be because ill-health was a 'legitimate' reason to be out of work or that disability benefits were only available to those with ill-health.

Dwyer & Mitchell[102] found that both self-reported and objective measures of poor health were associated with earlier expected age of retirement in men aged 51-61, in 1992, in the Health and Retirement Study (HRS) in the USA and found no evidence that the justification bias theory applied. McGarry[103] also using the HRS, with a further follow-up in 1994, found that subjective health was an important predictor of the intention of remaining employed amongst current workers and that this could not be solely attributed to the justification bias theory. McGarry also suggested that earlier concerns with justification bias in self-reported health measures may have been due to changing attitudes to retirement. Consequently, in the 1970s it may have been considered less acceptable to be retired in the absence of a health condition, an attitude which became far less prevalent more recently. More recently in a retirement the European Community Household Panel (ECHP) survey between 1995-2001, Mortelmans et al[104] also found results inconsistent with the justification bias theory.

Justification bias, that is over-stating health problems to 'justify' retirement, remains a possible factor in studies that associate self-reported poor health with increased retirement. However, given changing attitudes towards retirement plus an evidence base finding against such a theory, especially in more recent time periods its effects are likely to be much reduced or even negligible, in contemporary studies. In addition, a prospective study design, where self-reported health is measured before retirement outcomes, would also reduce any possible effect.

1.8.2   Financial position

Understandably, and in light of the role of SPA and pensions discussed above, financial position will have an important role in retirement decisions. However, as with health, the results are not linear. In terms of the influence of finances on retirement decisions it seems that a distinction can be made between different aspects of personal finances. Income from paid work may have a different influence than accumulated wealth, such as savings, pension schemes or house prices.

Fisher et al[6] summarises in review:

> *'In general, greater wealth and sources of retirement income tend to lead to earlier retirement timing because most workers wait to retire until they can afford to do so. However, individuals who have higher incomes may choose to delay retirement to continue saving for retirement, and/or because they have less physically demanding and more intrinsically rewarding jobs that allow them to work in later ages.'*

Similar results were reported by Topa et al[22] in a systematic review of risk factors for early retirement including 151 studies. The authors reported that higher income, pooling data from 24 groups, had a marginal negative effect upon and thus decreased rates of early retirement, whilst financial security had a positive effect, increasing rates of early retirement when pooling data from 27 groups. Similarly in an English cohort study, Rice[100] found that increased pension wealth was associated with earlier work exit. Whilst not exactly the same as finances, in a study including 11 countries in the SHARE cohort, Radl[105] found evidence of a non-linear relationship between retirement and social class, showing that those retiring latest were those with either better socio-economic positions or those with the poorest.

in qualitative work with Dutch early retirees, Reeuwijk et al[106] found that financial opportunity to retire was essential for participants before entering early retirement, albeit in a cohort for whom early retirement was readily accessible, mostly through arrangements put in place by the employer. According to Loretto,[20] although financial position is undoubtedly important in retirement decisions, it is often not the sole, or even the primary, motivator. Loretto reported that the choice was highly valued by workers, albeit that the choices themselves were *'constrained by a myriad of interrelated factors.'*[20]

Exploring factors related to unretirement in a British cohort, Platts et al[61] found results which were described as *'paradoxical,'* in that people paying rent and/or a mortgage were more likely return to the workforce, but that neither income nor subjective financial situation were associated with unretirement.

There is undoubtedly a link between financial status and retirement, however the effects of the relationship are hard to predict, especially when examining the seemingly contrasting effects of income from work and wealth. The distinction between wealth and income is likely to be a fine one and for many must be closely related, with those earning more likely to be generally wealthier. Further although a strong financial position may enable retirement choices, for many in a poorer financial position, choices may be more limited.

As with health, it is difficult to envisage a practical intervention to change the financial status of a population in order to affect retirement decisions. Once again, aside from the practical problems the effect would be unpredictable.

Overall, both health and wealth are important factors in retirement decisions. However, it is clear that they represent only part of a wider decision-making process by workers. Further, although good health and higher wealth increase the range of choices for workers, these choices are not available to all.

1.8.3   Work-related factors

Hypothetically 'better' jobs may encourage people to work for longer whilst more unpleasant jobs may encourage or force people into retirement. However, we should not expect the relationship to be simple. As with health and financial position described above, it is likely that 'better' jobs will also be held by those in higher socio-economic positions, who will therefore be wealthier and healthier, both of which have a bearing on retirement decisions. In a 2020 systematic review of effective age of retirement, Boissonneault et al[76] concluded that work-related factors, amongst others, needed further study to better understand their role in increasing labour-force participation at older ages. The review also highlighted the lack of geographical diversity in the 19 included studies, which investigated data from only 11 of the 36 OECD countries. Only two of the 19 included studies investigated data from the UK.

In a policy landscape where longer working is desirable, work-conditions would also be a relatively easy area in which to intervene to prolong working lives. If an aspect of the workplace consistently affected retirement decisions, it is possible that employer-based interventions that changed that aspect, could enable longer working lives. Such interventions could be relatively simple to design and implement. An investigation of work-related factors may also assist employers to ensure that work at older ages is spent in comfort and good health.

1.9   COVID-19 pandemic

On 30 January 2020 the World Health Organization (WHO) defined an outbreak of novel coronavirus (which causes the disease known as COVID-19) as a public health emergency of international concern.[107] By 11 March, the WHO characterised the outbreak as a global pandemic.[107] In the UK, the first cases of COVID-19 were reported on 29 Jan 2020 and the first death from the same was reported on 05 March 2020.[108]

As the COVID-19 pandemic worsened, the UK entered a period of 'lockdown' from 23 March 2020 to 10 May 2020[109] in order to reduce person to person infections. This was followed by a second national lockdown from 05 November 2020 to 02 December 2020, and a third national lockdown from 06 January 2020[109], which as was lifted on 19 July 2021. The intervening periods were interspersed with 'local lockdowns' and a three/four tier restriction system for localised areas with high infection rates.

During the periods of 'lockdown' in the UK, most non-essential workplaces were closed. Staff were asked to work at home or, where this was not possible, were 'furloughed' via the Coronavirus Job Retention Scheme.[110] In the UK, the job retention scheme entailed workers staying at home and not participating in work whilst receiving 80% of wages, a cost to the employer, which was met by HM Government.

The COVID-19 pandemic has profoundly affected work, at least in the short term. Many people unaccustomed to working from home became home-workers by default. Many people did not work at all for extended periods due to the 'furlough' scheme. Workplaces that remained open required alterations to become 'COVID-secure', including 'social distancing' measures, encouraging workers to stay apart two metres where possible and wear face coverings. How COVID-19 will affect work and the workplace in the longer term has yet to be established. Similarly, the effect of COVID-19 upon retirement is unknown at the time of writing.

As well as changes in work conditions, it is possible that the COVID-19 pandemic will change workers' perceptions of employment as a whole. Equally, it is also possible that new methods of flexible working have gained acceptance and/or can be facilitated, due to the unanticipated precedent of mass homeworking in the UK during 2020/21. The data gathered for this thesis was collected prior to January 2020 and as such represents a pre-COVID workplace and indeed a pre-COVID world. As such, no conclusions can be drawn about any possible changes in retirement brought about by the COVID-19 pandemic. The Health and Employment After Fifty (HEAF) study,[111] in which this thesis is nested, has been maintained. A COVID-19 specific follow-up questionnaire was recently circulated electronically and this, and subsequent, surveys will be able to answer these questions in the future.

1.10   Aims

From the above it is clear there is a steady increase in the proportion of economically inactive adults in relation to those who are economically active. Strain on pensions systems is imminent (if not already upon us) and a flurry of recent policy changes have been implemented to encourage

working to older ages. However, the effect of these changes may not alleviate the immediate or future problems.

It is therefore important to understand which factors influence an individual's choice to retire in a contemporary work environment. These choices are being made in a new retirement landscape with shifting perceptions of retirement, as well as several major administrative changes (for example abolishment of mandatory retirement). Understanding the reasons why people choose to retire is important both to understand how the choice is being undertaken in the new environment and as a precursor to any possible employer-led interventions designed to prolong working life and to ensure that working to older ages is spent in comfort and good health.

Therefore, the overall aims of this thesis are to:

1.   Explore the role of work-related factors on retirement decision-making amongst a sample of recent English retirees in order to develop a questionnaire.

- Research question: In the opinion of HEAF participants what are the work-related factors that influenced the decision to retire?

2.   Conduct a systematic review of studies, within the published literature, which have reported about the effect(s) of work-related factors on retirement.

- Research question: 'Amongst people aged 50 and over, which work-related factors affect the decision to retire?'

3.   Undertake a nested case-control study within the Health And Employment After Fifty (HEAF) cohort study incepted six years earlier, cases will be incident retirees and controls will be adults who remain working, matched for age and sex.

- Research question: 'After adjustment for appropriate confounders, which work-related factors affect the decision to retire (negatively and positively) in 2013-2018 amongst a cohort of UK retirees and workers?'

Chapter 2 Methodological overview

2.1 The health and employment after 50 study

The health and employment after 50 study (HEAF) is a questionnaire based, longitudinal study of people, aged 50-64 at baseline, with a focus on health and work. Commenced in 2013 the baseline cohort included 8,134 participants recruited from 24 English general practitioner surgeries.[111] HEAF is ongoing (as of 2021) with annual questionnaires. Participants were asked to renew their consent for contact from the HEAF study team 2016-17, at which point 6,190 participants consented to be part of the ongoing study. The most recent point of contact and questionnaire was the fifth follow-up sent in 2019 at which time point, HEAF participants were once again invited to re-affirm their consent for participation for a further five years. As of January 2020, the cohort included over 5,000 participants (see Figure 2-1).
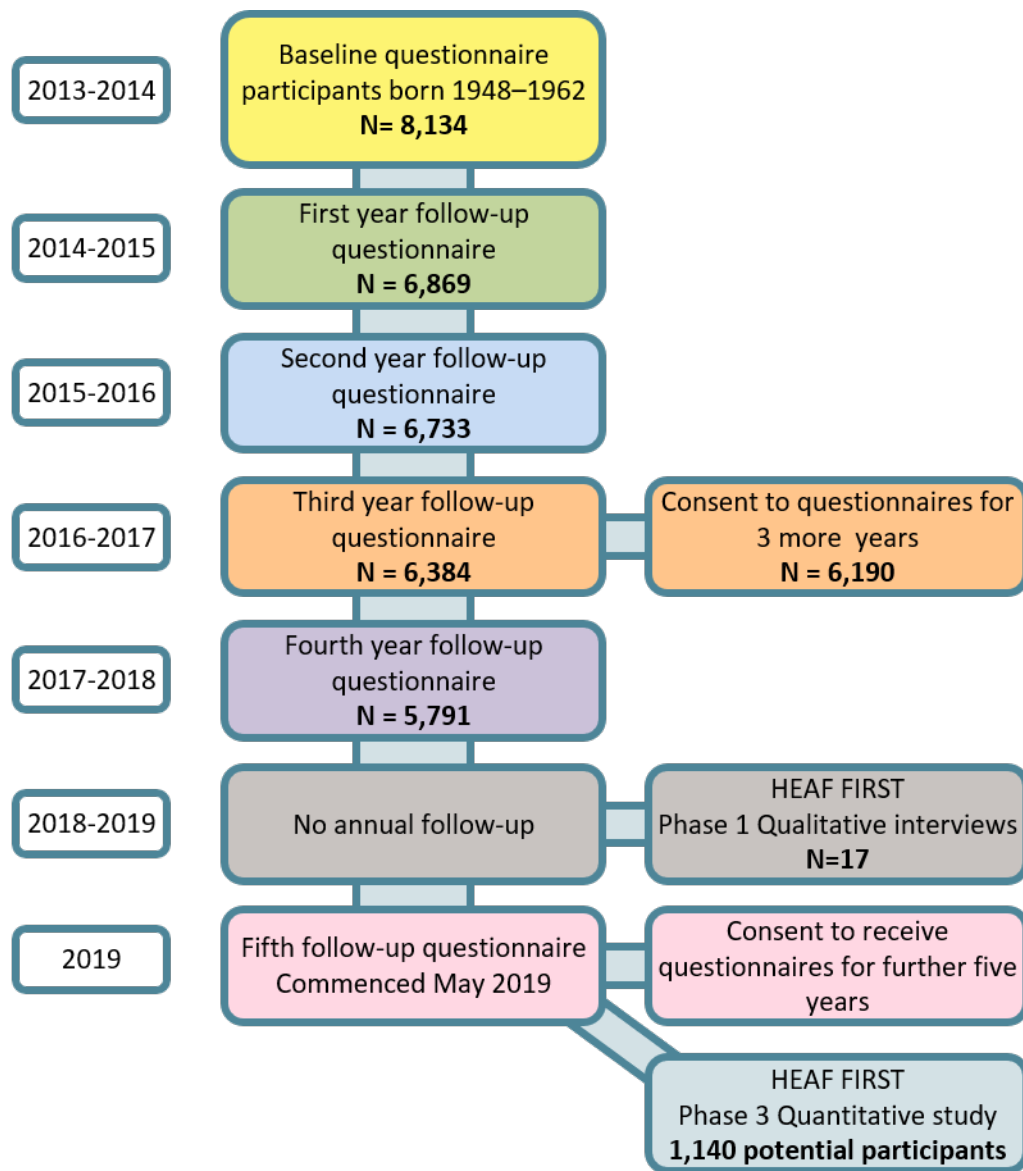
Figure 2-1   Flow-chart of participants at each follow-up in the HEAF cohort

The baseline questionnaire was designed to collect details of participant's health including mental health and pain, financial situation, employment details including aspects of the work environment, and plans for retirement. The study was also linked to the Clinical Practice Research Database (CPRD) which provided objective health data all of the participants who gave their consent.

The HEAF cohort included 2,084 participants who reported at baseline that they had retired, as well as 5,518 participants in either employment or self-employment. The proportions of retirees to workers has increased over time as the cohort ages and approaches and exceeds the UK's traditional SPA see Figure 2-2 and Figure 2-3. Overall, the trend has been to move from work into retirement, however some people have 'unretired' and moved back into the workforce.

HEAF Baseline 2013-2014
Employment status of participants, n=8,134

- Retired, 2084, 26%
- Unemployed, 532, 6%
- Self-Employed, 972, 12%
- Employed, 4546, 56%
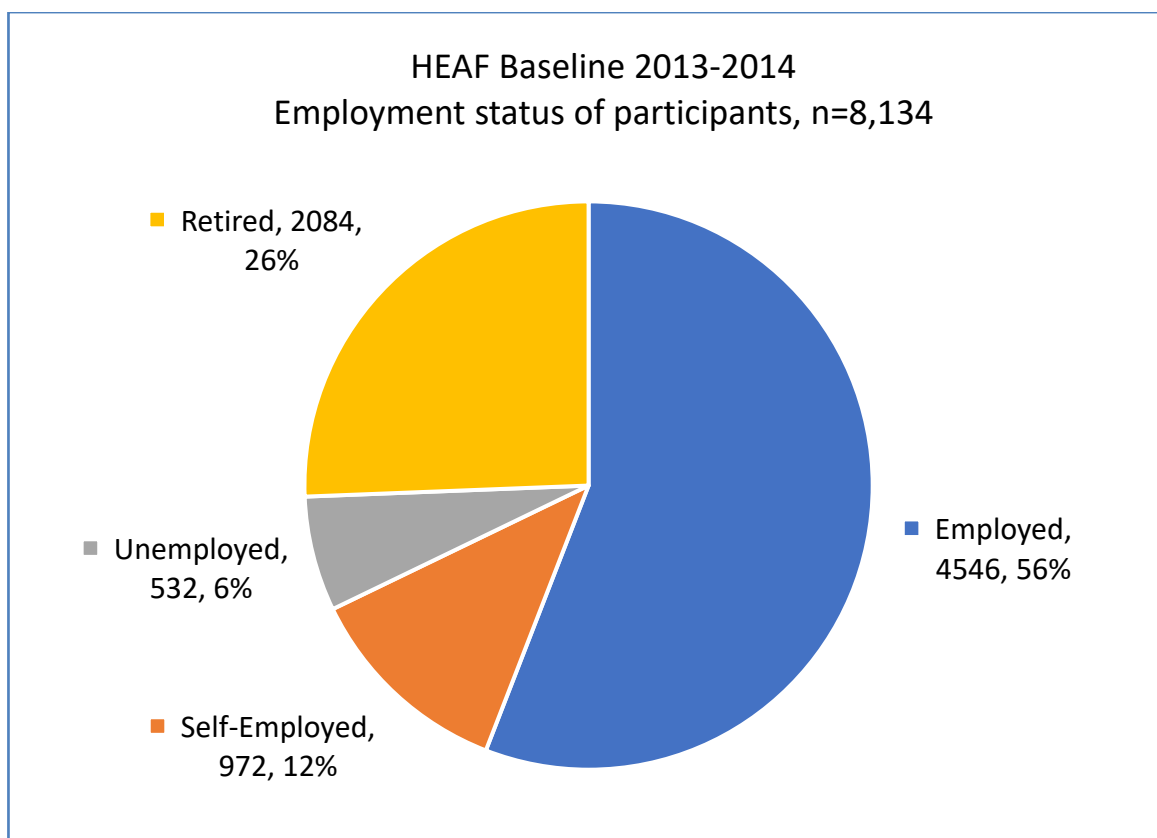
Figure 2-2   Pie chart of HEAF baseline participants' employment status

HEAF Follow-up 4 2017-2018
Employment status of participants, n=5,791

- Retired, 2624, 45%
- Employed, 2343, 40%
- Unemployed, 205, 4%
- Self-employed, 619, 11%
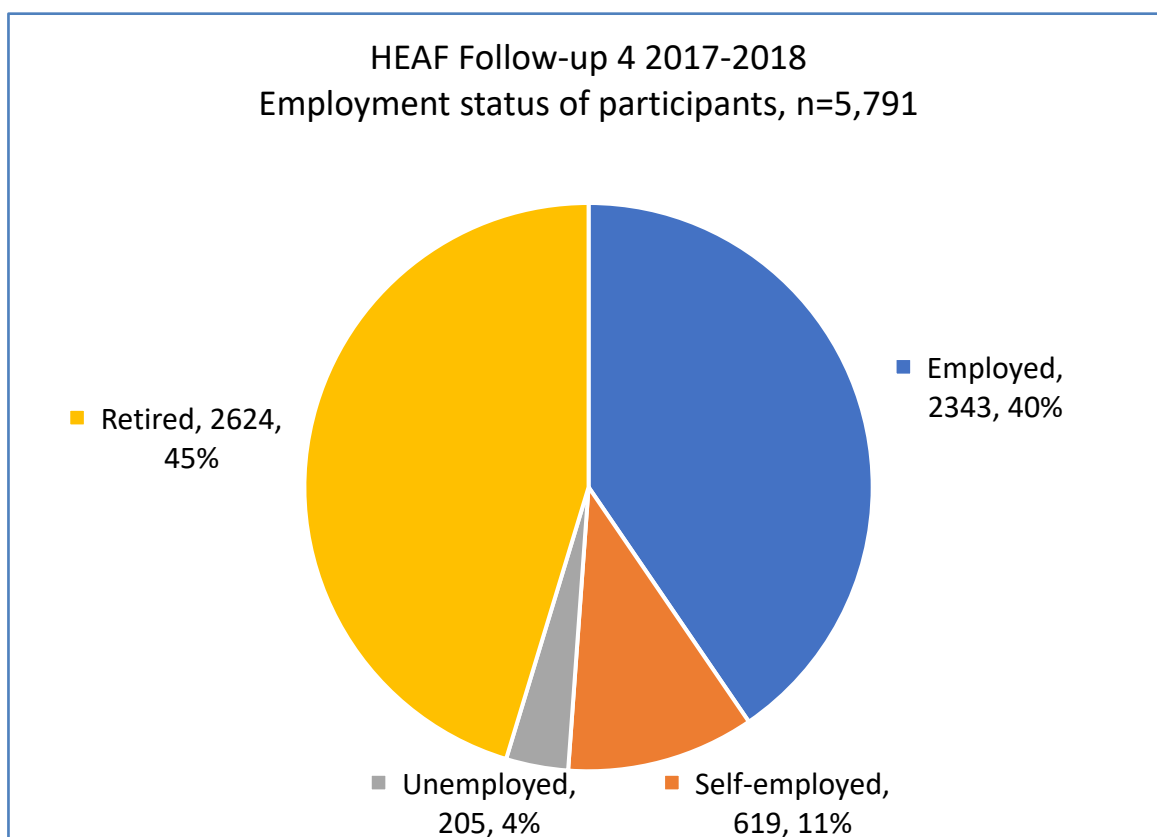
Figure 2-3   Pie chart of HEAF follow-up four participants' employment status

Therefore, the HEAF cohort includes many workers who are making retirement decisions in a contemporary setting. Consequently, retirement amongst HEAF participants will involve consideration of, and responding to, the various changes to the retirement landscape as described in para 1.6.

In the HEAF cohort the initial response rate to questionnaires was 20.7% which is relatively low[111]. Compared with the general population of 50-64 years olds in England the sample has a slightly higher level of education and wealth, but was similar as far as ethnicity, marital status and employment status.[111]

HEAF participants at baseline were also invited to give details of their current, or most recent, job and the industry in which that job took place. These data were coded into the Office of National Statistics standard occupational classification (SOC 2010)[112] prior to this research. The codes were subsequently used to determine the participant's socio-economic status under the Office of National Statistics socio-economic classification (NS-SEC)[113] Utilising the three-tier system, participants were divided into 'higher managerial/administrative and professional occupations,' 'intermediate occupations' and 'routine and manual occupations.' As shown in Figure 2-4 the cohort incorporates a spread of different occupations and socio-economic circumstances.

HEAF Baseline 2013-2014
Socio-economic class of participants
n=8,134

- Routine and manual occupations, 2520, 31%
- Higher managerial /administrative and professional occupations, 3253, 41%
- Intermediate occupations, 2244, 28%
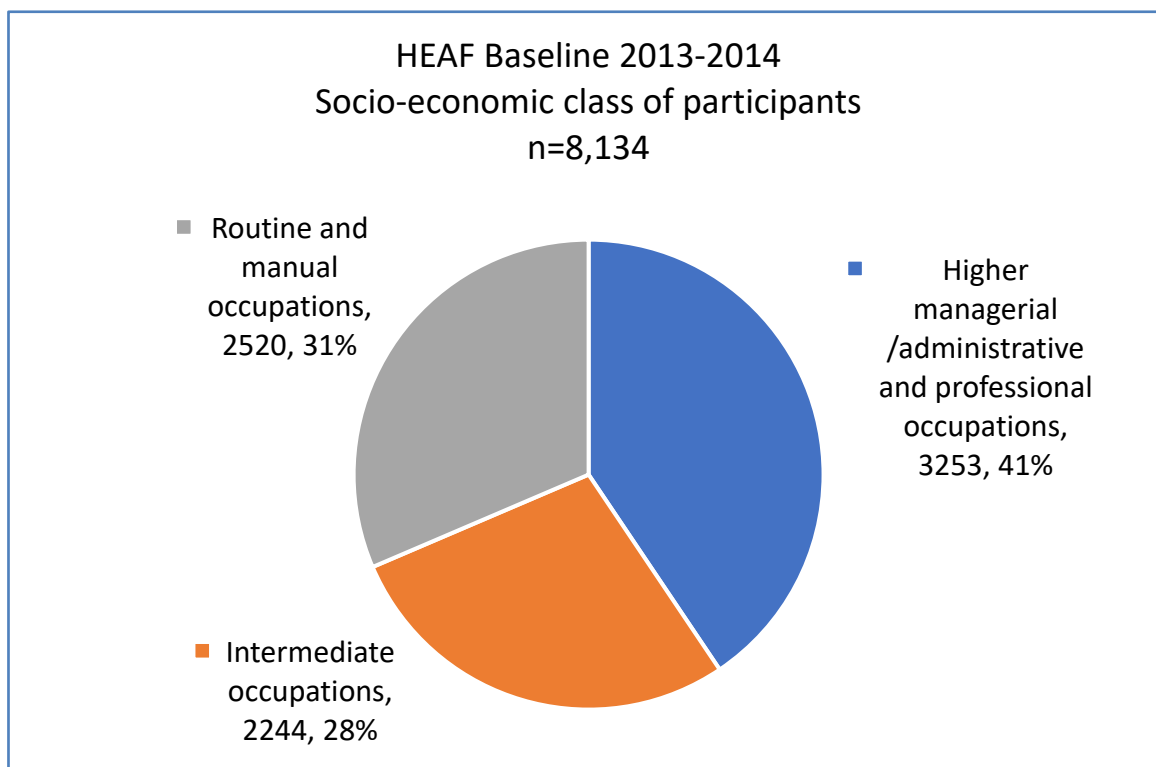
Figure 2-4   Pie chart of socio-economic status of HEAF baseline participants in NS-SEC categories

The sample is large and geographically spread throughout England. Therefore, the HEAF study provides an ideal sample in which to answer the stated aims of the thesis.

My PhD study into retirement decisions is a sub-study within the main HEAF study and involved sampling from amongst the participants of the HEAF cohort. The sub-study is called the health and employment after 50: factors influencing retirement study (HEAF FIRST).

The HEAF study is subject to an ongoing ethics approval with NHS Health Research Authority, North West, Liverpool East Research Ethics Committee: IRAS PROJECT ID 103258, REC Reference 12/NW/0500. Substantial amendments to the approval were submitted for HEAF FIRST phase one (number 7) with approval granted on 26 February 2018 and phase three (number nine) granted on 04 July 2019.

2.2   What is retirement?

It is clear that retirement must be operationalised in order to be measured and used as an outcome. This can present difficulties, as retirement is both a social and administrative concept. A useful amalgam is provided by the Feldman definition mentioned above at paragraph 1.2.3.

2.2.1   Feldman definition

Feldman[8] defines retirement as:

> 'the exit from an organizational position or career path of considerable duration, taken by individuals after middle age, and taken with the intention of reduced psychological commitment to work thereafter.'

As stated in para 1.2.3 this can be expressed as a job exit that satisfies three criteria:

a) After an organisational position or career path of considerable duration: As explained above this element will not be satisfied if the person retires from a short-term career path. This could potentially exclude many retirees from the HEAF FIRST study. Therefore, this element will not be used in this thesis, in favour of the second and third elements. In this thesis, the pre-retirement career or job should represent a period of relatively higher personal commitment to the workplace which should contrast with the third element.

b) After middle age: In this thesis, this element will be achieved by exploring retirement after the age of 50, in line with the OECD definition of an older worker.[9] The age of 50 has also been used as a lower age boundary by a number of retirement researchers.[10-13]

c) an intention of reduced psychological commitment to work thereafter: For the purposes of this thesis the third element is assessed subjectively. The retiree's intention is paramount. Therefore, I have given emphasis to participant's perceptions of retirement. If a participant

perceives themselves as retired, then the participant is considered as retired. In short, it is generally for the participant to state whether they have made the transition from work into retirement.

This definition of retirement is dependent on the perceptions and values of participants. However, adopting a different definition of retirement (for example a definition involving the number of hours worked) would risk excluding many people who perceive themselves as retirees. In the absence of mandatory retirement policies, retirement is now a self-determined choice in the UK. Therefore, defining retirement as a predominantly self-assessed status may better reflect the outcome of current retirement decisions. Further, it would be problematic to adopt a definition that would modify a self-reported retirement status without strong justification.

Therefore, this thesis predominantly uses the definition of retirement used by Feldman but with some modifications. The modifications are necessitated by the practical considerations in defining retirement and the changes in employment practices since the Feldman definition was proposed in 1994. It also follows that a retired person in this thesis, may or may not have passed the state pension age, and may or may not have ceased work completely.

It follows from this definition that intention to retire has been excluded. The thesis is concerned throughout with actual retirement. It has been shown that the factors that influence retirement intention may not always be the same as those which influence actual retirement.[114] Therefore, I generally excluded consideration of studies that explored factors influencing the intention to retire.

2.2.2 Bridge employment

Bridge employment is a commonly used term to indicate a partial withdrawal from the workforce. Beehr and Bennett[115] found that the definition of bridge employment was varied and used inconsistently in the retirement literature. In the same paper they identified 16 different types of bridge employment. Any narrow definition of bridge employment potentially excludes certain types of work force participation. Notably a person who reduces their hours in an existing job is excluded from narrow definitions of bridge employment.[115]

When defining retirement, Feldman[8] proposed that bridge employment was a subset of retirement behaviour, but crucially, a person who was employed in a bridge job could still be considered retired. Therefore, in the thesis I do not view bridge employment as mutually exclusive to the definition of retirement. The degree to which a person can work and still be considered retired, is probably best assessed subjectively by self-determination as described in

para 2.2.1. Following the reasoning of Beehr and Bennett [115] in this thesis I have adopted a wide definition of bridge employment of

> *'working for pay after retirement.'*

This can be seen to be somewhat nebulous, relying heavily on the definition of retirement, which as stated above I have interpreted widely. The Beehr definition is stated to build upon the definition proposed by Wang and Shultz[25] who define bridge employment as

> *'a longitudinal workforce participation process between one's retirement decision and entering full retirement.'*

Crucially then, the Beehr definition allows a person to remain working in their current role, perhaps with reduced hours or responsibilities and also be retired. Although bridge employment is not an outcome in the thesis, bridge employment remains an important process which could contextualise the employment status of some participants.

2.3   Phases of the project

To answer the research questions the HEAF FIRST project was designed with a mixed-methods approach in three phases, see Figure 2-5.
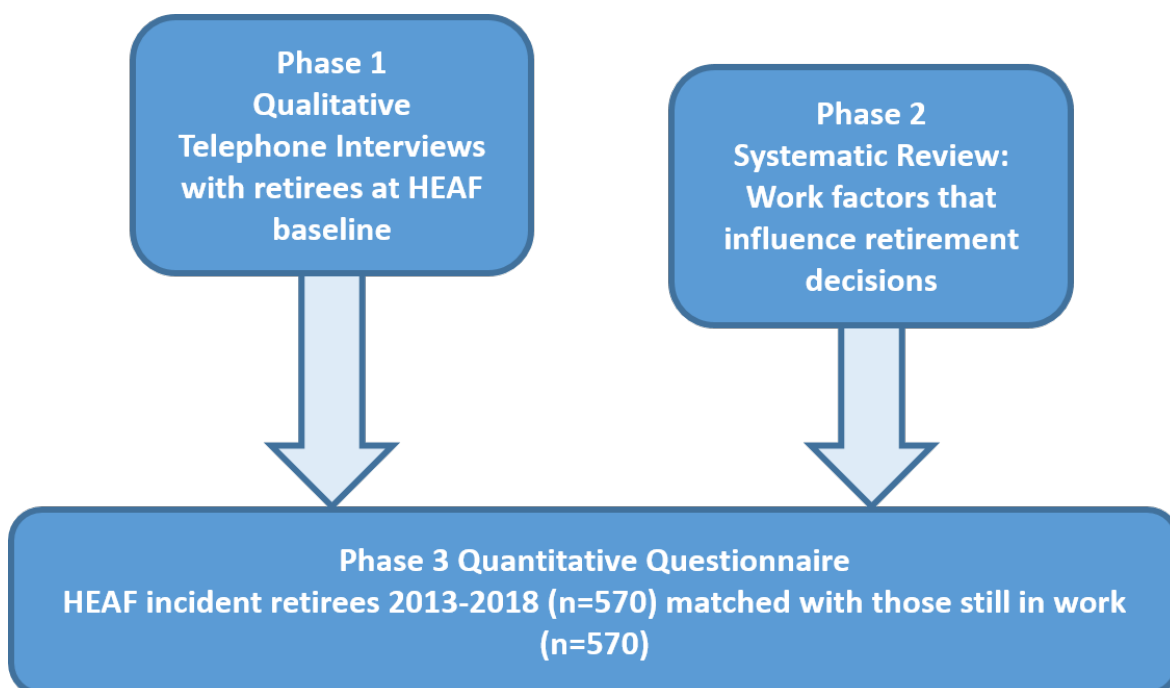
Figure 2-5   Diagram to show overview of phases 1-3 in the HEAF FIRST project

Phase one - qualitative telephone interviews

The first phase consisted of qualitative telephone interviews with a sample of HEAF participants enquiring about the work factors that had influenced their personal decision about when to retire. Participants were sampled based on biological sex and socio-economic status. The participants were existing members of the HEAF cohort who had self-reported at baseline that they had retired for reasons other than health. I selected the most recent retirees from this subset. The interviews were semi-structured utilising a topic guide focusing on factors in the workplace that may have influenced decisions to retire. Utilising thematic analysis, the results from the interviews were to inform development of a questionnaire for phase three of the project.

Phase two – systematic review investigating the effect of work-factors on retirement decisions

A systematic review examined the effect of work factors on the decision to retire. Papers were included if the relevant participants were aged 50 plus at retirement and the relevant retirement decisions occurred post-2000 in order to focus on contemporary retirement. A wide definition of retirement was taken encompassing retirement both before and after any relevant state pension age. However, intention to retire and transitions to disability retirement and unemployment were excluded as outcomes. There were no exclusions based on the location of the studies. The systematic review ran concurrently with the qualitative interviews.

Phase three - quantitative questionnaire

This utilises a case-control methodology comparing incident retirees with people still working of a similar age and same biological sex in the HEAF cohort. The questionnaire will test whether work-related factors have influenced retirement decisions. The questionnaire was sent to 570 retirees who have retired since the inception of the HEAF study along with the same number of controls who remain in employment. The controls were matched on age +/-2 years and biological sex.

Chapter 3   Phase one: Qualitative telephone interviews, work-related factors that can influence the decision to retire

3.1   Introduction

The aim of phase one was to explore without pre-conception, work-related factors that could influence the decision to retire in a sample of retired adults from a range of occupations. It was planned that the results from this phase would inform the development of a quantitative questionnaire for phase three.

The research question was stated as

In the opinion of HEAF participants what are the work-related factors that influenced the decision to retire?

3.2   Methods

3.2.1   Selection of qualitative method

Qualitative methods were chosen to allow for a wide range of topics to be explored in relation to the retirement decision. The advantages of this methodology were that it permitted the exploration of novel or unique factors that may not have been considered previously in retirement studies.

The research question called for a focus on work-related factors of the retirement decision. Semi-structured interviews were chosen as an appropriate method to retain a focus on work-related factors whilst also allowing exploration of other factors as they arose. The interviews were conducted by telephone as HEAF participants are geographically scattered across England and additionally telephone appointments may provide greater flexibility for the participants. Although telephone interviews may lose some context in terms of tone and body language there is some evidence that remote interviews can be regarded as less formal or more ordinary and therefore promote a sense of ease.[116]

The decision to retire is based on multiple factors[117] and non-work factors are an important part of overall decision-making. Therefore, the topic guide for this study was designed to allow the

participant to raise any issue that they felt pertinent to their decision to retire by asking open questions in the early stages of the interview whilst focussing more on the work environment in the middle part of the interview.

Thematic analysis based on guidance given by Braun and Clarke[118] was chosen to enable patterns to be identified in the data across participants that may indicate relevant determinants of the decision to retire.

3.2.2 Ontology epistemology

The ontological and epistemological position I adopted can be summarised as critical realism. Barbour[119] (pg. 36) citing Maxwell[120] (pg. VII) suggests that this is a

> *'realist ontology (the belief that there is a real world that exists independently of our beliefs and constructions) with a constructivist epistemology (the belief that our knowledge of this world is inevitably our own construction created from a specific vantage point).'*

The factors that influence retirement decisions are likely to be extensive and varied. It is possible that work-related factors such as job strain, may influence a wide variety of people when deciding to retire. However, how an individual reacts to that specific variable will inevitably be dependent on their beliefs and construction of the situation. Critical realism allows us to accept both these positions.

3.2.3 Development of topic guide

The topic guide was designed to allow discussion of as wide a range as possible of factors in the retirement decision. This was achieved by asking open and broad questions at the outset of the interview and subsequently narrowing down to workplace factors as the interview moved towards the middle stages.

The initial topic guide contained work demographic questions such as size of organisation and hours worked as well as seven main types of workplace factors that might have influenced the decision to retire. These factors were chosen as they had proved influential in prior studies[33, 94, 106]. Moreover, themes and influences from workplace stress models including Karasek's Demand–Control-Support model[121] (DCSQ), Siegrist's Effort Reward Imbalance model [122] (ERI), and Leiter & Maslach Areas of Worklife model[123] were included. The seven topic areas selected were:

- workload/effort
- rewards

- training and skills
- job control
- work environment
- job satisfaction
- work-community

The topic guide was piloted in two mock telephone interviews carried out with colleagues prior to interviews with participants. The topic guide structure and example questions are annexed at Appendix A.

3.2.4   Evolution of Topic Guide

The topic guide evolved between interviews in response to the content of interviews and the field notes and reflexive log.

Participants were keen to be interviewed about their retirement decisions and often shared a lot of information in the early stages. Responses were probed and explored as they occurred, meaning that the structure of the interview was fluid. For example, job satisfaction as a factor in retirement decisions was often raised very early in participant interviews, whereas the topic guide may have suggested it should be discussed later. When this occurred, I endeavoured to discuss the issue as it arose rather than revisiting later to enable the smooth flow of the interview and to ensure that the participant felt listened to.

The original topic guide included several work demographic questions such as size of organisation and hours worked. It became clear that these questions were unnecessary as all relevant aspects of work demographics were raised more naturally in other parts of the interview.

Experience from interviews led to inclusion of the topic *'What made the decision to retire more difficult?'* I initially found it problematic to open-up the conversation to discuss issues that may have discouraged the participant from retiring. The question was added to both gather relevant data and to give the participants manifest permission to talk about factors that may have made the decision more difficult.

Furthermore, a wrap-up question was added *'What else would you like to add about your retirement decision that we haven't already covered?'* This was to end the interview on a positive note as suggested by Barbour[119] (pg. 118). The addition was also made as a direct response to interview five at the end of which the participant volunteered this information.

3.2.5   Sampling

The phase one interviews were purposively sampled from the existing HEAF cohort,[111] described at para 2.1. The HEAF cohort includes people born between 1948 and 1962 who lived in England and were registered at a GP surgery. Phase one was sampled from the participants who had indicated that they had retired from work prior to baseline in 2013-14. Participants who reported that they had not left work for a health reason were selected for study. Although health is an important factor in many retirement decisions[93, 94] HEAF FIRST concentrated on retirement occurring in the absence of serious health concerns. Serious health concerns may have overridden and obscured the effect of workplace factors, which was the primary focus of the research. Participants in HEAF FIRST phase one also had to be members of the ongoing HEAF cohort in early 2018. This was so that relevant consent for initial contact was in place.

The HEAF study collected comprehensive data about the participant's demographics[111] allowing me to select participants based on various characteristics. The HEAF FIRST interviewees were selected in order to obtain a purposive spread between biological sex and socio-economic status, a form of maximum variation sampling.[124] Biological sex was selected as a relevant demographic due to the differences in UK retirement ages between biological sexes, see paragraph 1.6.1. Socio-economic status based on the ONS NS-SEC[113] three tier system as described in para 2.1 was used in sampling in order to obtain a wide range of work types and experiences.

Individuals with periods of unemployment prior to retirement were excluded from HEAF FIRST qualitative phase in order to maintain the focus on work-related factors in the retirement decision.

Invitations were sent to the most recently retired participants in each NS-SEC[113] and biological sex category. As the study progressed, mailings were targeted towards categories who were under-represented in the responses to date. The invitations consisted of an introduction letter, a participant information sheet, and a consent form. There was no reward or inducement for taking part.

3.2.6   Number of Interviews

Interviews were conducted until saturation of themes relevant to the research question was reached. Saturation can be defined as having enough information to replicate the study and the point at which no further coding is feasible.[125] The definition of data saturation I used was also influenced by the concept of 'information power' as proposed by Malterud et al[126] which highlights five areas that can influence sample size, which are: the aim of the study, the specificity

of the sample, the availability of established theory, the quality of the dialogue and the analysis strategy. Saturation was sought in respect of the range of possible workplace determinants of retirement. Whilst other factors arose in the interviews (e.g. health and family interactions) these were not pursued until saturation.

Interviews were carried out concurrently with both transcription and the initial stages of coding described at para 3.2.9. This enabled a better understanding of the data and its content whilst also continuing with the interview process. Topics and reasons for retiring began to repeat themselves at interview six, although saturation had by no means been reached. Interview seven was the first to take place in the routine and manual occupational class and revealed a new selection of factors which had not been present in the first six interviews. This both validated the sampling technique described above at para 3.2.5 and moved the concept of saturation further away. By interview 11, topics raised by participants were regularly repeating and interview 12 was the first which did not raise any new topics. Similarly interview 13 did not add any new topics to the data. Further sampling was carried out within the routine and manual occupational class which, at that point, had been relatively underrepresented. Interviews 16 to 18 failed to raise any new topics so at that point saturation had been reached.

3.2.7   Interview procedures

On receipt of a completed consent form, the participant was telephoned to arrange an interview date. Interviews were conducted by telephone and loosely followed the topic guide described at para 3.2.3. The interviews were semi-structured so that particular questions and the order in which they were asked could vary between participants. Barbour[119] (pg.120) characterises semi-structured interviews as balancing the researchers agenda (in this case exploring the role of work-related factors on retirement decisions) whilst allowing room for the participant to provide their own insights into the topic. The first open questions were about retirement generally and participants were asked:

'What does retirement mean to you?' and 'What was the main reason for your retirement?'

These were asked in a similar style in all interviews. This gave the participant an opportunity to mention any factor whether work-related or not. After the opening questions the interviews focussed on work-related factors as possible determinants of retirement. The topic guide was used to guide the conversation so that all seven topic areas had been discussed with each participant. On occasion, the participant themselves raised the topic area, in which case the topic was probed as it occurred rather than the following the order of the topic guide. Therefore, it should be noted that not all questions were asked of all participants and the questions were not

always phrased in the same manner. This was to allow the interviews to proceed in a conversational manner in an effort to produce richer data.

I conducted the interviews which were audio-recorded and then transcribed. Field notes and reflexive logs were completed immediately after the interviews. This enabled self-reflection on the interview in order to consider changes to the topic guide. The field notes and reflexive log were not treated as data for analysis but provided a tool to aid analysis.

3.2.8   Transcription

I transcribed the interviews as soon as possible after the interview date (usually within two to three days.) This enabled familiarisation with the data and an opportunity to consider coding. Transcription was carried out verbatim without extra notation for pauses or tone. Names and other identifying material were redacted. All names used in analysis were pseudonyms. I read the transcripts whilst listening to the recorded interviews on a further two occasions.

3.2.9   Coding

The transcripts were coded based on guidance given by Braun and Clarke[118] for thematic analysis. I used Nvivo[127] to assist with the coding process.

Although the data were coded based upon conducting an inductive thematic analysis, the topic guide was developed using existing theory. It was also relevant that both researchers involved in coding were aware of existing theory in the area. Therefore, it would be naive to suppose that existing theory did not influence both researchers in this task. For example, both researchers independently developed a code based on the concept of 'control' which can be linked to the demand-control model developed by Karasek.[121] Nonetheless the data were coded inductively to ensure that new concepts or themes were recognised despite the influence of existing knowledge. Data were coded on a complete basis as per Braun and Clarke[118] to allow a greater range of details about retirement decisions to be represented. Coding commenced during the data collection stage. This allowed the concept of saturation to be monitored and minimised over-collection of data.

Initially Professor Karen Walker-Bone (KWB) and I, coded three interviews (numbers one, six and seven) independently then compared results. Results were largely similar with differences in coding mainly stemming from a difference in the naming of codes rather than the content. Discrepancies were discussed and resolved. For example, both reviewers had highlighted 'control' as a relevant code. I applied this code narrowly to participants discussing the execution of their

roles. KWB took a wider view, noting that some of the descriptions of workplace change reflected a lack of control. In resolution the codes 'autonomy' and 'loss of control at work' were devised.

Subsequently a coding frame was developed to assist with coding the interviews. An excerpt from this frame as amended is attached at Appendix B. The framework was not exhaustive and additional codes could be added at any point by either researcher. In particular, the 'example' column was updated as more interviews were coded.

I coded all interviews utilising the coding frame, including re-coding interviews one, six and seven to ensure consistency. Any new codes arising were applied through the preceding interviews. Further codes were added during this process as necessary.

The codes evolved to be more specific as coding progressed. For example, the code 'isolated work' was applied to the interviews where the participant described being alone or working alone. It was observed that this code wasn't reflecting the content of data as many instances of working alone were not directly related to retirement decisions. As the coding evolved this was transformed into 'I'm isolated' This code described the participant feeling alone or unsupported at work when this factored into retirement decisions. Data would not be included in this code simply because the participant was working alone. In total we identified 44 codes.

3.2.10   Development of themes

I commenced development of themes after complete coding had been undertaken for interviews one to thirteen.

The codes were grouped together with other similar codes in an inductive fashion to form candidate themes. For example, the codes of 'declining standards at work' and 'loss of control at work' frequently described workplace change and so were grouped together in a candidate theme. The code for 'value mismatch' was also frequently cited in reference to workplace change and therefore this was included. This candidate theme eventually became the sub-theme 'You've changed' to reflect comments on workplace changes that had been experienced negatively. Working versions of the thematic map developed during this process can be found at Appendix C.

The candidate themes were discussed in team meetings. The candidate themes and updated coding frame was tested by KWB by coding interviews eight, nine and thirteen. Results were then compared my coding. Discrepancies were discussed and resolved.

Although the analysis was conducted in an inductive fashion from the data, it was of course impossible to remove the deductive element provided by the team's prior reading and

knowledge. Therefore the terminology and groupings were inevitably influenced by pre-existing literature, notably the models devised by Fisher et al[6] and Reeuwijk et al.[106]

3.2.11 Ethics

The HEAF study has an ongoing ethics approval with the NHS Health Research authority, North West, Liverpool East Research Ethics Committee IRAS PROJECT ID 103258, REC Reference 12/NW/0500. Proposals for HEAF FIRST phase one were submitted as a substantial amendment (number 7) to the existing project and protocol along with interview guide and all information sheets and template letters on 17 January 2018. A favourable opinion was obtained from the committee on 23 February 2018 with HRA approval being granted on 26 February 2018.

3.3 Findings

3.3.1 Participants

There were 18 positive responses from 58 invitation letters giving a 31% response rate. Eighteen interviews were carried out between April 2018 and July 2018, of which 17 were included in the analysis. One interview was excluded as the participant had a period of unemployment immediately prior to retirement meaning they did not meet the inclusion criteria. The demographics of the sample are summarised in Table 3-1. The participants in interviews five and 15 reported that they had moved from employment to self-employment then onto retirement. In each case the discussion embraced leaving both the employment and the self-employment as the participants felt this was relevant to their retirement transition. The interviews lasted around 20-25 minutes, excluding the introductions and post interview conversations.

Table 3-1   HEAF FIRST phase one qualitative interviews: participant characteristics

	Male N=8	Female N=9	Total N=17
Socio-Economic Status (SES)			
Higher and managerial	2	3	5
Intermediate	4	3	7
Routine and manual	2	3	5
Employment status prior to retirement			
Self-Employed	2	4	6
Employed	6	5	11
Retirement timing			
Before state pension age	5	2	7
At state pension age	2	3	5
Later than state pension age	1	4	5

The participants all retired between June 2012 and July 2014. Age at retirement ranged between 55 and 67 and therefore the study included people who had retired before the state pension age (SPA) and those who had retired after it. Case-studies of a sample of the participant's retirement experiences are at Appendix D.

3.3.2   Reflections

At the time of the interviews, I was a 38-year-old man, working as a research assistant who had worked with the HEAF cohort for three years. In opening conversations, I tended to introduce myself as 'the person who deals with all the questionnaires when you send them in' rather than as a researcher or a PhD student. The method of introduction has been shown to have influence on the content and data generated in an interview.[128] In the current study my approach was designed to break down social barriers rather than introduce extra ones.

I was universally younger in age than the participants. I was never asked my age by the participants and the interviews were conducted by telephone, which gave no visual cues as to the age difference. However, there can be little doubt that the participants knew that I was younger. One participant explained that they were *'part of the older generation'* to illuminate a decision they had taken. This of course implied that I was not part of that generation and demonstrated

the participant's awareness of an age difference. Therefore, the participants were aware that they were operating from a platform of greater experience than my own in this topic. In this respect the participants occupied a higher position in the interview power dynamic because of their direct experience of this life phase compared with my relative inexperience. This appeared to be beneficial as it encouraged the participants to explain their views and experiences in greater detail than they may have done otherwise. The participants were also generally very assertive and quick to tell me if a topic had no effect on their decision.

The only exception to this was in interview sixteen. The participant formerly worked in the National Health Service (NHS) and often seemed to assume that I was familiar with the NHS (even though this was not the case).

3.3.3   One reason or many?

During the early stages of the interview participants were asked their main reason for having chosen to retire. Most participants responded with a single reason for their retirement, for example job satisfaction, or financial position. However, upon further questioning, many more nuanced reasons were brought out, reflecting the multi-factorial nature of the decision. It is likely that these first responses reflected the nature of the interview flow. Yeo et al[129] (pg. 188-190) refer to 'interview mode' where the interviewee is working at a deeper level than everyday social interactions, achieved through rapport and interview technique. On a social level it is likely that the participants had previously been asked the reason for their retirement and had a well-prepared, but brief, answer. However, as the participants reached 'interview mode' the nature of the decision revealed itself to be more complex than initially suggested. There was not necessarily a conflict in this. When asked for a main reason for retirement, the participant's response holds a value both as a reason in itself and a social-level explanation of the decision. When presented with the opportunity to talk in more detail, then the interviewees elucidated upon their prior answer and explained the multi-factorial nature of the decision. Therefore, it was probable that the two seemingly incompatible responses reflect the level on which the questions were asked and answered, rather than any contradiction in reasoning. On a literal level, the open question asked for a 'main' reason for retirement, which in hindsight suggested that a single reason could explain the decision. For example, in interview 16 the participant felt that the overall reason for retirement was the commencement of a pension, however on further questioning the participant also stated that some work-related factors were relevant. Later as the formal interview drew to a close, the participant side-lined the extra factors returning to the point where a single reason was given for the decision.

3.3.4   Themes

Factors that influenced retirement decisions covered a wide range of topics and personal circumstances. The decision appeared to be one in which many factors are weighed against each other on an ongoing basis in order to reach a retirement decision. I distilled the data in relation to the decision to retire into five themes shown in the thematic map at Figure 3-1. Earlier versions on this map in development stages can be found at Appendix C.

Three of the themes contained factors that motivated or 'pushed' the participants away from work and towards retirement. These were named:

•   'Work was pushing me'

•   'It's not you it's me'

•   'I had my reasons'

The theme 'Work was pushing me' contained work-related factors that influenced retirement decisions which was the prime focus of the research question. This theme was broken down into four sub-themes: called

•   'You've changed'

•   'I've got no time'

•   'This hurts'

•   'Grinding me down'

A fourth theme included work-related factors that pulled the participants towards work and away from retirement. This was called:

•   But work also pulled me back

A fifth related theme was created which addressed participant's perceptions of life in retirement which was called:

•   Now I'm free

The 'push' and 'pull' terminology was adopted from Schultz et al.[130] However, in the current analysis 'push' refers to factors that pushed the participant from work toward retirement, and 'pull' refers to factors that pulled the participant back towards the workplace, whereas Schultz uses pull to denote factors that pull towards retirement.
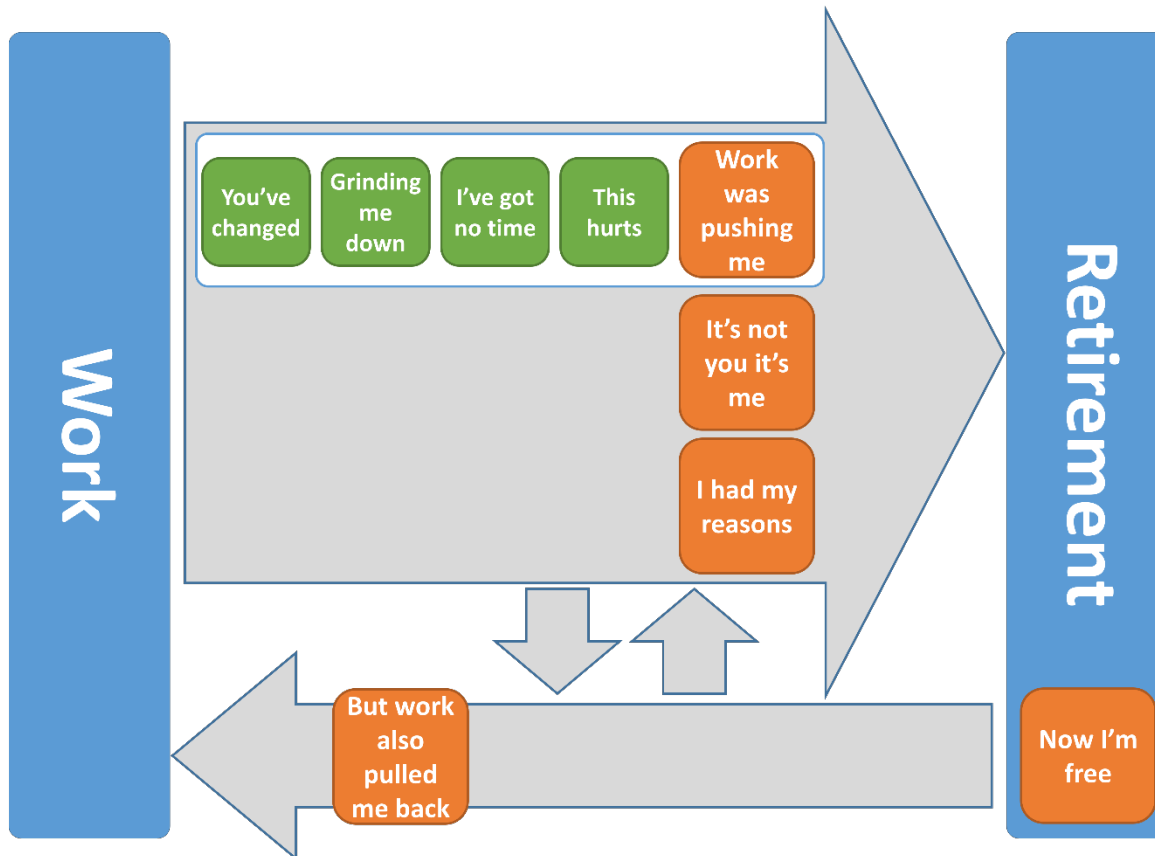
Figure 3-1   HEAF FIRST phase one qualitative interviews: thematic map

Figure 3-2 shows the themes and sub-themes from the phase one results, along with examples of the codes used in their formulation. Note that the four codes indicated for each theme and sub-theme are examples, rather than representing an exhaustive list of the constituent codes.
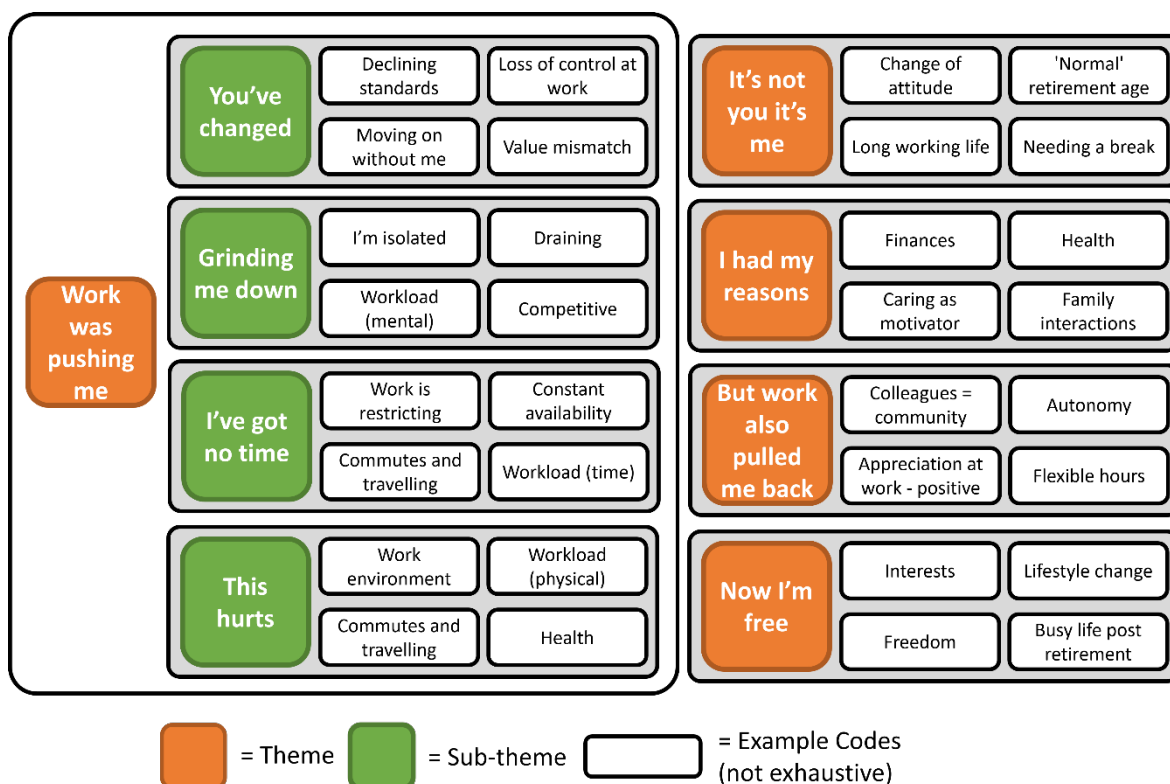
Figure 3-2   HEAF FIRST phase one, theme and code structures

The following sections will describe and discuss the themes and subthemes from the phase one results in more detail.

3.3.4.1   Work was pushing me

Theme Definition:

This theme encompassed factors in the workplace that 'pushed' the participants towards retirement.

These 'push' aspects were described as negative and unpleasant. It seemed that leaving the job and entering retirement allowed the retirees to remedy or escape these factors.

The research question focused on work-related factors that could influence the retirement decision and therefore this area was the most intensively probed using the framework of the interview guide. The data under this theme were broken down into four sub-themes to provide a more comprehensive and detailed interpretation.

3.3.4.1.1   You've changed

Theme Definition:

This sub-theme captured workplace changes that were reported as factors in retirement decisions. In this sub-theme, workplace changes had resulted in a new environment of work conditions and processes that retirees contrasted unfavourably with the prior status-quo.

Retirees associated such changes with declining standards and increasing workloads. These changes conflicted with personal values or work-related pride, which caused an imbalance, for which the only perceived remedy was retirement.

Change in this sub-theme seemed to increase camaraderie between immediate colleagues, as they shared and endured the same turmoil together. However, this appeared to be at the expense of developing ill-feeling towards those who were higher-up in workplace hierarchies who had initiated the work-related changes. Thus, the workplace was factionalised into 'us' and 'them.'

Change also seemed to have led to feelings of lost control over both the work and workplace.

When change was experienced in a negative manner, retirees sometimes described themselves as an obstacle to the changes and the workplace itself was perceived as moving on without them.

Examples of codes included in this theme were:

•   declining standards at work

•   loss of control at work

•   value mismatch

•   us vs them

In this sub-theme, change itself was not always perceived negatively, however change sometimes precipitated several negative feelings towards work in given circumstances. In interview four, Gareth said:

> *'I love new things and challenges, but you want to know that you have a secure position within that.'* Gareth, self-employed, intermediate NS-SEC

Here, Gareth acknowledged the positive effect change could have on his own job-satisfaction but added a caveat that the particular changes to his organisation had decreased his sense of security, turning that change into an undesirable experience.

Change became a notable 'push' towards retirement when it was perceived to result in a decline in standards at work. Retirees mostly expressed this in terms of the practical result of the new working arrangements, rather than the change process itself.

In Interview 14, Lisa said that she felt less valued at work towards the end of her career. When asked what had changed, she replied:

> *'I think the focus on the service changed. It was not anymore about giving a gold-standard service. In my opinion it was about delivering, service delivery volume'* Lisa, Employee, Intermediate NS-SEC

To Lisa, the prior status-quo of 'gold standard' work had changed, with the focus moving towards volume. Lisa also used a quantity-based description of the service post-change which seemed to imply a de-personalisation of the service and the workers, as well as a more literal focus on greater workloads.

Some retirees described a decline in standards as occurring whilst they were still in work, whilst others implied that they had anticipated that a decline was inevitable at some point in the future. Declining standards also produced a mismatch in the values or focus held by the employee and the perceived newly changed focus of the employer. In interview six, Phillip stated that upcoming changes to the workplace were his main reason for retirement. When asked to describe those changes he said

> *'The sort of changes were cutback in financial support for the services we were providing and not being able to do the job that we, and I say we because we worked as a big team, we were employed for originally. And it was being imposed upon us, and it wasn't good for the children we were working with.'* Phillip, Employed, Intermediate NS-SEC

Phillip believed the forthcoming changes would have inevitably resulted in an interruption of the status quo, so much so that he considered that his original role would be undeliverable in the new climate. The reference to the role *'we were employed for originally'* hinted at a perceived betrayal of the arrangements made between him and the employer in the pre-change climate. Phillip found his role prior to change very rewarding but felt that the upcoming changes would inevitably result in a poorer service. Phillip worked with children at a school and the declining standards were described in terms of the end result, namely having a detrimental impact on the well-being

of the children with whom he worked. The perceived post-change workplace would be less advantageous for the children and therefore less rewarding for Phillip, pushing him towards retirement.

In the current study the retirees were specifically asked about training in their former roles. Sometimes when the retirees described a negative change occurring in the workplace, they also gave descriptions of a decline in the available training. For example, Lisa in interview 14 described a negative workplace change that had motivated her to retire. When asked about training she described the environment in the new role:

> *'if there's something had cropped up during an assessment and you wanted to research that for future, for my, sort of, education, then there was never any time to do that within the work time. That would have to wait until you got home.'* Lisa, employee, intermediate NS-SEC

Lisa perceived that training for new work-scenarios had been side-lined, notionally because of time demands. Therefore Lisa, who wanted to work to the highest standards, felt obliged to research new developments at home. To Lisa, the training had declined to such an extent that professionalism was only maintained through personal endeavour. However, it should be noted that participants generally reported that workplace training did not influence their retirement decisions.

Workplace changes were also experienced negatively when the participant perceived the change to result in a loss of control over their work or their role.

Alice, from interview fifteen, left full-time employment for a self-employed consultant role in the same work area. She regarded this as part of her transition into retirement. When asked if enjoyment of her job played a role in her retirement decision, Alice said of the full-time role:

> *'I wasn't enjoying my job there. I wasn't enjoying the way that the structure of the organisation was going, and what kind of opportunities that offered me, and the kind of projects I was being offered. Leaving my self-employment, I don't think that* [enjoyment] *came into it because, if I didn't like the way it was, it's up to me to change it.'* Alice, self-employed, higher managerial NS-SEC

Alice believed that changes in the full-time role had limited her opportunities, so that she had lost control over the type of work she was doing. In contrast, she viewed any lack of satisfaction at the self-employed job as a challenge which she could remedy. In this respect the same stimulus (lack of enjoyment due to change) resulted in two different outcomes. Alice left full-time employment

but stated that if similar circumstances had occurred in the self-employed role it would have been up to her to resolve them. The difference between the two was the amount of control that Alice felt able to exert in the role. This interpretation is reinforced by Parry et al[131] who reported in a qualitative study based in England, that those in creative/professional work streams regarded themselves as being forced out of professional roles when workplace changes limited their autonomy.

In this sub-theme, the loss of control could be remedied by retirement, which itself was contrastingly described as representing freedom, see para 3.3.4.5. It is also of note that job roles with autonomy could potentially pull the participant back towards work, see para 3.3.4.2.

The findings show that a reduction in the amount of control that the participant experienced due to workplace change was a factor in the retirement decision. This is in line with other quantitative studies such as Carr et al,[10] which demonstrated that higher work-related decision authority significantly associated with a reduced risk of work-exits or Robroek et al[12] which showed that low job control associated with an increased likelihood of early retirement.

Workplace change also affected interactions with colleagues. Counter-intuitively a change in the workplace that was described in negative terms sometimes increased camaraderie amongst immediate colleagues. However, this seemed to come at the expense of increased animosity towards those who initiated the changes or the workplace as a whole:

For example, when asked about the importance of colleagues, Betty said in interview one:

> *'we had good working relationships and there was another middle manager the same as me in the same boat………. but she's retired and we, we see a lot of each other, so the social aspect and the closeness of the team was always there. It's almost as though we were fighting on our own, to make sure that our customer base was heard'* Betty, employee, higher/managerial NS-SEC

Betty reported that declining job-satisfaction was a major factor in her retirement decision. The workplace had undergone major restructuring. Betty described her colleague as being in the same boat, a term that described a shared local experience between the two whilst also suggesting being besieged on all sides by water, an impenetrable barrier. In her description they were holding on against the rising tide but were doing so together. The closeness between the two was emphasised by stating that contact still occurred outside of the workplace post-retirement. Betty described them as 'fighting' to make sure that their customers were heard. This element of conflict seemed to describe an ongoing battle, or war, with other colleagues within the workplace. This created a factionalised workplace where Betty and her close colleagues were

united against a common rival faction, which ultimately resulted in decreased job satisfaction. These feelings of 'Us vs them' were also evident in several other interviews.

In interview 16, Lucinda described herself as *'not a great team playe*r' but also reported a supportive work atmosphere amongst colleagues. When asked about this apparent contradiction she replied *'well it's different. I mean people on your level that's different, you're doing the same job you're under the same pressures, it's, I don't get on with management too well.'* Again, the workplace was described as factionalised into two tiers: colleagues on the same level who have a shared experience and management who are perceived to not share the same common pressures.

Where the 'Us vs them' factions occurred, the rival faction (them) were perceived as decision-makers who were higher-up in workplace hierarchies and were to blame for the changes. The rivals were sometimes reported to be an unspecified cadre of colleagues who were responsible for the changes. For example, in interview eight Elena said:

> *'Well, I think everyone sort of appreciated, to a certain extent, that actually you were doing a good job with the best you could, or the other staff did, but as much as appreciation from the hierarchy well…… some of them stayed in their offices. They didn't really get involved too much.'* Elena, employee, intermediate NS-SEC

Here again was a description of a workforce under strain, doing the best they could despite limited resources. The rival faction was described as *'the hierarchy,'* presumably meaning those higher up in the work hierarchy, who stayed both literally and figuratively behind closed doors, whilst Elena and her immediate colleagues struggled onwards. In this description, the 'us' were *'other staff'* whilst the 'them' did not fall within this description, despite working in the same organisation.

The retirees' pride in their work also seemed to interact with workplace change. Lisa, Betty and Phillip described their work prior to workplace change with pride. As described above in interview 14 , Lisa had said that prior to changes her service had been a 'gold standard'. When asked whether the degree of work-related control had affected her retirement decision, she replied:

> *'I'd gone from quite a highly responsible job with….a lot of self-esteem I had with that, to then feeling that I was just a number really, and not a number that was terribly well looked after by the employer.'* Lisa, employee, intermediate NS-SEC

Lisa's role had changed with implications for her self-esteem. The role post-change did not provide her with the same fulfilment. Lisa used numerical terms to describe herself in the post-

change role perhaps reflecting a decline in self-worth and a perceived lack of value to the employer. Crucially the reduction in pride and perceived decline in status of the work, had meaning for Lisa. The new role was remunerated at the same rate as Lisa's previous role due to pay protection policies. However, the results of the change depleted Lisa's self-worth, despite the monetary reward being the same.

A reduction in rewards, precipitated by workplace change, also seemed to push towards retirement. When asked about workload and its effect on her retirement decision in interview eight, Elena replied:

> *'they decided that; from the next following financial year they were going to pay me not at a teaching assistant rate, but they were classing me as a dinner lady and I was going to drop more money, but still do the same workload……… I voted with my feet and that was the final straw.'* Elena, employee, intermediate NS-SEC

Elena reported many negative changes in her workplace along with a resulting decline in standards. The management she previously labelled '*the hierarchy*' wished to change Elena's rate of pay and job title. This reduced both her monetary rewards and perceived status. Both of these were unacceptable to Elena who described them as a 'final straw.' It appeared that this had been a factor, amongst others, that tipped her decision towards retirement.

Change also pushed towards retirement when it increased workload. Elena reported there was *'more and more just being piled on everyone.'* In interview 16 when asked whether workload affected her decision to retire, Lucinda described the workplace as *'busier and busier and we were struggling a bit yeah.'*

When negative changes pushed towards retirement, retirees sometimes perceived themselves as an obstacle to that change. Betty, in interview one, said *'I didn't like what was happening and I think in the end they were quite thankful that I was going.'* Similarly, Phillip, in interview six, said the *'establishment'* felt that he and his immediate colleagues were *'an encumbrance to change.'* This seemed to represent an endpoint to the negative changes. These responses seem to indicate a breakdown between the organisation and the worker that seemed, to them, to be unfixable.

In addition, the retirees sometimes seemed to perceive that the workplace had moved on without them. In interview two, Julian said *'well the offices were about to move so they (laughs) they basically they didn't want me to go with them. (laughs)'.*

Negative change motivating towards retirement can be explained by the person-environment fit theory.[132] This postulates that workers will evaluate their current roles against their skills and

interests as a degree of fit, which in turn could be a factor in the decision to retire. Perceived negative changes in the work environment as described in the interviews above, could alter the role and expectations on a worker over time, meaning that the worker no longer fits into that role. Therefore, a perceived reduction in person environment fit could motivate towards retirement.

In a previous quantitative study, Breinegaard at al[98] found that change of management was significantly associated with early retirement, although contrastingly De Wind et al 2014[117] found that re-structuring in the workplace was not associated with early retirement. The mixed findings may reflect the heterogeneity of the variables tested; however, they may also reflect the HEAF FIRST findings that change is, in itself, not a catalyst for retirement. Rather, the way in which the change is perceived is the important determinant. Therefore, the presence or absence of change, in itself, may not influence retirement decisions without a further analysis of how the change was perceived. In line with another qualitative study about reasons for early retirement,[106] I found that retirees described changes in the workplace as factors in their retirement decision-making. However, the HEAF FIRST results suggest that the changes only pushed towards retirement when they resulted in negative consequences or perceptions for the participant.

3.3.4.1.2   Grinding me down

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Theme Definition:

Some aspects of work were reported as being unpleasant, gradually pushing participants towards retirement. Work was described as draining and competitive with heavy workloads. Participants perceived that they were not appreciated for their efforts. Commutes and travelling were said to be unpleasant, whilst feelings of isolation contributed to the overall burden.

The participants may have regarded these factors as normal in the past, but over time these factors exhausted or frustrated them. These factors were perceived to be alleviated by retirement.

Examples of codes included in this theme were:

•   draining descriptions of work

•   competitive descriptions of work

•   appreciation at work – negative

•   I'm isolated

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In this sub-theme, work was described as draining, taking a cumulative toll, which pushed the participants towards the perceived freedom of retirement. In interview one, Betty stated that her job satisfaction had declined. She described her work:

> *'I didn't, didn't enjoy going to work……… Which means you dread it. Which means you don't sleep properly. It brings all those things up…….. I'm reasonably fit, I don't have anything wrong with me. I probably have a bad back from sitting at a desk in front of a computer for hours and hours on end. It wasn't physical but it was, it was draining.'*   Betty, employee, higher/managerial NS-SEC

Betty's work life was infringing on her home life causing a lack of sleep. The job was draining and the phrase 'hours on end' elicited a monotonous, grinding workplace. Betty highlighted two possible counter-indicators to this; she perceived herself to be reasonably fit and had a desk-based role, which therefore had reduced physical strains. Nonetheless, she regarded the work as draining. By mentioning the two counter-indicators Betty emphasised that the job was detrimental, it was so bad that it was wearing her down despite her being fit and having a desk-

based role. Although Betty acknowledged that her role was not overtly physical it had exerted a physical toll, that being a lack of sleep.

In interview eleven, Jamie was asked if he enjoyed his job:

> *'Yes, yes I would overall yes, yeah until…..the point it got a bit much. It was repetitive like that and the complaints got worse over the years as well, and the number of them, volume of them'* Jamie, employee, intermediate NS-SEC

Jamie stated that he enjoyed his job but also mentioned several negative aspects of his role. Jamie perceived his work as repetitive and that this had been getting worse. Dealing with customer complaints was becoming harder as the workload gradually increased. Jamie was subsequently signed-off work with stress and eventually retired from his role.

Mental workloads and stress were also highlighted as factors which wore the retirees down over time. Work that the participants may once have found stimulating seemed to drag and take its toll.

In interview 12, Patsy was asked what she disliked about her job:

> *'I don't think I really did…… dislike anything about it. There were times when it became difficult, stressful, but that's no different to any other job I don't think. And sometimes you go home, and you think; oh, why am I doing this? but not very often. But you just get over and get on with it.'* Patsy, employee, intermediate NS-SEC

In a similar pattern to Jamie above, Patsy initially said that there was nothing she disliked about her role, but she then described some of the negative aspects of her work. Crucially here the periodic stress that Patsy encountered made her question why she was undertaking the role at all. To Patsy this was something she had to resolve personally and ultimately brush aside to undertake work again. She did not appear to regard this as being different to any other work, even though her role did on occasion seem overwhelming.

In meta-analysis stress has been shown to be a significant predictor of early retirement,[22] albeit with a small effect size and with supporting literature that may be prone to publication bias. The sub-theme 'grinding me down' was broader than a quantitative based description of stress. The sub-theme encompassed work that may have been acceptable to the participant on a basic level but was nonetheless pushing them towards retirement because it no longer stimulated them in the same way. In this study, participants used the word 'stress' to encompass both a medical condition requiring time off work and also general workload, especially where the work had become more challenging than usual. Therefore, it is possible that a narrow measure of stress

may not demonstrate the wider effect of work pressures upon retirement decisions. This may explain the low effects reported in meta-analysis.[22] It is also possible that the presence of stress/pressure effects retirement decisions only as part of a complex balancing act with other more positive job aspects that pull the participant back towards work see 3.3.4.2. If this is correct, then measures which seek to balance pressure with positives such as Siegrist's effort reward imbalance[122] may prove more useful measures in retirement studies.

In this sub-theme the lack of appreciation at work that the participants expected or felt was earned, could push towards retirement. This complements the theme 'but work also pulled me back' where positive appreciation was cited as a possible factor that pulled the participant back towards work, see 3.3.4.2.

In interview six, Phillip was asked what he disliked about his former job:

> *'I think the lack of appreciation by authority. By the fact that you were not appreciated for all the work you were doing with these young people, by the local authority, who had an agenda of cutting back on the financial support, and the, strapped budgets. I think was the part we didn't like'* Phillip, employee, intermediate NS-SEC

For Phillip, appreciation was something that did not happen but should have done. Phillip highlighted the good work he did as a contrast to the lack of appreciation. Specifically, '*authority*' were failing to appreciate his work. In this quote 'authority' was used to mean both people higher-up in the workplace hierarchy and also as a separate entity, the local authority who controlled the school that Phillip worked in. Separately Phillip described his immediate supervisor as being appreciative of his efforts. However, here the lack of appreciation from even higher up in management structures was important. Phillip felt that the authority had a separate agenda that did not acknowledge quality work, money being their main driver. Phillip also described himself as part of a group that disliked this aspect saying *'we didn't like'* echoing the 'us vs them' code referred to in the sub-theme 'you've changed' see 3.3.4.1.1.

Also contained in this sub-theme was the topic of isolation. In interview 11, Jamie was asked what he disliked about his job:

> *'Well, there was a certain amount of pressure. I was the only one in the office sometimes. You had to deal with everything that came up and some of them were busier than others and that led to the stress……… There wasn't a lot of backup because there just weren't other people there to come and help'* Jamie, employee, intermediate NS-SEC

Jamie was physically isolated being the only staff member in his office. Significantly Jamie was also isolated in his work; when Jamie needed support there was no-one to help him. He faced the customers, many of whom had complaints, on his own.

Isolation in this sub-theme did not necessarily mean physically working alone, more that the participant described a scenario where they were working towards a different goal to the rest of the organisation, or where there was no assistance in achieving the goals. In interview 16, Lucinda relayed that she wouldn't have been very happy at work if she'd stayed in her employment. When asked what changed she responded:

> 'we were a bit of an anomaly; in that we didn't really belong to anybody. We didn't belong to nursing, we didn't belong to the admin. We was always being moved around' Lucinda, employee, higher managerial NS-SEC

Although Lucinda described a team, there was a perceived disconnect between that team and the rest of the organisation. They did not belong anywhere and were therefore subject to extra changes. Lucinda felt that no other group in the organisation really understood them. They were part of a group, but also isolated and on their own.

Poor internal communication could trigger similar feelings to isolation. When describing a problem in her organisation's ordering system Betty said in interview one:

> 'The company wasn't good, deliberately in my view, wasn't very good at communication, Therefore I was generally the last to know' Betty, employee, higher managerial NS-SEC

The lack of communication was perceived as deliberate so that Betty was left in an awkward position when explaining situations to customers, something which decreased her job satisfaction in its own right. The statement that she felt *'the last to know,'* suggests isolation as described above.

Commutes and travel were also highlighted in this sub-theme. In interview 15, Alice was asked whether she disliked the travelling aspect to her role:

> 'That's a difficult one because, yes the challenge of getting there and finding how to get there, but when you were doing it time after time, it was tiring………So to start with it could be quite exciting, but once you'd been doing it for a while, it got you down a bit' Alice, self-employed, higher managerial SES

Initially Alice regarded the travel as a challenge and an adventure. However, these feelings changed and in line with the rest of this sub-theme the travelling turned into a negative. This affected her physically through tiredness and mentally by making her feel '*down.*'

Work in this sub-theme seemed to be characterised as a grind that wore the participants down. To the retirees this contrasted unfavourably with the freedom and control offered by retirement pushing them towards leaving their roles.

3.3.4.1.3 I've got no time

Theme Definition:

In this sub-theme, work was regarded as a restriction on time. Work was reported as a time-burden which tired workers out and prevented them from engaging in other activities more meaningful for them. The participants felt that excessive or increased hours infringed on personal time. Workloads and commutes were perceived as becoming more invasive, even when they were consistent throughout the employment.

Mobile technology was regarded as a source of a growing time burden which meant that the participant was constantly available for work. This invaded even further into the participant's time. Retirement seemed to offer an alleviation of these restrictions.

Examples of codes included in this theme were:

• work is restricting

• workload – time

• mobile tech = constant availability

• commutes and travelling are unpleasant

Workloads were frequently described in terms of time. In interview one, when asked about her main reason for retirement Betty said:

> *'I was working a six-day week, not normal hours and it was usually a minimum of 60 hours……..Sometimes more…….To be honest I don't want to work those sort of hours when I'm in my 60s'* Betty, employee, higher managerial NS-SEC

Here Betty stated that her hours were unacceptable when reaching her 60s. This implied that these hours might have been acceptable, even normal, at an earlier time point. However, as Betty became older this perception changed.

Chapter 3

In this sub-theme, unacceptable hours of work seemed to prevent the participants from pursuing other tasks. In interview 13. Louisa was asked how important workload was in the decision to retire:

> 'I think it was quite important, especially as when I was working there, I didn't have a lot of me time or free time. I was, certainly summer months, I was working from about eight in the morning until eight at night and that could be seven days a week because the workload was phenomenal.' Louisa, self-employed, routine and manual.

Again, workload was described by reference to time. Here time expended at work was clearly stated to be at the expense of other more personal pursuits, characterised as *'me time'* or *'free time'*. In contrast, retirement was often described in terms of freedom or liberation, see theme 'Now I'm free' at 3.3.4.5. Therefore Louisa's *'phenomenal'* work burden could be resolved by retirement.

This sub-theme was not restricted to full time workers with long working hours. Elena, a part-time worker described a similar time-based scenario in interview eight. After Elena explained her main reason for retirement, she was asked if anything else influenced her decision, she responded

> 'The fact that, although I was only doing three hours a day actually at the school I was working at, the preparation and everything else, I was probably doing three hours in the evening' Elena, employee, intermediate NS-SEC

Elena's work could not be achieved in the three hours that she was paid for. The extra effort that Elena felt was necessary to perform her role doubled the time demands.

The hours that participants regarded as suitable seemed to be subjective. In interview 14, Lisa said her shift patterns were a factor in her retirement decision, she described them:

> 'I was working predominantly the late shifts which finished at 11:00 and 11:30 at night and working twilight shifts which finished at one, two o'clock in the morning and we were working three out of four weekends. There was no leave allowed over Christmas and new year and they were obviously very pressurised times' Lisa, employee, intermediate NS-SEC

Lisa's previous job, which she had enjoyed a lot more, was also shift-based. When asked about this she said

> 'they were more amenable shifts. So, like, I might work every other weekend or have one weekend off in three, and I'd work a mixture of early shifts, late shifts and twilight shifts, but

not heavily loaded towards the later shifts which, as you can probably appreciate, it plays

havoc with your body clock and I was tired a lot of the time.'

The shift pattern in the later job left Lisa tired, whilst the shift pattern in the earlier job was described in more flexible terms as an amenable '*mixture*'. Lisa worked shifts in her old role, but these were more suited to her. Lisa felt that the new hours lacked flexibility and pushed her towards retirement. This reinforced the analysis in the theme 'but work also pulled me back,' where flexibility in hours can be seen as a factor that deters retirement, see 3.3.4.2.

In a quantitative study Van Solinge et al 2014[114] did not find a significant association between shift work and retirement decisions. Counter-intuitively Friis et al[133] found that nurses who worked evening shifts or rotating hours were significantly less likely to leave the workforce than their colleagues who worked daytime shifts. In this study there was no obvious hourly pattern that universally pushed participants towards retirement. However, hours were a factor in retirement decisions when the participants perceived them as restrictive. This may explain the mixed results in the quantitative studies, in that hours can push towards retirement but only when the participant perceives those hours as restrictive, an aspect that the quantitative studies do not address.

In this sub-theme, work was described in terms of restriction, which contrasted with the apparent freedom offered by retirement. In interview six, Phillip described his other reasons for retirement as:

'we wanted to do some travelling and see some of the world and have the freedom to go on those holidays without the restriction of only being able to do that in school holiday time.'
Phillip, employee, intermediate SES

These time constraints could be exacerbated by mobile technology, which seemed to further cut into the participant's free time. In interview two, Julian described a situation where he was ill in hospital:

'I was at the hospital waiting to go into the operation and I was dealing with e-mails and phone calls, and it suddenly struck me that this was not a way that I wanted to live the rest of my life basically' Julian, employee, intermediate NS-SEC

Julian's commitment meant he was willing to work even when hospitalised. Mobile technology enabled this and even placed an expectation on him to do so. It seemed that this experience directly influenced Julian's retirement decision. The illness, coupled with the work demands changed his perception of a job that was formerly acceptable, into a job that he did not want to

continue. Elsewhere Betty described mobile technology invading into non-work time in similar terms. *'even when you were on holiday it was always a, a requisite that you took your mobile phone with you.'*

Commutes and travelling were also described in terms of time burdens. In interview five, Gerard's commute made him question his role:

> *'there was a lot of driving time involved and….. the fact that I was spending what seemed to be an inordinate amount of time traveling, that was one of the reasons for saying, y'know, well, why am I doing this?'* Gerard, self-employed, higher managerial NS-SEC

Gerard retired from paid work and continued to apply his professional skills in voluntary work nearer to his home.

Participants felt that staying away from home for work could also cut into time required for other priorities. In interview 15, Alice had married shortly before her retirement:

> *'Also, my husband was retired. And the work I was doing did require being away from home for five or six weeks at a time, coming home at weekends. And I thought well actually this isn't the way to start a new marriage.'* Alice, self-employed, higher managerial NS-SEC

Alice's family commitments had changed. This made her feel differently about staying away from home for work, leading to an incompatibility. Although the family commitments were the factor that changed, the nature of the work also drove the incompatibility as it was perceived to be unchangeable.

In this theme, work was a restriction on time. The theme 'now I'm free' see 3.3.4.5 which described retirement perceptions and experiences, contrasted directly with this. In that theme, life in retirement was often described as busy with no time available, an apparent paradox which is described more fully in that section.

Hermansen[134] found that awarding older workers additional leave reduced early retirement in 61-62 year olds by up to 5% over two years, supporting the notion that getting the right balance between work and leisure time can be a factor in the retirement decision. The HEAF FIRST findings reinforce this, by suggesting that time demands and shifting priorities pushed the participants towards retirement.

3.3.4.1.4   This hurts

Theme Definition:

This sub-theme captured the relationship between physical comfort and work and its effect on retirement decisions. Physical workloads that were once regarded as normal became more unpleasant and were described in negative terms, sometimes even if the work was otherwise enjoyable. This was generally perceived as a personal shortcoming due to a decline in physical abilities, rather than a work-related incompatibility.

The physical work environment also pushed individuals towards retirement. Participants described poor work environments as unhealthy or unpleasant. The physical environment as a factor in retirement decisions was not restricted to those with predominantly physical workloads, as the sub-theme was also relevant for some office-based workers.

Examples of codes included in this theme were:

•   physical work environment unpleasant

•   workload – physical

•   health as retirement factor

In this sub-theme, physical workloads seemed to become harder to achieve and therefore less tolerable as the worker aged and declined in physical ability. In interview seven, Leo was asked whether physical workload influenced his decision to retire, he responded:

> *'I always felt that obviously doing a lot of heavy lifting, and pulling and pushing, sledge-hammering, was partly good because it kept me fit. But at the same time……. as I got older things were making me a bit out of breath and I could see it was making me, bit unhealthy at the same time, so I decided to knock it on the head.'* Leo, employee, routine and manual SES

Historically, the workload itself was not a problem for Leo. In fact, he regarded it as having a beneficial effect on his health as it kept him fit. As time moved on, this workload became more difficult and Leo linked that to his worsening health condition. However, the mismatch between ability and work was framed in terms of Leo's health which made the role impossible. To Leo, his own declining physical ability created a mismatch with work, pushing towards retirement.

Physical workloads were often described as a constant, being unchanging throughout working life. In this sub-theme it was not the workload that changed, it was the worker themselves. This

contrasted with mental workloads (see 3.3.4.1.1) which were sometimes perceived as changing and increasing as the participant neared retirement.

In interview nine, Greg was asked what he disliked about his job:

> *'Greg: It was very manual work. As I got older, I was finding it heavier, a heavier job to work………..*
>
> *MJS: So how hard was your job physically then?*
>
> *Greg: It, I would say you needed to be fairly fit to do it.'* Greg, employee, routine and manual NS-SEC

Greg found his physical workload harder as he aged. This was expressed by saying *'I was finding it heavier,'* an acknowledgment that his perception of the work had changed. The implication was that the workload was unchanged but that he himself had changed, to the extent that performing the role was more difficult. This mismatch between physical ability and physical demands pushed Greg towards retirement. Greg felt that someone undertaking the role needed to be fairly fit, a status that Greg applied to himself less and less.

A mismatch between physical workload and ability could also make a job less enjoyable. In interview 13, Louisa was asked how hard her job was physically, she responded by describing the lifting and manoeuvring necessary to perform the role, then stated:

> *'yes, physically I had to be fairly strong, but as I say my hands were getting weaker, so it became more and more difficult to do, and by the same token because it became more difficult it became less enjoyable'* Louisa, self-employed, routine and manual NS-SEC

Again, Louisa described the mismatch by emphasising her own physical decline. She felt her hands were getting weaker. She linked this to a decline in her enjoyment of the job, which led to the decision to retire.

When asked later to summarise her retirement decision Louisa responded:

> *'I think it's gotta be summed up in one word pain. I was fed up with the pain. I was fed up with, although I had so much good things, there were so many good things about it, the pain overrode everything, and y'know I'd get a garment and say, oh my goodness how much pain is this gonna cause me? And it negated any of the good feelings I had. So, it had to go I'm afraid.'*

Louisa enjoyed her job, in fact she found it difficult to leave. However, the work caused her pain and eventually this pain overruled any good aspects that work may have offered. Louisa described a balancing act that tipped towards retirement as the pain got worse.

This sub-theme wasn't limited to workers with roles traditionally referred to as manual. Lisa, who worked in a call centre, was asked about physical demands at work:

> *'Well latterly, this job wasn't physically demanding, in that it was sitting down at a desk and a computer and the telephone. Having said that, sitting for eight hours a day relentlessly taking one call after another, that I found quite challenging. I think I'd probably got long standing back pains from my previous…… jobs which were and had always been quite physically demanding……….. So then to go to sitting for eight hours a day, I didn't find that very easy'* Lisa, employee, intermediate NS-SEC

Lisa had moved from physically demanding nursing roles into a nursing call centre. She described the new role as having minimal physical demands, especially in contrast to earlier roles. Nonetheless the role caused her discomfort. It was not easy for Lisa to sit at a desk all day, especially given the ongoing pains that she ascribed to her previous roles.

Commutes and travelling were also raised when discussing physical strains at work. When asked about the physical difficulty of her work, Alice responded in interview 15:

> *'The only physical side of it was travelling. It was basically a brain job. It wasn't hard physically except there was quite a lot of travelling and therefore humping luggage about or driving a lot'* Alice, self-employed, higher managerial SES

Similarly, to Lisa (quoted above), Alice stated that her role was not physically difficult. However again there was a caveat to this: that the travelling and driving were unpleasant. As Alice neared full retirement, she preferred to take projects nearer home to avoid the travelling and absences from home, a factor which she linked to her retirement decision.

Participants also discussed the physical work environment as a factor in the decision to retire. In this sub-theme the participant's work surroundings could be uninviting, uncomfortable or even a serious health concern.

In interview seven, Leo identified dusty work conditions as one of his main reasons for retirement. When asked for further details on this subject he responded:

> *'There's always a lot of dust in the brake drums …….. if I wear a mask that's fair enough…….. but you can't wear it for a ten-hour shift. And other people are doing the*

> *same job as you next door….. so, you can't wear a mask the whole shift. So, there are*
> *a lot of times when the dust probably flying around, and you're not wearing a mask.*
> *So, I just decided that, that it was time to give it up and breathe some fresh air.'* Leo,
> employee, routine and manual NS-SEC

The dusty conditions influenced Leo's retirement decisions. He emphasised the impracticalities of personal protective equipment and did not feel that the mask was an adequate solution to the dusty environment. Ultimately the concern could only be remedied by removing himself from the environment via retirement. In this case, retirement was a liberation that enabled Leo to breathe some fresh air both literally and figuratively.

Alice who worked as a financial consultant was asked about her mental workload. After she described this she added:

> *'quite often you'd go and work in somebody else's company you don't get the best working*
> *conditions. So, you could be doing all this stuff huddled in a corner with a little laptop so. Or*
> *I could be working at home in the luxury of my own study with a big computer and my own*
> *files round me, so it's quite a contrast.'* Alice, self-employed, higher managerial NS-SEC

Alice gave an image of an overcrowded, unwelcoming and temporary environment. This contrasted with working at home which was described as more comfortable and expansive.

This sub-theme had obvious links with health. In several of the passages quoted above the mismatch in physical ability and physical workloads were described or justified as the result of a health condition. Leo had a throat problem meaning the dusty environment was particularly hazardous and Louisa had arthritis which made her work less enjoyable. It is notable that declining health, a personal attribute, coupled with consistent physical work-strains, a work attribute, resulted in a push towards retirement. In this sub-theme the workplace was not required or expected to adjust to the worker's reduced abilities, rather the worker felt that their own decline made them incompatible with the workplace and as a result they voluntarily removed themselves from the role.

Hennekam et al[135] suggests that even when pushed into retirement there is a tendency for retirees to rationalise this as a 'choice' to maintain positive social identity and maintain a level of control. It is possible that this is what occurred in the quotes above where retirees expressed that they had taken a choice to leave the work environment, even though the workplace has exerted a significant push by failing to adapt to their needs.

The relationship between physically demanding jobs and retirement decisions is unclear in the literature. A systematic review by Van Den Berg et al[94] showed mixed results whilst review by Scharn/Sewdas et al[33] did not find a correlation between the two. De Wind et al,[117] found no significant association between physical demands and early retirement. When testing more specific exposures Lund et al[136] found a significant association between extreme bending/twisting of the neck/back and working whilst mainly standing/squatting with early retirement. The HEAF FIRST qualitative findings suggests a link between physical work factors and retirement. This was in line with qualitative work from Reeuwijk et al[106] where physical job demands were a factor in early retirement decisions. However, in this study, physical demands did not seem to push towards retirement in isolation. Rather they seemed to push towards retirement when they co-existed alongside a mismatch with ability.

In contrast to several other European countries the UK does not have a state recognised form of disability retirement (see para 1.8.1) and offers relatively restricted rights to early retirement. This could mean that those struggling with physical workloads are pushed towards more traditional retirement routes rather than channelled into a separate pathway for disability or early retirement. Therefore, it is possible that physical strains at work play a more important role in general retirement behaviour in the UK. However, Carr et al[10] did not find that physical workloads were associated with work exits in the English longitudinal study of aging cohort (ELSA), in contrast to the current findings.

The perception of a mismatch between physical ability and workload as a personal shortcoming rather than a work-related problem deepens our understanding in this area. In addition, the HEAF FIRST data highlighted the physical work environment as another possible factor in the retirement decision which seemed to be a new or underexplored area in the retirement literature.

3.3.4.2   But work also pulled me back

Theme Definition:

This theme related to work aspects that weighed against the decision to retire. These factors acted as counters to the more negative 'push' aspects of work.

Work in this theme was described as providing many positives including a sense of pride and status. In limited circumstances, work was even perceived as a break from the rigours of outside life.

The negative 'push' aspects of work were also countered by autonomy and positive appreciation. In particular, supportive colleagues formed a community both in work and socially. Loyalty to this community and unease at the prospect of being excluded from it, made leaving and going into retirement difficult.

Work in this theme was described as a fundamentally positive experience, but these descriptions were often bound up with negative caveats.

Examples of codes included in this theme were:

• colleagues = community

• loyalty made decision harder

• I loved my job, but……

• appreciation at work – positive

In this theme, certain aspects of work were described as alleviating or counteracting the pushes toward retirement. In interview nine, Greg, a factory worker, was asked about the increasing complexity of his work:

> 'MJS: And do you think that affected your decision to retire, the increasing complexity?
>
> Greg: No, because basically the involvement I had from, well day one if you like, meant I was part of the process
>
> MJS: So how much say did you have in those changes?
>
> Greg: I would say from a technical point of view, I would say, most of the say. The management would come with a proposal of a new type of [engineering product] and

> *basically it was left to me to decide how it was gonna be made.'* Greg, employee, routine
> and manual NS-SEC

Greg's work had increased in complexity, a factor that could act as a push factor in the sub-theme 'you've changed' see 3.3.4.1.1. However, Greg didn't regard this as a negative, in fact he viewed the change positively. Greg was involved in the change from an early stage, suggesting that he had decisive input. It was also significant that the change was described as a *'proposal'* indicating that the matter was still negotiable. Greg did not feel that this was a change that had been imposed. The change grew his skillset and increased his value as an employee. The change was potentially a 'push' towards retirement but was not expressed as such. Autonomy in the role seemed to overrule any potential negative.

This data supports the demand-control model of Karasek,[121] which postulates that increasing a worker's control over their work can alleviate the stress of high work demands. Originally used as a tool to assess work-related stress and burnout, there has been a limited attempt to use this in retirement models. Robroek et al[12] found that lack of job control was significantly associated with early retirement but results were attenuated when testing the lack of job control in combination with high demands. Similarly, Carr et al[10] found that greater decision-making authority was significantly associated with reduced risk of work exit whilst finding little to support the interaction between job demands and resources. It is possible that autonomy in a role could reduce a worker's perception of the demands of that role. Therefore, if decision authority is high then the job feels less demanding. Greg quoted above had considerable autonomy and did not feel his job was unpleasant despite the increasing complexity.

The participants in this study were all retired and generally described retirement in positive terms. However, the participants were also positive about work. Work as a concept was generally regarded as a good thing. However, the practicalities of the job had often made it undesirable to continue. Descriptions of enjoyable work were often used to buffer criticism. A negative work comment was sometimes preceded by a balancing positive statement or vice-versa. This may have been a verbal convention but may also have been indicative of the multi-factorial nature of the retirement decisions where positives and negatives push and pull, swaying the retiree's decisions.

For example, when asked about enjoyable factors of work Elena in interview eight responded:

> *'I loved being with the children, I loved being with the staff. I was in the school for quite a
> few years and just loved the whole place. It was the changes in the education system I did
> not like.'* Elena, employee, intermediate NS-SEC

For Elena the basic state of working was enjoyable, she loved the role and the people she encountered and the workplace itself (school). This statement was immediately balanced out with a negative statement about work. The changes in the system were seemingly separate from either the staff, the children or even the school, all of which remained the same. The change was an additional, undesirable factor outwith those elements.

When asked about a workplace change in interview one, Betty said:

> Betty: 'I really enjoyed my job as payroll manager, we had a tremendous amount of fun really
>
> MJS: Ok
>
> Betty: And fun went out the door….' Betty, employee, higher managerial NS-SEC

Betty's positive statement about work was immediately followed by a negative, perhaps indicating a balancing act between the factors. This also occurred the other way around. When discussing a negatively perceived workload in interview two, Julian finished a statement with a positive *'Emotionally it was, it could be quite demanding. So yes, that aspect of it was quite, quite heavy, but enjoyable.'* For Julian the downsides of work were balanced by enjoyment of work.

Work could even be perceived as a 'break' from life outside work, especially if there were difficult circumstances outside of work. This reversed the concept of work as a drain on time discussed in sub-theme 'I've got no time,' see 3.3.4.1.3. In interview eight, Elena said of her role:

'I needed that to get away from the caring role the whole time, although I was only doing three hours a day it did get me away.'

This reinforces earlier qualitative findings from Canada that suggests work can be a form of respite for caregivers[137] almost reversing the traditional concepts of work and leisure time.

In this theme pride in work and the status of active work also seemed to discourage participants from retirement. Alice in interview 15 was asked for factors that made the decision to retire harder:

> *'one of the things that it could easily have been for me was to reduce my feelings of value. I quite often valued myself by the jobs I've had and I looked to, I don't know whether it was consciously at the time, but looking back I'd already started replacing that with other things that gave me value in my own eyes.'* Alice, self-employed, higher managerial NS-SEC

Alice found it harder to leave work because of the value she placed on her identity as a worker and more specifically in her role. She went further and suggested that she had endeavoured to find other things that would replicate the feelings of value in retirement. Simply leaving work would not have sufficed, as it would have left her lacking self-worth. Separately in the interview Alice added to a description of herself as being retired, preferring the term *'not working for money.'*

Maintaining contact with colleagues has previously been found to encourage work beyond retirement in qualitative findings.[95] [96] Similarly, in this theme, colleagues were described as a community which made work more attractive and therefore harder to leave. When discussing colleagues in interview 13 Louisa said:

> *'I had a good working relationship; we could talk to each other. I didn't necessarily think of them as sort of surrogate daughters, but I certainly felt closer to them than I possibly should've done. Y'know we'd buy each other Christmas presents and birthday presents and this sort of thing, which is quite nice, and I actually didn't want to let them down. I didn't want to just y'know say, right that's it I'm leaving, and give them a months' notice as that would've been absolutely dire'* Louisa, self-employed, routine and manual NS-SEC

Louisa described a close relationship with her colleagues and acknowledged that it went far beyond a working relationship. The conversation used familial terms and focussed on social interactions despite discussing work relationships. These relationships made the retirement decision harder as Louisa wished to maintain this community, both for her own sake and that of her colleagues. Louisa demonstrated her commitment to the community and felt that retirement would be letting her colleagues down and have *'dire'* consequences. Louisa was self-employed so was not required to give any sort of formal notice to her colleagues but felt obliged to warn far in advance of the upcoming disruption that her retirement would cause, this is even though she reported suffering physical pain in the job. A notice period of 18 months was given. For 18 months the pull of community and loyalty overruled the push towards retirement provided by the physical pain.

A sense of loyalty both to colleagues and work itself seemed to make retirement decisions harder. In interview 18 when discussing whether anything would encourage Amanda, a carer, to return to work she said:

> *'There are a couple of care homes around here and they often do advertise and I don't feel the need to go in, but what I do, do in a small way is I run a choir and my choir goes to sing*

> *at, at least two nursing homes regularly so it comes around another way.'* Amanda, self-employed, routine and manual NS-SEC

Amanda felt a strong sense of loyalty to her work and clients. Even though work was available, other commitments prevented her re-entering work. However, the sense of loyalty was so strong that Amanda returned to a workplace environment voluntarily, in order to fulfil this self-imposed obligation. In this way, Amanda no longer worked but still served the community she had been a part of.

Colleagues were hard to leave but this pull back towards work could be reduced by arrangements to stay in contact. In Interview eight, Elena was asked if her close colleagues influenced her decision to retire:

> *'No, because I'd made up my mind to go, and I knew I'd see the ones I wanted to see afterwards anyway'* Elena, employee, intermediate NS-SEC

Here the community pull at Elena's work was outweighed by other factors that motivated her to retire. However, the community still had value to Elena and she intended and indeed did, maintain contact with selected colleagues after retirement.

The pull of the community back towards work, can be contrasted with the push towards retirement given by isolation, see 'grinding me down' at para 3.3.4.1.2. Equally a breakdown of the community group can motivate retirement thoughts, see 'us vs them' at para 3.3.4.1.1.

In this study, positive appreciation was a recurrent topic in the data that acted to pull participants back towards work. In Interview six, Phillip was asked if being valued at work affected his decision to retire:

> *'I think that was important in as much that it was great to feel good about yourself, and good and valued, and I think that becomes a little less obvious when you're, when you are at home. I think, I suppose that's why I, that's why I do my other activities in retirement because I do feel valued'* Phillip, employee, intermediate NS-SEC

Phillip was in a role where his immediate supervisor was very appreciative of his efforts. Phillip contrasted this with retirement where appreciation may be harder to achieve. Phillip even suggested that his activities in retirement will help him achieve the appreciation he formerly received at work. This appreciation was important to him, so leaving work left a gap, one that was not simple to fill. In contrast, Phillip also highlighted a lack of appreciation from higher up in the management chain as a factor in his retirement, described at para 3.3.4.1.2.

Louisa in interview 13 described how she felt after she received positive appreciation at work *'you suddenly think yeah it's worthwhile, all the stress all the aggro and it has been worthwhile'.* The positive appreciation alleviated the negative aspects of the work. Here this seemed to work retroactively as well. The negative aspects of work described by Louisa occurred before the alleviating positive appreciation.

The findings that positive appreciation could pull back towards work reinforces qualitative findings from Hennekam et al[135] which suggested a working culture where people are recognised and valued would be able to retain older workers for longer.

Whilst having adequate finances mostly motivated towards retirement (see theme 'I had my reasons' at 3.3.4.4), finances could also have an effect in this theme. When personal finances were felt to be inadequate or low then they could pull the participant back towards work and discourage any retirement decision. In interview 15, Alice was asked if anything made the decision to retire more difficult:

> *'An inability to replace money if there was a disaster. I'd always earnt my way out of any financial difficulties………and to give up that ability was quite scary'* Alice, self-employed higher managerial NS-SEC

To Alice work provided financial security, whilst she was in work she trusted her ability to weather unforeseen financial difficulties. Retirement meant sacrificing security.

Having flexibility in working hours was mentioned by participants as a pull towards work. In interview 12, Patsy described a situation where her partner had become seriously ill near to her retirement:

> *'it was ok at the time that it all happened they were very good, and I had time off and if I wanted to, I could've worked from home and just when he came out of hospital things like that they were…… very good. But I manged to go back after about two or three weeks on a part-time basis and then went back full-time later on, so it worked out ok'* Patsy, employee, intermediate NS-SEC

Patsy's partner had become ill, a factor that in other circumstances may push overwhelmingly towards retirement, see theme 'I had my reasons' at 3.3.4.4. However, Patsy was allowed time off and permitted to work from home. She was very positive about her employer and was able to return in a short period of time. Ultimately Patsy's partner's health was still a factor in her retirement decision, but the actual decision did not take place for another year after the events described above. The flexibility allowed her to remain at work.

In two studies conducted in the Netherlands Sewdas et al[95] suggested that flexible working is often a pre-condition to working beyond retirement age, whilst Hennekam et al[135] suggested that flexible hours may even be considered normal in that setting. Although the situation is improving the UK has less widespread work-related flexibility when compared to the Netherlands.[138] In fact, in interview 16 Lucinda described the process of obtaining permission to work part-time as *'a struggle but they gave it to me in the end'.* It seemed that flexible working was regarded as a privilege rather than a right or norm, which may curtail its uptake. These results are similar to a UK based qualitative study by Loretto et al[20] that reported that some participants *'felt that they could not ask for more flexibility in their work as their employer was already being kind to them in 'allowing' them to work part-time.'*[20]

Patterns of work were regarded as positive when they suited the participant. It was not always obvious what hours would suit each person, see sub theme 'I've got no time' at 3.3.4.1.3 where Lisa compared two shift patterns, one negatively and one positively.

In this theme work-related factors were enjoyable and brought many positives into the worker's life that pull them away from the retirement decision and back towards work. It seemed that these factors could alleviate or even outweigh push factors in the theme 'work was pushing me.'

3.3.4.3   It's not you it's me

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Theme Definition:

This theme contained factors that influenced retirement decisions but were notionally unrelated to the workplace. These factors seemed to arise from values or feelings rather than being generated by external circumstances. In this theme, participants suggested that there was a normal age to retire or a point at which retirement is almost inevitable.

These factors were often perceived as inalienable and inherently isolated from other factors, so much so that they could not be modified. If more practical concerns interfered to delay retirement the participant experienced disappointment or resentment.

Examples of codes included in this theme were:

• 'normal' retirement age, planned retirement

• needing a break from work

• long working life

• change of attitude

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In this theme workers described their working lives as being long. They felt they had spent many years working. Leo who retired at 65 said:

> *'I've been working since I was 15 years old. I just decided whilst I still got my health, I'm going to enjoy the rest of my life.'* Leo, employee, routine and manual NS-SEC

Leo emphasised his age at commencement of work, stressing that his working life had been long. Work was a phase of Leo's life which was over and he felt justified in retiring to enjoy the next phase.

In interview 12, Patsy who had reservations about entering retirement nonetheless said:

> *'because I worked in the same authority for over, I think it was 47 years, so I think. I didn't really have a difficult decision to retire, I, it came at the right time for me.'*

Again, Patsy emphasised the length of her working life. Patsy's retirement was also driven by her partner's health, but despite her reservations, she felt there was a *'right'* time to retire.

The long working life was also expressed in terms of overall contribution to the workforce. In interview three Bernard said:

Chapter 3

> *'I'd worked since leaving school, so I'd worked what? 43 years, I thought I'd done my share'*

Bernard had retired early relative to the statutory pension age yet felt he had contributed enough of his time to work. When asked about this later in the interview Bernard elaborated:

> *'I reckon 42, 42 years continuous employment is a decent shift. Y'know when you look around and you see people that have never worked and they work spasmodically and they appear to have no intention of working and the rest of the world is supporting them from our taxes, I think I've done my share to be honest, 42 years.'* Bernard, employee, higher managerial NS-SEC

Bernard cited someone who has never worked as a contrast. Bernard himself identified with a separate group believing that his work and the taxes he had paid, had allowed others not to work. Therefore, he felt as if he had contributed his share to society and was justified in taking his retirement.

When asked about his main reason for retirement Gareth responded, *'I'd had enough of working solidly and I actually needed a break'*. Gareth believed he had worked a long time and therefore his break was deserved. The use of the word break implied a temporary cessation of work. When asked whether he would consider a return to the workplace Gareth responded in the negative.

Several interviewees referred to the UK state pension ages, 65 for men and 60 for women, as being significant. Many considered these to be 'normal' retirement dates.

In interview nine, Greg was asked for his main reason for retirement, he said:

> *The fact that I got to 65 was, I would say. the main reason. But other than that, it was me intention to retire earlier but due to circumstances it wasn't possible, so I decided to work 'til I was 65, I was in a position to draw me state pension.'* Greg, employee, routine and manual NS-SEC

In a cohort of workers and managers Wainwright et al[21] also found the belief that the former SPAs of 60 for women and 65 for men, were the optimal ages for retirement The norm was also echoed in Parry et al[131] who divided their cohort between 'workers' and 'creative/professionals'. The workers were said to be highly conscious of the state pension age and regarded retirement as a reward for their hard work.

In this study this finding was not confined to one socio-economic group. Bernard's company pension scheme gave a retirement age of 60.

'the normal retirement date had been set 30 years before. Y'know I'd always worked on the assumption that unless something major went wrong or happened I was always intending retiring at 60. In a way it was a foregone conclusion unless something had happened to prevent it, rather than the other way round.' Bernard, employee, higher managerial NS-SEC

Bernard's perception of the normal age of retirement was aligned, not with the state pension age of 65, but with his company pension. This was stated to be the main factor in Bernard's retirement decision unless something else had intervened.

The 'normal' state pension ages were often set by legislation i.e. the SPA. Due to legislative change several women participating in this study had their SPAs increased in the later part of their working lives. The new SPAs were also set by legislation but were no longer considered as 'normal.' In interview eight, Elena described the changes with disdain and anger and she felt unfairly treated and deprived of pension payments:

'So, although I was one of those WASPI[2] women who had my pension…….. moved twice without ever being told and losing about four years pension, I still decided to go. Elena, employee, intermediate NS-SEC

Elena felt the state pension changes resulted in her losing pension rights. She still decided to retire despite restricted financial circumstances. The lack of notification of the changes was highlighted to emphasise the lack of fairness.

Participants sometimes experienced a change of attitude as they approached their retirement. In this theme the change was not connected with the workplace but represented an internal decision or realisation. It could render a previously acceptable job, unsustainable. In interview five Gerard described a competitive workplace, when asked further about this he responded:

'it really wasn't as stimulating as it had been before, so it starts sort of, I think generally as one gets older one starts to appreciate different things. Well, I've gone through that, that not, not necessarily, not wanting to be competitive but actually the buzz of being in a competition just started to fall away.' Gerard, self-employed, higher managerial NS-SEC

For Gerard the work had not changed but his attitude had. The internalised shift of focus away from work to different things had rendered his work less interesting and so pushed him towards retirement.

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[2] WASPI stands for Women against State Pension Inequality, a campaign to obtain transitional pension arrangements for women affected by the state pension changes. https://waspi.co.uk/

The factors in this theme could be changed by practicalities. However, in the absence of an unplanned event, the factors in this theme were often stated to be inalienable and inherently isolated from other factors, so much so that they could not be modified.

Towards the end of interview nine Greg was asked if there was anything that may have encouraged him to stay at work for longer, he said:

> *'I think mentally I was sort of like, had it in me mind that 65 was gonna be me retirement age or, to make the job different to keep us there longer, I just, I wouldn't, I wouldn't have wanted longer than that.'* Greg, employee, routine and manual NS-SEC

At this stage Greg felt as if he had done enough work and the positive aspects of the workplace were outweighed by the value he placed on the cut-off of 65 for retirement.

In this theme, long-held values or feelings played an important role in retirement decisions. These were often perceived to be a naturalistic or a 'normal' transition into retirement. Although it seemed that these factors were entirely within the control of the participants, they also seemed to perceive them as difficult to change or modify.

3.3.4.4   I had my reasons

Theme Definition: This theme contained factors that pushed the participant towards retirement and were notionally unrelated to work. These factors seemed to be external to the participant or were susceptible to change outside of their control, which could lead to a re-evaluation of the retirement decision. In this theme the factors acted upon the participant and changed their plans. These factors were sometimes perceived as overriding, meaning that all other considerations became irrelevant. Health status and financial status pushed the participant towards retirement, whilst caring responsibilities and family interactions were also prime motivators.
Examples of codes included in this theme were: • health as retirement factor • family interactions as retirement factor • caring as motivator for retirement • finances as retirement factor

In this theme, health was a factor in retirement decisions. In qualitative work De wind[92] has shown that both good health and poor health can influence early retirement decisions. Similar pathways were also evident in this study. When asked for a main reason for retirement, in interview 13 Louisa said:

> *'My hands would not, they protested basically. The type of work I did it was becoming increasingly painful'* Louisa, self-employed, routine and manual NS-SEC

Louisa had arthritis and this made her work more difficult. The primary reason given for retirement was *'my hands'* initially attributing the retirement decision to a decline in health. Only afterwards was this contextualised in terms of work, the decline in health made the work more painful.

Health in this theme did not exist in isolation. It was measured alongside the demands of the job role causing a mismatch which pushed towards retirement. In interview 11, Jamie was asked his main reason for retirement:

> *'Well, it was health grounds due to workplace stress…….. I could have carried on if I'd have changed, another job, because I went to….. the firm's doctors, about two or three interviews altogether, and they said that I could carry on working, if I did another job, different job. But they decided it was time to get rid of people, cut down a bit. So, I was offered if I'd like to retire, so that's how it came about basically. It was their idea not mine'* Jamie, employee, intermediate NS-SEC

Again, Jamie's first response attributed the retirement entirely to health. Afterwards Jamie explained the interaction that this caused with his work. His old role was unsustainable, but Jamie felt he could have worked in a different role. Later in the interview, it became clear that Jamie did work in a different role for a short period and then retired when his employer discontinued that role. Jamie also pointed out that his employer suggested the retirement. Retirement was a simple solution to an otherwise complex work problem. This excerpt also demonstrates another recurrent finding in this study, namely that participants initially attributed retirement to one factor. However, when discussed at greater depth several other factors are were also said to be at play, see 3.3.3 for further discussion.

Perceived good health also influenced retirement. In interview seven, Leo said:

> *'I just decided whilst I still got my health, I'm going to enjoy the rest of my life.'* Leo, employee, intermediate NS-SEC

Leo was concerned that his work was leading to a decline in his health. Nonetheless he described himself as being in good health, and that this would enable him to enjoy a longer retirement.

Justification bias theory (see paragraph 1.8.1.1) suggests that individuals may use ill-health as an excuse or justification for retirement which could mask other factors, especially in studies that utilise self-reports of health[101, 103]. However Dwyer et al,[102] McGarry et al[103] and Mortelmans et al[104] have produced findings contrary to this theory, suggesting that self-reported health was an independent determinant in the retirement decision. In this study, the sample were drawn from amongst those who had previously confirmed they had not retired mainly or partly for health reasons; therefore, any effect of justification bias is likely to be minimal.

However even if retirement was initially attributed to being for a health reason, many other factors still seemed to be relevant in that decision-making process. Health was repeatedly balanced against the job role and assessed in the context of the work being carried out. When health declines, the workplace seemed to remain unchanged and retirement was used to resolve the mismatch between health and job requirements.

Financial factors also played a role in retirement decisions in this theme. Here retirement was perceived as a desirable outcome and work was tolerated until enough finances have accrued to enable retirement.

In interview 13, Louisa was asked if there were any other reasons for her retirement:

> *'There were, no longer the money issues that made me work. We went through our money issues and decided that yes we could, I could retire'* Louisa, self-employed, routine and manual NS-SEC

Louisa clearly linked her working status to financial necessity, once that financial necessity was no longer present then she was free to make the retirement decision. This was also a joint decision as the finances were discussed with another person. In this context adequate finances were a pre-requisite to retirement.

Finances also seemed to act as a push towards retirement if retirement itself was rendered financially more attractive. In interview 11 Jamie, was asked about the rewards in his last role:

> *'the pension, as I say, was good as well and they did actually make my pension up to the full amount, they gave me seven years' worth as well which made it up to the maximum pension when I retired so that was good.'* Jamie, employee, intermediate SES

Jamie was offered a deal to retire, one in which the employer agreed to fund seven remaining years on his pension. Jamie saw this as a bonus, which pushed him towards retirement.

When the requisite financial security was not in place then finances could have the opposite effect in the theme 'But work also pulled me back' at 3.3.4.2

Family interactions were another important factor in this theme. Alice mentioned the retirement status of a partner in interview 15: *'I also got married to somebody who was already retired and that helped that decision.'* Alice's partner was retired which meant that retiring herself was an opportunity to spend more time together, pushing her towards retirement.

However, the relationship between a partner's retirement status and the participant's retirement decision was not simple. Louisa stated in interview 13: *'My husband didn't work he, he retired early so, but I felt that I needed to work rather than wanted to work'* Louisa viewed her husband's retirement as putting her under increased financial pressure, which seemed to be the distinguishing factor that kept her at work when compared to Alice above.

The participants were also motivated towards retirement when a family member's health was in decline. Being a carer motivated participants to retire in two ways, which sometimes overlapped.

Firstly, the practical necessities of the caring role interfered with work, secondly the desire to spend time with the family member, sometimes with an increased awareness that the remaining time is an ever-depleting resource, both of which pushed towards retirement. In interview four, Gareth stated that his partner's health was in decline, he described his retirement:

> *'it was also time that I could look after my wife for the last year or so of her life.'* Gareth, self-employed, intermediate NS-SEC

Caring in this theme was a role that displaced work. As the necessity to care for someone increased, the likelihood of remaining in work decreased.

In interview eight Elena said:

> *'I went down to part-time hours before I retired because I was caring firstly, from 2000 my mother………. Then 'til 2015 I took over care of my father, who is now in a care home when we couldn't manage any longer'* Elena, employee, intermediate SES

As caring responsibilities escalated, continuing work became harder. Eventually in Elena's case they became unmanageable, necessitating the use of a care home and motivating towards retirement.

3.3.4.5 Now I'm free

> **Theme Definition:**
>
> This theme encompassed descriptions and perceptions of life in retirement. Retirement was often described in terms of freedom, which was expressed as a counterpoint to work which was restricting. The freedom provided an escape from the negative aspects of work or other push factors.
>
> Freedom facilitated lifestyle change, pursuit of other interests and voluntary roles.
>
> Life in retirement was also described as being busy which was perceived as a positive.
>
> Examples of codes included in this theme were:
>
> • busy life post retirement
>
> • freedom of retirement
>
> • interests (non-work)
>
> • volunteering in retirement

This theme contained descriptions of life in post-retirement. The descriptions of life in retirement contrasted with many negative descriptions of life in work. Therefore, retirement provided a natural remedy to escape a negative work scenario.

Overwhelmingly retirement was described in terms of freedom which corresponds with Reeuwijk et al[106] where freedom was considered a pull factor towards retirement.

In interview 18, Amanda was asked what ceasing work meant to her:

> *'My days do not have to be so structured, that I make the decisions daily or weekly basis on what I'm going to do'* Amanda, self-employed, routine and manual NS-SEC

Retirement for Amanda had a lack of structure or rules; it was not as rigid as her life before. She clearly valued the control she had in retirement, choosing what she was going to do on a short or medium-term basis. This compared favourably to the theme 'you've changed' where a loss of control was a negative factor in work, see 3.3.4.1.1. In this theme retirement could help regain that lost control.

In interview one, Betty described her retirement: *'I choose exactly what I do, when I want to do it and it's done to my standards whatever I do.'* Again, the control element was emphasised. Betty

felt her workplace had suffered a decline in standards, her retirement allowed her to rectify this and put higher standards back in place again. Betty endeavoured to achieve high standards in her actions outside the workplace, a goal she felt was impossible to achieve in work towards the end of her employment.

In interview 11, Jamie was asked what retirement meant to him. He highlighted his freedom whilst acknowledging that the freedom had limits:

> *'it does mean that I can please myself and do what I want with my time to a certain extent, apart from voluntary things. But I try not to take on things that might tie my time up. In other words, I do voluntary things that I can fit in with everything else that might be going on'* Jamie, employee, intermediate NS-SEC

Jamie felt free, but only to a certain extent. He participated in voluntary work but tried not to let that restrict his freedom.

Parry et al[131] found that those in professional/creative work streams were more likely to derive satisfaction from voluntary work in older ages as a substitute for occupational satisfaction. Gerard in interview five, resonated with this description by citing voluntary work as his main reason for retirement. He described his transition away from paid work:

> *'And that led me to a whole new field of working relationships, and it was that satisfaction that…… actually said I'm enjoying this. Ok, I'm not earning much money, but actually I'm getting a lot out of it.'* Gerard, self-employed, higher managerial NS-SEC

Gerard still had *'working relationships'* in his retirement through his voluntary activities. These contrasted with his former work because he enjoyed it, unlike his former role which had become increasingly frustrating.

The freedom granted by retirement gave an opportunity to pursue other interests, which could be long-standing hobbies or aspirational targets. In interview three, Bernard's main reason for retirement was said to be his long-standing hobby.

> *'the plan was always to retire at 60 and with the intention that it gave me 10 years to pursue a hobby to an obsession, if that's a good way of putting it.'* Bernard, employee, higher managerial NS-SEC

Bernard's hobby played a major role in his retirement planning and decision. His retirement allowed him to take his hobby to a level of near professionalism.

In this theme, retirement could result in a lifestyle change that improved the participant's life in a general sense. In interview 15, Alice was asked what other factors affected her retirement decision:

> *'A desire to do other things that filled my interest, and if I could do those without needing to earn money, I thought I would have a better quality of life.'* Alice, self-employed, higher managerial NS-SEC

Retirement gave Alice the freedom to pursue her interests. This was perceived as a better quality of life. This was despite surrendering her professional status and financial security, which Alice had emphasised as important aspects of her life in work.

Similarly, Gerard emphasised the benefits of retirement in terms of health, both physical and mental:

> *'there was a real physical benefit. And of course, from the physical benefit comes a, that sort of mental benefit too because I felt good...... and it was a real positive for me.'* Gerard, self-employed, higher managerial NS-SEC

In this theme life in retirement was also said to be busy, when asked whether he would describe himself as retired Phillip in interview six responded: *'it depends how you define retired but I'm a very busy retired person'.* Phillip's life was busy, so much so that he was uncertain that the label 'retired' applied, even though he had ceased working. This was echoed by Alice from interview fifteen, who believed this was a general trend. *'I think my generation is a very active generation, every retired person I talk to is doing something.'*

Pride in being a worker can be a pull towards work, see 'but work pulled me back' at 3.3.4.2. It is possible that endeavouring to have a busy retirement meant that retirees maintained their pride by demonstrating utility and personal-value post-retirement.

Being busy in retirement was, paradoxically, both a contrast and a parallel to life in work, which was often expressed in terms of being highly demanding on time (see sub-theme 'I've got no time' at para 3.3.4.1.3). Although being short of time was a negative factor of working life it was considered a positive factor when it occurred in life post-retirement.

Irene in interview sixteen, highlighted her hours as a factor in her retirement decision. When asked whether it was something she missed about work she responded:

> *'no, I don't miss that because I'm filled up with other things that are nice, like the grandchildren and things like that'.* Irene, self-employed, routine and manual NS-SEC

Irene was busy at work, which was a negative, she was also busy in retirement which was expressed as a positive. However, the distinction was that the time demands in retirement are from *'nice'* things such as her grandchildren.

Sometimes post-retirement activities appeared similar to work roles as explained by Alice:

> *'there's lots of people like me that do a lot of things that, people like them may have got paid for in the past, but they're giving their services to other things'* Alice, self-employed, higher managerial NS-SEC

Post-retirement roles varied from caring to property work and on many levels resembled employment roles. Elena described her caring responsibilities as *'work as well, but unpaid.'*

Given the resemblance to work, it was not immediately obvious why having a busy life post-retirement was generally viewed favourably by the participants. This was especially interesting considering that the roles undertaken in retirement were unpaid, so the rewards involved were less obvious. It is possible that the amount of control inherent in being a volunteer played a role. Ultimately a volunteer could simply leave a voluntary role if it was not to their liking. Betty suggested this when describing her attitude to post-retirement roles *'if I don't want to do it, I don't do it.'*

The 'Now I'm free' theme was neither a push factor nor a pull factor in itself. However, the descriptions of retirement in this theme allowed for a much clearer understanding of the retirement decision. The perception of life in retirement was often a stark contrast to the more unpleasant descriptions of the workplace. Retirement was an escape from these and immediately, if crudely, resolved any workplace push factor.

3.3.5 Pathways to retirement

From the analysis presented above, it became clear that there were differing pathways into retirement explained by the participants which were worthy of comment.

3.3.5.1 Bridge employment

In this thesis, bridge employment is a subset of retirement whereby a person still remains in the workforce to some degree but in a reduced capacity, see para 2.2.2.

In these interviews, bridge employment varied from reducing hours at a prior career job, to leaving paid employment but then entering self-employment in the same field.

When asked about her exit from the workforce in interview 15, Alice described a two-step transition:

> *'I did it in two steps. I left a fully employed job when I was 56 and I became self-employed which I then finished…….. then when I was 59, I stopped being self-employed and didn't work for money at all.'* Alice, self-employed, higher managerial NS-SEC

Alice clearly regarded her exit as being a two-stage process and in other parts of the interview expressed different reasons for leaving the two roles. Alice's case-study is available at Appendix D.

In interview 16, Lucinda described reducing her hours before retirement:

> *'I did three [days], 25 hours I went down to, and that has become quite a common thing with some of the older ladies now. In fact, they're doing almost like a, I believe they're doing almost like a job share there now, a lot of people are part-timing'* Lucinda, employed, higher managerial NS-SEC

However simply reducing hours was not necessarily a solution to the push from work given in the theme 'I've got no time', see 3.3.4.1.3. In interview eight Elena reduced both her hours and job role until she was working three hours per day. However, in order to complete her role to her satisfaction she *'was probably doing three hours in the evening'* which was unpaid. This caused resentment and provided a push away from work.

3.3.5.2   Redundancy

Favourable voluntary redundancy terms were available for some participants in this study. This is despite a shift away from early retirement culture across Europe in response to both the ageing population and the financial crisis of 2008, see Topa et al[22] and Wang and Shultz.[25]

The retirees viewed the redundancy process as a financial incentive, which motivated them towards retirement in the theme 'I had my reasons' (see para 3.3.4.4) and reducing the effect of theme 'But work pulled me back' (see para 3.3.4.2).

In interview 12, Patsy was asked whether her rewards influenced her retirement decision:

> *'Well yes I think if I hadn't had the pension and I hadn't had the redundancy then I may have carried on to the end of the next year. That did help me make the decision'* Patsy, employee, intermediate NS-SEC

Here redundancy was highlighted as a process that enabled Patsy to retire, fulfilling her pre-requisite for financial security. Without it, she envisaged working for another year.

Redundancy sometimes seemed to be used as an alternative to resolution of workplace incompatibilities, providing a route out of employment. This pathway was utilised by both the worker and the employer. Julian in interview two, had a change of attitude towards work brought on by a serious health condition:

> *'I suddenly thought there are better things in life than working, so I literally went in the following day and applied to be made redundant, and that's what happened, I was made redundant'* Julian, employee, intermediate SES

Betty's workplace changed and this resulted in a clash between her values and those of her employer, to the extent that Betty no longer trusted her employer:

> *'it got to the stage where I couldn't…. when the offer of redundancy came up, I couldn't wait to take it and hope that I would be accepted'* Betty, employee, higher managerial NS-SEC

Workplace change pushed Betty towards retirement, the offer of redundancy provided an extra stimulus to leave her employment. In addition, Betty was *'very surprised that I was accepted'* for redundancy. Betty was a vocal critic of the workplace changes and linked this to her redundancy being accepted *'I also had a very loud voice…….. I didn't like what was happening and I think in the end they were quite thankful that I was going.'*

Elsewhere, Jamie in interview 11, felt his retirement was due to health, specifically his workplace stress which had resulted in sick-leave. When describing the mechanics of his retirement he said:

> *'they decided it was time to get rid of people, cut down a bit, so I was offered if I'd like to retire, so that's how it came about basically. It was their idea not mine'* Jamie, employee, intermediate *NS-SEC*

Although Jamie was happy to take early retirement, it was his impression that this course of action was also favoured by his employer. Although he was not forced into retirement, the mechanics of the transition were put in place by the employer. Here the disengagement between the worker and the employer seemed to work both ways. Whilst Jamie was glad to exit work, the employer made retirement far simpler than returning to work. The employer also paid a further seven years' worth of pension contributions to ensure Jamie had the maximum pension and removed Jamie's preferred role which he felt he could perform with less stress. His 'choices' were (in his view) to return to a role that had previously led him to be signed-off sick, or to take early retirement with full pension rights.

3.3.6   Limitations

The interviews allowed the participants to discuss many aspects of the decision to retire including aspects that were not ostensibly linked to the workplace such as health and family interactions. Discussing non-work factors ensured that they were not ignored and allowed possible interactions with the workplace to be explored. However, it should be noted that non-workplace factors were not probed to the same depth in the interviews. Therefore, the interviews were not an exhaustive study of why people choose to retire. It is recognised that a study designed to explore other determinants such as health, in depth, will find a range of topics and issues that were not raised here (see De wind et al[92] for health based pathways to retirement).

Sometimes the participant was asked what they liked or disliked about their work as a platform for further discussion. I endeavoured to draw the interview back to the effects of these likes and dislikes on the retirement decision. Likes and dislikes in the workplace will in many cases be instrumental in the retirement decision. Nonetheless it was possible that discussion of likes and dislikes about the workplace could have impacted upon the stated reasons for retirement.

All participants interviewed were retired. Therefore, the theme 'But work also pulled me back' does not necessarily represent aspects that may keep people working into older ages, although it should be noted that of the 17 participants, five retired at state pension age whilst five retired after state pension age. Nonetheless the theme does reflect factors that were part of the decision-making process and weighed against the decision to retire.

The invitation sent to the participants emphasised that the interview would be about their retirement decision and work-related factors prior to retirement. This was re-iterated when the interview date was booked over the phone. Therefore, it is possible that those responding to the invitation letter were those who had more defined work-related reasons for retirement. It is also likely that the participants had thought about their retirement decision in the context of work-related factors prior to the interview. Therefore, in this specific context, it is possible that the participants may be overstating the influence of work factors on their decision. However even if this is the case, this is likely to have had a minimal effect on the conclusions of the study as the scope was to find a range of possible work-related determinants of the decision to retire.

The participants were interviewed in 2018 but had retired four to six years prior to this. Therefore, it is possible that the data may have been subject to recall bias, with the passage of time obscuring the decision-making process. However, it was also possible that the passage of time clarified the participant's thoughts on the matter. As attachment to former roles declined it

is possible that the delay between retirement and interview allowed the participants to be more open about their decisions at the time.

3.4   Conclusion

The factors that influence the decision to retire from work were many and varied. Characteristics of work itself have been seen to play an important role in this decision making.

It appeared that there was a complex interplay between different factors which resembled a balancing act as the participants approached their retirement. At a given point in time, one factor may have seemed determinative and induced the participant to make the decision to retire. However, it appeared that even where there was a single reported determinative factor, this still formed part of an interplay between many other factors. For example, a participant retiring to care for a family member could also consider flexibility of working hours before deciding whether to retire.

The theme 'work was pushing me' coupled with 'but work also pulled me back' provided a rich array of data on work-related factors that influence the retirement decision. An individual will decide to retire based on a range of factors that will influence them to different degrees. Nonetheless it is possible to envisage that adjustments to the workplace could reduce or buffer the push elements of work to the extent that people may choose to work for longer and retire later.

The telephone interviews added to the questionnaire development for phase three of the project. For example, although workplace change had been tested previously in the literature[98] the results from the interviews allowed me to probe this aspect further. Specifically, the phase three questionnaire explored whether other parts of the sub-theme 'You've changed,' such as perceived declining standards at work, contributed to the retirement decision. From the analysis of the interviews the following topics were taken forward into the phase three questionnaire.

You've changed. This was explored further by asking questions on perceived declining standards at work, a value mismatch with the employer, a loss of control at work and negative appreciation at work. I hypothesised that the presence of these aspects would make participants more likely to retire.

Grinding me down. This was explored further through questions on isolation and the perception of work as draining which I hypothesised would increase the likelihood of retirement. To my knowledge, commuting has rarely been explored in the retirement literature, but featured

strongly in this theme. I hypothesised that longer or less pleasant commutes would lead to earlier retirement.

I've got no time. This was explored by asking questions that went beyond simply describing work or shift patterns. A previously unexplored aspect of this was the perception of being constantly available for work through mobile technology, which I hypothesised may increase the likelihood of retirement.

This hurts. In this analysis physical workloads were relevant to the retirement decision when coupled with a mismatch with physical abilities. Therefore, I included a question on whether people felt they can cope with their physical workload, rather than simply describing the physical strains.

But work also pulled me back. Similarly, phase three further explored aspects that may pull people back towards work or may encourage them to work for longer. Analysis at this stage suggested that having a close community at work, loyalty to one's colleagues, the presence of flexible hours and positive appreciation at work may have discouraged people away from retirement.

Chapter 4   Phase two: Systematic Review

4.1   Introduction

The aim of the systematic review was to review work-related factors and their relationship with contemporary retirement decisions. The research question for the systematic review was:

'Amongst people aged 50 and over, which work-related factors affect the decision to retire?'

The systematic review protocol is reproduced at Appendix E.

4.2   Methods

4.2.1   Population

The target population were individuals over the age of 50 who had been employed or self-employed who had subsequently transitioned into retirement. These should be compared with those remaining in employment/self-employment, or who retired earlier or later from the same initial cohort.

4.2.2   Exposures: Work-related factors

The exposures under investigation were factors related to work. These were defined as aspects of the day-to-day working environment or circumstances that the worker would potentially no longer experience if they were to retire. Such factors were treated as distinct from work-related demographics in the workplace such as the size and sector of the employer.

The focus was on examining work-related factors which impacted retirement decisions with a view to understanding potential employer interventions which may lengthen working lives. As such, work factors predominantly under the worker's control, such as whether the participant worked part time were excluded from the review. However, aspects such as the *availability* of part time work (if the participant wanted to reduce hours) were considered relevant.

See protocol at Appendix E for the full list of included and excluded exposures.

4.2.3   Outcome: retirement

The outcome of interest in the review was retirement. In this phase retirement was defined as moving from employment/self-employment for remuneration to being out of work with no intention to return. Self-reported or register-based retirement information were both included.

It became clear in the planning phase that many different definitions of retirement were being used in the literature. This was unsurprising given the changing context and social meaning attributed to both the word retirement and the process of retirement as a whole. Therefore, for the current review the definition adopted was relatively wide to encompass retirement both before and after SPA and to look at a wide variety of countries and contexts.

4.2.4   Inclusion/exclusion criteria

The review was limited to retirement that took place after age 50. See para 2.2.1 for further explanation of using 50+ as a lower threshold. For this review, studies which examined retirement before age 50 were excluded since it is likely that very different factors affect those who retire before aged 50.

As set out above, the review was designed to examine contemporary retirement decision-making. Therefore, studies were excluded in which all reported retirements occurred prior to 01 January 2000. For example, a study in which all retirements occurred between 1992-1998 was excluded whilst a study where the retirements ranged from 1997-2002 would be included.

Any studies in which the outcome was solely an 'intention' to retire were excluded. Similarly work transitions to unemployment or disability retirement were excluded. The review was restricted to full text publications in English that had been peer reviewed.

4.2.5   Search strategy

The search strategy was designed to search for the outcome (retirement and its synonyms) alongside a search for the exposures (work-related factors). The search then combined these together with an 'AND' search.

The search required an extra level of sophistication because both elements of the text search had their own synonyms. For example, 'employment' and its synonyms were combined with 'conditions' and its synonyms. The resulting strategy was able to search for 'employment conditions', 'employment environment' or 'work environment' simultaneously. Proximity

searching was used to ensure that the two elements of the exposures occurred within two words of each other, see Figure 4-1.

Pilot searches were carried out and the search strategy redrafted appropriately. From this, a list of key search terms and synonyms were generated, which were applied across the relevant bibliographic databases. Truncations of all relevant words were also searched. The searches also included relevant Medical Subject Headings (MESH®) terms and keywords or equivalents. The final search strategy was tailored to each individual database due to changes in the search mechanisms. For example, the MeSH terms or equivalent were not the same in Medline and Ovid. The mechanisms for using proximity searching were also different between databases. Two example search strategies for two individual databases can be found at Appendix F.

The final search strategy was designed to search for literature that combined the outcome with work-related factors. The outcomes were 'retirement' along with two synonyms: 'workless' and 'pension'. The exposures were 'work' along with four synonyms including 'employment' and 'job' combined with 'factors' and nine synonyms as shown in Figure 4-1. In addition a further exposure category was added that included 'push and pull' a term for determinants of retirement popularised by Schultz[130] and 'effort reward' a type of job strain as defined by Siegrist.[139]
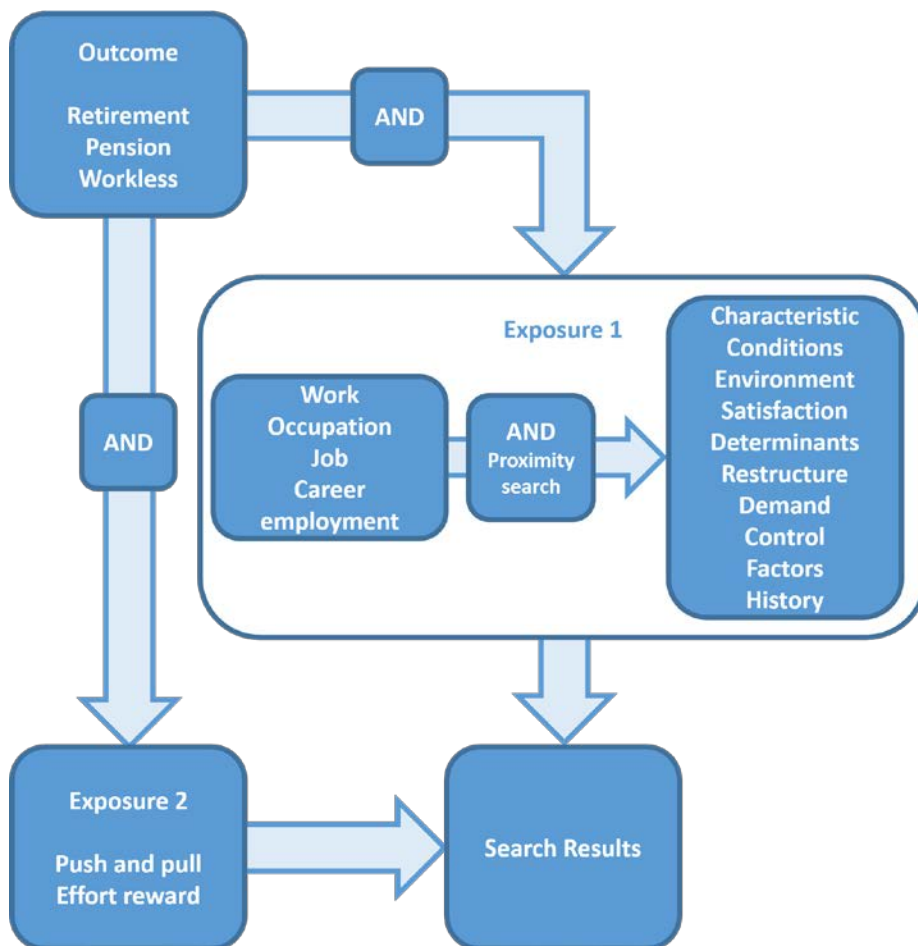
Figure 4-1   HEAF FIRST phase two systematic review search strategy overview

4.2.6   Bibliographic databases

To inform selection of relevant databases, the University of Southampton's internal search tool (delphis) was explored in order to establish where the potentially relevant papers appeared on other search databases. Specialist library staff at the University of Southampton were also consulted for support to select relevant search databases.

Based on these processes the following six search databases were identified as relevant:

- MEDLINE, Ovid
- EMBASE, Ovid
- PsycINFO, EBSCO
- CINAHL, EBSCO
- Web of Science
- International Bibliography of the Social Sciences (IBSS), PROQUEST

The search terms were adapted individually for each database and the searches were peer reviewed by the University of Southampton library staff. The final searches were carried out on 18 October 2017.

4.2.7 Screening of results

Results from the searches were collated in Endnote[140] and titles and abstracts were independently screened for eligibility by two researchers, myself, and either Dr Clare Harris (CH) or Dr Catherine Linaker (CL) utilising the RAYYAN[141] platform. Results were compared and discrepancies discussed and resolved. A further independent full text screen was then carried out on the remaining references. This was conducted by the same researchers. Results were once again compared, and discrepancies discussed and resolved. I carried out backwards checking on the bibliographies of included studies.

4.2.8 Data Extraction

A bespoke data extraction form was designed with reference to the STROBE[142] criteria. A copy of the form is included at Appendix G. The form was designed to extract data relevant to the research question and the definition of the outcome measure. Initial reading had indicated that the outcomes were heterogeneous, and the outcomes warranted recording in detail in order to compare and contrast studies.

The form was sent to all reviewers and completed using one included paper. After amendment, the form was further piloted by the reviewers on two additional studies and discussed and finalised.

Data were extracted by two team members independently and then compared. I extracted data from all studies whilst CH and CL each extracted data for half of the studies. Discrepancies were then discussed and settled.

Numerical data were extracted from the most adjusted statistical models presented. For example, where a regression had been run with univariate associations and then afterwards with multivariable associations and both models were presented, data from the latter were extracted. This had the advantage of ensuring that the data extracted represented effect sizes with less chance of confounding. This of course may have led to under-stating the effects of work-related factors on the decision to retire; however, this was felt to be preferable to extracting data from simpler models which would risk over-stating the effects.

4.2.9 Risk of bias checks

A risk of bias template was devised, based upon the Scottish Intercollegiate Guidelines Network (SIGN)[143] template for cohort studies. Relevant statements were added to this from the Strengthening The Reporting of OBservational Studies in Epidemiology (STROBE)[144] statement and one bespoke item was added which was specific to this study (Q10), which assessed whether the outcome specifically excluded unemployment and disability retirement. This resulted in a 16-item checklist with an overall measure for risk of bias, see Appendix H. The tool was developed iteratively, and a further measure was added that indicated the paper's overall relevance to the study question in HEAF FIRST.

The risk of bias tool was piloted independently by KWB and I, on two included papers. The tool proved to be acceptable and was therefore used for all cohort studies. The risk of bias checks were carried out independently on all included papers by two reviewers (myself and KWB). Results were compared and discrepancies discussed and resolved.

4.2.10 Categorisation of exposures

The included papers tested a wide range of work-related exposures and in many cases defined similar exposures differently and/or used different questionnaires or tools to measure them. For the purposes of creating a cohesive overview, I considered the description of the exposure in the text and any further details of the questions asked in the study and then grouped similar exposures into categories.

For example, in one paper,[145] an exposure labelled 'psychosocial demands' was found to include the answers to two questions which concerned 'working under time pressure' and 'working at speed'. Given its similarity to other exposures, this was categorised with the psychosocial job demands category in the synthesis.

A further example can be seen in the 'job control' category. This includes exposures that authors labelled as: autonomy[117], influence[133] and decision authority[136] amongst others.

Within categories, the exposures were further separated according to the direction of effect upon retirement. The further categories were:

Retirement more likely: This included (a) exposures which were significantly associated (defined as $p<0.05$) with increased odds, hazard ratio or risk of retirement and (b) those that were significantly associated with an earlier age of retirement in any of the included studies.

Retirement less likely: this included (a) exposures which were significantly associated (defined as $p<0.05$) with decreased odds, hazard ratio or risk of retirement and (b) exposures that were significantly associated with a later age of retirement in any of the included studies.

No significant association: This included exposures which were not found to be significantly associated with retirement in the included studies (defined as $p\geq0.05$).

4.3 Results

Figure 4-2 shows a flow chart of the results from the search and screening processes. Results from the six search databases were collated in Endnote[140] and totalled 4,995 references. 2,555 duplicates were identified and removed from the set.

4.3.1   Search Results
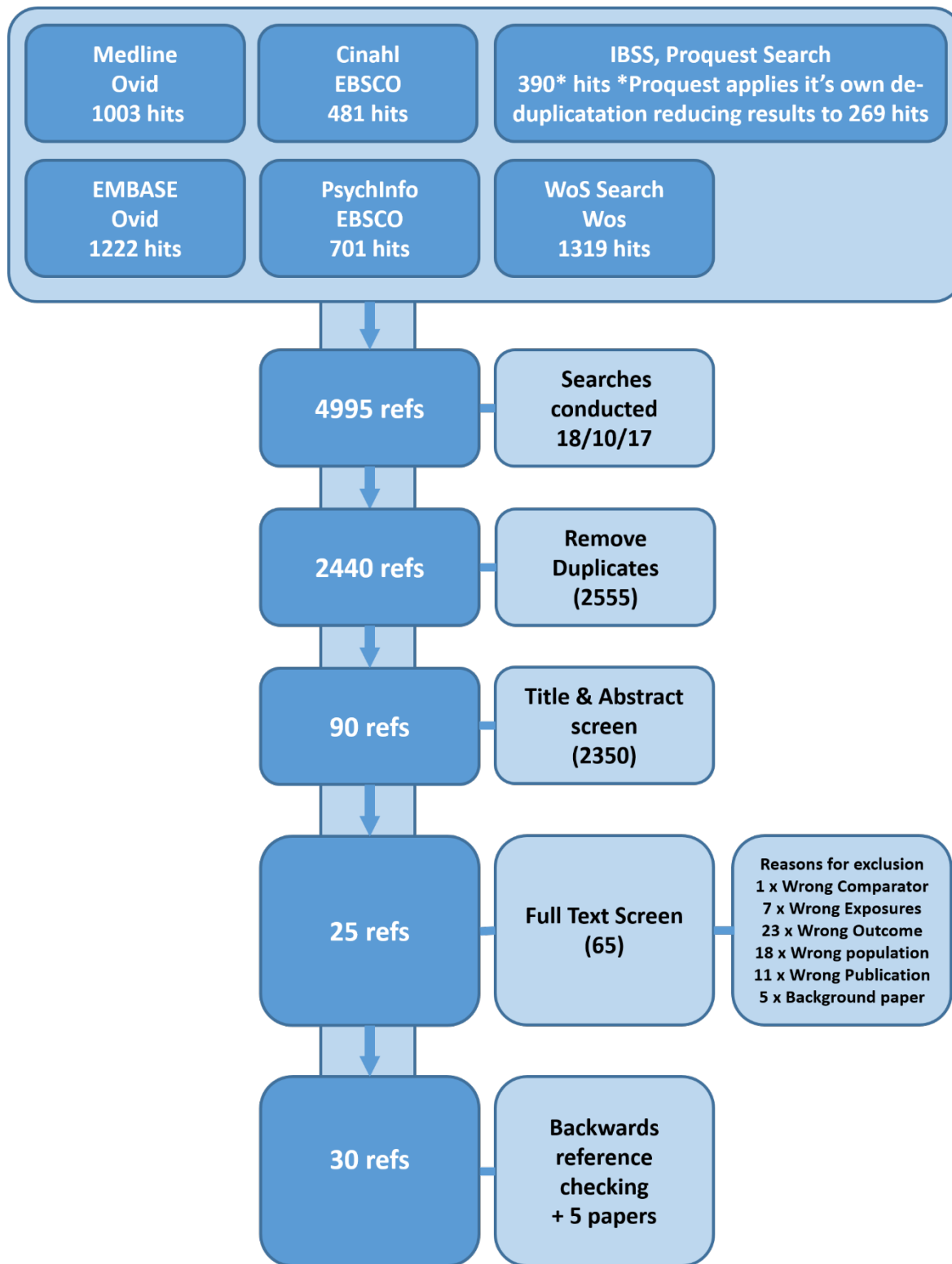
Figure 4-2   HEAF FIRST phase two systematic review: reference screening flow chart

4.3.2   Screening

The remaining 2,440 references were uploaded onto the Rayyan[141] online platform for conducting systemic reviews. A pilot screening process was conducted on 100 references with MJS, CH and CL checking all entries and then discussing any relevant conflicts.

The remaining titles and abstracts were screened by two reviewers independently to assess their relevance to the protocol. I checked all papers whilst CH and CL each checked 1,170 references. Conflicts were discussed and settled. 2,350 references were removed at this stage, which left 90 references to proceed to full text screening.

Full text screening was carried out in Endnote.[140] I screened all papers and CH and CL each considered 45. Again, conflicts were discussed and resolved. 65 papers were removed at this stage and the reason for exclusion was recorded (see Figure 4-2).

The protocol called for peer-reviewed papers only. In cases of doubt, journal titles were examined to see if peer reviews had been conducted. This was done using Ulrichsweb.[146] No papers were excluded due to the peer review requirement.

At that stage 25 papers were eligible for inclusion in the review. I checked the bibliography of all included studies and relevant reviews for any additional material. This was completed in August 2018. Any new papers were discussed with all reviewers before inclusion. This led to five papers being added, Kubicek et al[145], Damman et al 2015[147], Hermansen[134], Midtsundstad et al[74] and Van Solinge et al 2010.[148]

In total 30 papers were included in the final review.

4.3.3   Included papers

The 30 papers included in the systematic review are summarised in Table 4-1.

Table 4-1   Papers included in HEAF FIRST systematic review

Ref No.	Author	Year	Location	Cohort	Sex*	Study years	Age at baseline	N
1	Angrisani[149]	2017	USA	HRS	Mixed	2002-2012	51-79	4148
2	Breinegaard[98]	2017	Denmark	Civil Servants	Mixed	2009-2012	60-64	3254
3	Carr[10]	2016	UK	ELSA	Mixed	2004-2011	50-69	3462
4	Dal Bianco[11]	2015	Europe	SHARE	Separate	2004-2011	50-69	3737
5	Damman[150]	2011	Netherlands	NIDI	M only	2001-2007	50-64	1212
6	Damman[147]	2015	Netherlands	NIDI	W only	2001-2011	50-64	420
7	De Preter[151]	2013a	Europe	SHARE	Mixed	2004-2007	50-70	5127
8	De Preter[13]	2013b	Europe	EC Household Panel	Separate	1994-2001	50+	4494
9	De Wind[117]	2014	Netherlands	STREAM	Mixed	2010-2011	59-63	2317
10	De wind[152]	2015	Netherlands	STREAM	Mixed	2010-2012	58-62	1862
11	Friis[133]	2007	Denmark	Danish Nurse Cohort	W only	1993-2002	51-59	5538
12	Gortz[153]	2012	Denmark	Bespoke (teachers)	W only	1996-2006	60-64	4686 obs
13	Hermansen[134]	2014	Norway	Bespoke	Mixed	2000-2010	61-62	15231
14	Joyce[154]	2015	Australia	MABEL (doctors)	Mixed	2008-2012	65+	1078
15	Kim[155]	2005	USA	HRS	Mixed	1992-2000	51-61	3268
16	Kubicek[145]	2010	USA	WLS	Mixed	1993-2004	51-56	2499
17	Lee[156]	2013	South Korea	KLOSA	Mixed	2006-2008	50+	1579
18	Lund[136]	2005	Denmark	DWECS	Mixed	2000-2004	57-62	365
19	McGonagle[157]	2015	USA	HRS	Mixed	2008-2012	51+	1656
20	Midtsundstad[74]	2012	Norway	Bespoke	Mixed	2001-2007	61-62	4018
21	Mortelmans[104]	2013	Europe	EC Household Panel	Mixed	1995-2001	50-65	13434
22	Pengcharoen[158]	2010	USA	HRS	Mixed	1992-2002	51+	2869
23	Robroek[12]	2013	Europe	SHARE	Mixed	2004-2009	50+	4923
24	Robroek[159]	2015	Netherlands	POLS	Mixed	1999-2008	50-64	2922
25	Schnalzenberger[24]	2014	Europe	SHARE	Separate	2004-2007	50-65	3712
26	Thorsen[160]	2016	Denmark	DANES	Mixed	2008-2012	56-64	1876
27	Tuominen[161]	2012	Finland	Flexible Retirement Age	Mixed	2003-2009	58-61	850 + 445
28	Van den Berg[162]	2010	Europe	SHARE	Mixed	2004-2006	50-63	4611
29	Van Solinge[148]	2010	Netherlands	NIDI	Mixed	2001-2007	50-60	1621
30	Van Solinge[114]	2014	Netherlands	NIDI	Mixed	2001-2011	50+	1450

*Sex: Mixed = men and women in same analysis, Separate = men and women analysed separately, M only = men only, W only = women only

4.3.4   Geographical settings

Table 4-2 describes the geographical settings of the studies included in the systematic review. The review protocol placed no limit on geographical locations. Given this, the range of geographical settings for the included studies was surprisingly small. Seven studies were based on Europe-wide

datasets, seven further studies were specific to the Netherlands, whilst Denmark and the USA were the subject of five studies each. Outside of Europe and the USA, there was only one study set in Australia and one in South Korea.

Table 4-2   Geographical settings of the studies included in the HEAF FIRST systematic review, by country

Location	Number of papers
Australia	1
Denmark	5
Europe	7
Finland	1
Netherlands	7
Norway	2
South Korea	1
UK	1
USA	5
Total	**30**

4.3.5   Cohorts represented

In several cases, included studies were based on the same cohorts (Table 4-3). The European-wide SHARE cohort was used in five papers, whilst the US-based HRS cohort featured in four papers as did the Netherlands based SHARE study. Therefore the 30 included studies represented 18 separate cohorts. Some of the included papers focussed specifically on one type of worker: teachers in day-care sector (Gortz[153]), nurses (Friis et al[133]), doctors (Joyce et al[154]), senior public service workers (Breinegaard et al[98]), and one focussed only on married couples (Kubicek et al [145]).

Table 4-3   HEAF FIRST systematic review, cohorts represented in the included studies

Cohort	Paper	Year	Study Years
Survey of Health, Ageing and Retirement in Europe (SHARE), Europe-wide **5 studies**	Dal Bianco	2015	2004-2011
	De Preter	2013a	2004-2007
	Robroek	2013	2004-2009
	Schnalzenberger	2014	2004-2007
	Van den Berg	2010	2004-2006
Health and Retirement Study (HRS), USA **4 studies**	Angrisani	2017	2002-2012
	Kim	2005	1992-2000
	McGonagle	2015	2008-2012
	Pengcharoen	2010	1992-2002
Netherlands Interdisciplinary Demographic Institute Work and Retirement Panel (NIDI), Netherlands 4 studies	Damman	2011	2001-2007
	Damman	2015	2001-2011
	Van Solinge	2010	2001-2007
	Van Solinge	2014	2001-2011
EC Household Panel, Europe-wide 2 Studies	De Preter	2013b	1994-2001
	Mortelmans	2013	1995-2001
Study on Transitions in Employment, Ability and Motivation (STREAM), Netherlands **2 Studies**	De Wind	2014	2010-2011
	De Wind	2015	2010-2012

4.3.6   Outcomes

The retirement outcomes evaluated in the included studies were heterogeneous. 21 of the studies used self-reported retirement whilst the remaining nine used measures such as registry data.

Sixteen of the studies solely explored 'early retirement' as an outcome, whilst one study (Tuominen et al[161]) presented separate models for early leavers and later leavers. In each case 'early' is defined by reference to the country-specific state pension age. Of these, seven studies examined factors affecting early retirement that was administered by the state in some manner such as the post-employment wage (PEW) or Efterløn in Denmark (used in five studies).

4.3.7   Data extraction

The systematic review protocol prescribed that the most adjusted data model be extracted. The included papers utilised many different forms of analyses which meant that this rule could not always be applied in such simplistic terms. I endeavoured at all times to include as much data as possible and this resulted in some nuances as per below:

- In Damman et al 2015[147] the most adjusted model presented restricted the cohort to those living with a partner. This reduction in cohort size was unnecessarily restrictive for

the research question so the next most adjusted model was selected which preserved a higher number of the cohort in the study.

- Where a paper presented final models based on backwards elimination they did not give effect sizes for non-significant exposures by design. In these cases, I noted that the exposure had been investigated and was non-significant and the result was included in the study. However, we did not extract data from the simpler models to establish the non-significant effect size as this would not be comparable to the significant variables which were extracted from the backwards eliminated model. Examples are De wind et al 2014[117] and Friis et al.[133]

- In Van den Berg et al [162] only univariate associations were reported. The paper was focussed on health and therefore associations between workplace factors and retirement were not part of the final model. The results were extracted for the review but as noted the associations are univariate only.

- Tuominen et al [161] presented two different models, one comparing early retirees to later retirees, the second comparing later with 'on-time' retirees. Both models were relevant and so were extracted separately. However, the synthesis the results will be considered as related to avoid ascribing double weight to a single cohort. Similarly, Joyce et al[154] presented results for four different years of retirement, with no overall trend presented in the paper. These were extracted separately but results were considered to be related in the analysis to avoid ascribing extra weight to the results.

- Kubicek et al[145] presented indirect effects of several work-related exposures. These were extracted notwithstanding that many other papers did not conduct similar analyses.

- In Thorsen et al[160] the extracted model three was stated to be over-adjusted by the authors and therefore may have lost some precision and under-stated results. Job satisfaction had been dropped from this model in order to reduce multicollinearity despite being the strongest predictor of retirement in the previous two models. In this case job satisfaction was extracted from model two whilst noting this was not mutually adjusted with other work-related factors.

4.3.8   Categorisation of work-related exposures

The included 30 papers evaluated a total of 169 work-related exposures which had been investigated in relation to retirement outcomes. Of these, 55 were reported to have a significant effect upon retirement, either increasing or decreasing retirement age or increasing/decreasing the likelihood of retirement.

Based on the final adjusted models presented by the authors at a 95% level of confidence, 27 exposures were categorised as 'retirement more likely', 28 exposures were categorised as 'retirement less likely' and 114 exposures were not significantly associated with retirement (p≥0.05), see Table 4-4. Note that at this stage, no attempt had been made to harmonise the direction of effect of the exposures so, for example, appreciation (low) appears in 'retirement more likely' if it was significantly associated with an increased likelihood of retirement whilst appreciation (high) appears in 'retirement less likely' if it was significantly associated with a decreased likelihood of retirement.

Table 4-4   HEAF FIRST systematic review, effect of extracted exposures on retirement outcomes

Description	Number of extracted exposures
Significantly associated with retirement being more likely	27
Significantly associated with retirement being less likely	28
No significant association with retirement	114
Total	169

Amongst the included papers, 26 found a significant association between at least one work-related factor and retirement outcomes. Only four papers found no significant associations, those being De Preter et al 2013a[151], Kim et al[155], Pengcharoen et al[158] and Robroek et al 2015.[159]

To make the data more suitable for comparison, and description, the 169 exposures were categorised into 19 pragmatic categories in order to allow comparisons. These categories were defined, by grouping similar types of exposure together (see Table 4-5).

Table 4-5   HEAF FIRST systematic review, categorisation of work-related exposures extracted from included papers

Age Discrimination	4 Exposures
Description: This category contained exposures that explored the extent to which older workers perceived that they were being treated differently from their younger counterparts	
Examples: Angrisani et al[149] explored the effect of an exposure called 'age discrimination' compiled of answers to two questions: 'In decisions about promotions my employer gives younger people preference over old people' and 'my co-workers make older workers feel they ought to retire before age 65'. De Wind et al 2015[152] measured age discrimination with three items from the Nordic age discrimination scale concerning opportunities for development, education and training, and promotion in comparison to younger workers. Answers were on a five-point scale ranging from 'totally disagree' to 'totally agree.'	

Age-related human resources practices:	2 Exposures
Description: This category included exposures in which a specific organisation-wide policy had been introduced which was solely for the benefit of older workers.	
Examples: Hermansen[134] explored the effect of an exposure called 'Retention measure – additional leave' which distinguished between employers who had offered older workers an extra five days of leave when reaching the age of 62, and those who had not. Midtsundstad et al[74] tested the effect of 'Inclusive working lives' (IW) policies for older workers. This exposure was assessed at organisation level distinguishing between those organisations that notionally offered IW polices and those that did not. Policies could include bonuses, days off or reduced working hours specifically for older workers.	

Appreciation:	7 Exposures
Description: This category included exposures that explored the extent to which older workers were given praise, or recognition, for the roles or work that they performed.	
Examples: Carr et al[10] defined 'low recognition' by answers to a single question 'I receive the recognition I deserve for my work'. Answers that disagreed with the statement on a four-point scale were considered jobs with low recognition. Thorsen et al[160] reported on the effect of an exposure called 'recognition from management' which was concerned with answers to a single question 'is your work recognised and appreciated by the management?'	

Effort-reward imbalance	13 Exposures
Description: Exposures were added to this category if they were stated to be based on calculating a ratio between work efforts and work rewards to reach a notional measure of 'job quality.'	
Examples: Dal Bianco et al[11] reported the effects of an exposure called 'poor job quality' this was said to be based on Siegrist's[122] ERI model and was calculated by adding together scores of questions on effort factors (questions on stress and physical demands) and dividing them by the scores of questions on reward factors (questions on freedom, skills, support, recognition and security). Scores for efforts and rewards were weighted to allow for the higher number of reward factors. Those who had a ratio in the top tertile were considered to have poor job quality. Schnalzenberger et al[24] also based the ERI measure on questions from Siegrist's ERI model. Questions regarding physical demands and time pressure were considered efforts and were divided by five rewards elements (support, recognition, earnings, prospects, and job security). Ratios were calculated balancing the two effort items against the five reward items, with appropriate weighting. Tertiles were created with lower scores being considered the lowest job quality.	

Flexible hours	6 Exposures
Description: Exposures were added to this category if they described the availability, or notional availability, of changing work patterns in the same job.	
Examples: Angrisani et al[149] tested the effects of an exposure called 'Employee cannot reduce hours of work'. This was a binary based on the response to the question 'not counting overtime hours, could you reduce the number of paid hours in your regular work schedule?' Lee et al[156] created an industry level measure called 'flexibility of hours.' This exposure was based on the proportion of workers in each separate industry who had reduced hours by more than 20% during the follow up period.	

Irregular Hours	4 Exposures
Description: Exposures were included in this category if they recorded the extent to which the participant worked non-regular hours. This included shift-work or rotating shift patterns.	
Examples: Van Solinge et al 2014[114] included an exposure called 'Irregular working hours.' Hours were considered irregular if participants gave a positive answer to either of the following questions: 'Do you do shift work?' or 'Do you (regularly) work during the evening or at night?' Friis et al[133] tested the effect of 'work schedule' on retirement, splitting the participants into those who worked day shifts (comparator), evening shifts, night shifts or rotating shifts.	

Job control	10 Exposures
Description: Job control collected together the exposures which related to the amount of control, influence or autonomy that a participant could exert in how they perform their role.	
Examples: Carr et al[10] tested the effects of 'Decision authority' being the sum of questions: 'I feel I have control over what happens in most situations' and 'I have very little freedom to decide how I do my work' (reversed). Scores were on a scale of 1-7. Robroek 2015 et al[159] included an exposure called 'job control' which consisted of a sum score of five questions regarding work pace, execution of work, order of tasks, interruptions when needed and finding solutions. The highest quartile were regarded as having low job control.	

Job prospects	4 Exposures
Description: Job prospects collected exposures that measured the extent to which a participant perceived that they could develop or be promoted within a role.	
Example: Schnalzenberger et al[24] utilised a single item from the Siegrist ERI model 'My job promotion prospects/prospects for job advancement are poor' to establish 'poor job prospects,' on a four-point scale. Van Solinge et al 2014[114] tested the effects of an exposure called 'growth opportunities' this was a mean derived from answers to three questions: 'my work offers ample opportunities for promotion,' 'My job now offers few opportunities for growth,' and 'I have more or less reached a dead end in my work.'	

Job satisfaction	19 Exposures
Description: This category included exposures in which the participant was asked to comment on their overall satisfaction with their job/work. The exposures were concerned with general or overall feelings towards the role, rather than focussing on any individual aspect of the work.	
Example: De Preter et al 2013b[13] measured 'job satisfaction' on a six point scale ranging from 1-6 with 1 being 'not satisfied' and six being 'fully satisfied.' Kubicek et al's[145] job satisfaction consisted of answers to a single question 'All things considered, how satisfied are you with your job as a whole? With answers on a four-point scale from very dissatisfied to very satisfied.	

Job security	3 Exposures
Description: The job security category gathered together exposures that measured the participant's perceived likelihood of keeping or losing their role with their current employer.	
Example: Lund et al[136] tested the effects of an exposure called job insecurity, composed of answers to four questions with yes/no answers. The questions established whether the participants were worried about: becoming unemployed; new technology making them redundant; difficulty finding another occupation; and being transferred against their will. Schnalzenberger et al[24] explored the effects of an exposure called 'poor job security.' This was based on the response to the question 'My job security is poor' with answers ranging from 'strongly agree' to 'strongly disagree.'	

Organisational change	6 Exposures
Description: This category included exposures that indicated whether the participant had experienced changes in their workplace. The range of these changes was wide from individual management change to organisational restructures.	
Example: Breinegaard et al[98] utilised four organisational change exposures gathering the data through internet-based surveys targeted at head of work units. Therefore, a unit-head could answer on behalf of all their employees. Data was gathered on: whether there had been a change of management, and whether the work unit had, merged, demerged or relocated in a period of two years and three months. De Wind et al 2014[117] explored two restructuring exposures based on answers to the same question: 'Has enterprise restructuring occurred in the past 12 months?' Answers were 'no,' 'yes with compulsory redundancies' and 'yes without compulsory redundancies.' No restructures was used as the comparator and the restructures with, or without, redundancies forming the two exposures.	

Organisational justice	4 Exposures
Description: This category arose from three Danish studies which measured the participant's perception of fairness at their workplaces. The three studies used similar items, but those items were combined in different ways to form different exposures.	
Examples: Breinegaard et al[98] explored the effects of an exposure called 'organisational justice' which comprised answers to six questions concerning: being informed; receiving information; trust in information from management, management trust of employees, conflict resolution and distribution of work. A composite scale was constructed with measurements ranging from 1-100. Lund et al[136] included an exposure called 'predictability' consisting of two of the same questions used by Breinegaard namely being informed and receiving information, again formed into a composite scale of 1-100. Thorsen et al[160] included an exposure called 'organisational justice' which is based on two items on conflict resolution and work distribution (both of which were used by Breinegaard). A five-point response scale was used.	

Perceptions of culture of working at older ages	5 Exposures
Description: This category included exposures that explored the culture within a workplace specifically relating to older workers, including peer retirement and whether the employer or staff were supportive of working to older ages.	
Example: De Wind et al 2015[152] included an exposure called 'attitude of colleagues/supervisor about working until age 65.' This was a composite of two questions: 'Do your colleagues think it is important that you continue working until the official retirement age?' and 'Does your supervisor think it is important that you continue working until the official retirement age?' Five responses were available ranging from 'very unimportant ' to 'very important.' Van Solinge et al 2014[114] tested the effects of an exposure called 'peer retirement' which consisted of answers to one item namely ' all my colleagues are retiring early'. Answers were on a five-point scale ranging from 'fully agree' to 'totally disagree.'	

Physical demands	19 Exposures
Description: The physical demands category drew together all exposures that related to work-based physical requirements or physical demands of the job. Although the names given to the exposures usually indicated that they should belong in this category, the items used to measure the exposures were wide ranging.	
Examples: Robroek et al 2013[12] measured physical demands using a single item 'my work is physically demanding. Would you say you strongly agree, agree, disagree or strongly disagree?' Those who strongly agreed were considered to have physically demanding jobs. De Wind et al 2015[152] included an exposure called physical job demands which consisted of answers to five items on use or force, use of vibrating tools, awkward postures, prolonged standing and prolonged squatting. Answers were given on a five-point scale ranging from 'always' to 'almost never'.	

Psychosocial Job demands	28 Exposures
Description: This category collected the exposures which measured psychosocial job demands (other than overtly physical strains). Pressure, stress, mental demands and quantitative demands were all included, making the category relatively wide.	
Example: Van Den Berg et al[162] investigated the effects of an exposure called 'High time pressure at work.' This was measured via a single question from Karasek's[163] Job content questionnaire (JCQ), namely 'I'm under constant time pressure due to a heavy workload' Robroek et al 2015[159] tested the effects of 'work demands' which consisted of answers to two questions regarding working at a high pace and working under time pressure with answers on a three point scale. Sum scores in the lowest quartile were considered to have high work demands.	

Social support	15 Exposures
Description: Social support included exposures that related to interactions with workmates and the levels of support perceived by the participants. These exposures were wide ranging covering general work atmosphere through to direct support from managers.	
Examples: Carr et al[10] tested the effects of an exposure called 'social support' which consisted of a single item 'I receive adequate support in difficult situations' in which participants agreed or strongly agreed they were coded as having high social support. Lund et al's[136] exposure entitled 'social support' consisted of answers to four questions concerning support from colleagues, colleagues listening to problems, support from supervisor and supervisors listening to problems. Answers were on a five-point scale.	

Training	4 Exposures
Description: Training is the availability, or receipt of, work-based training.	
Examples: Van Solinge et al 2014[114] included a 'perceived schooling opportunities' exposure consisting of one item 'if you want additional training/schooling in my company this can always be arranged.' Responses were on a five-point scale ranging from completely agree to completely disagree. De Preter et al 2013b[13] utilised an exposure 'vocational or training course' which asked a single dichotomous item 'have you been following a vocational or training course since January last year?'	

Work ability	7 Exposures
Description: Work ability includes exposures concerned with the participant's perceived ability to undertake their work or role.	
Examples: McGonagle et al[157] explored the effects of 'perceived work ability' which consisted of four items concerning current work ability compared to lifetime best and current work ability to meet the physical, mental and interpersonal demands of work. The response scale ranged from 0 'cannot currently work at all' to 10 'work ability at its lifetime best.' Tuominen et al[161] also included an exposure of 'perceived work ability' on a scale of 0-10 where 0-6 was considered poor and was also used as the comparator, 7-8 considered moderate and 9-10 considered good.	

Others	9 Exposures
Description: This category included the residual exposures that were unique and/or incomparable with any of the other categories. Although gathered together they should not be considered interrelated.	
Examples: Midtsundstad et al[74] explored the effect of the presence of a HR manager (yes/no) primarily as a control in their paper, but reported individual results for the exposure. Angrisani et al[149] included an exposure 'job requires use of computers' based on one item establishing use of computer on a four-point scale: 1, almost all the time to 4 almost none of the time.	

4.3.9   Risk of bias results

Table 4-6 summarises the results of the risk of bias checks on the included papers. In the overall risk of bias assessment, 18 papers were rated as '+' indicating a low risk, 10 were rated as '+/-' indicating a medium risk of bias, whilst two were rated as '-' indicating a higher risk of bias.

In addition, papers were given an overall rating based on their relevance or generalisability to the study question. Eleven were rated '+' meaning they were of relevance to the study questions and notionally results from these studies may well have a parallel with work transitions both generally and in older workers in the UK. Seven were rated '+/-'; meaning that they had limited generalisability to other studies of work transitions. Twelve were rated '-' meaning that they had little discernible applicability to work transitions in the wider population. In most cases this rating was applied because of the very specific nature of some cohorts, e.g. Australian post-SPA age doctors (Joyce et al[154]), Danish women aged 59 employed as day-care teachers (Gortz[153]), or Danish nurses (Friis et al[133]). Some papers gave few details on the makeup of the cohort so that generalisability was difficult to assess (e.g. Angrisani et al[149]). It should be noted that this rating was not indicative of the quality of the study but rather the applicability to the study question in the current review.

Two studies (Gortz[153] and Lee et al[156]) were rated as minus for both overall risk of bias and relevance to the study question so that they provided the least compelling evidence in the review.

Eleven studies were rated as plus for overall risk of bias and relevance to the study question. The combination of higher methodological quality and higher relevance to the study question was relatively rare.

4.3.10   Risk of bias results table

Table 4-6   HEAF FIRST systematic review, risk of bias results for the included studies

Study	Author	Q1 Study Question	Q2 Population defined	Q3 Response rate	Q4 Dropout rate	Q5 drop out comparison	Q6 Descriptives	Q7 Incl/Exc	Q8 Outcome defined	Q9 Outcome reliability	Q10 Other outcomes excluded	Q11 Exposures defined	Q12 Exposures valid	Q13 Confounders	Q14 Confidence intervals	Q15 Evidence	Q16 Generalisable	Overall RoB	Overall Relevance
1	Angrisani	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	CS	CS	Yes	Yes	No	+/-	-
2	Breinegaard	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	No	+	-
3	Carr	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	No	No	Yes	CS	Yes	Yes	Yes	Yes	+	+/-
4	Dal Bianco	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	+/-	+/-
5	Damman 2011	Yes	Yes	Yes	Yes	No	No	Yes	Yes	CS	Yes	CS	CS	CS	Yes	Yes	No	+/-	-
6	Damman 2015	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	CS	CS	Yes	CS	Yes	Yes	Yes	No	+/-	-
7	De Preter 2013a	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	CS	Yes	No	Yes	Yes	Yes	Yes	+	+
8	De Preter 2013b	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	No	Yes	Yes	+	+
9	De Wind 2014	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	+	+
10	De Wind 2015	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	CS	CS	No	Yes	Yes	+	+
11	Friis	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	+	-
12	Gortz	Yes	Yes	N/A	N/A	N/A	No	Yes	Yes	Yes	Yes	Yes	No	No	No	CS	No	-	-
13	Hermansen	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	CS	Yes	CS	Yes	No	Yes	Yes	+	+
14	Joyce	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	Yes	No	+/-	-
15	Kim	Yes	Yes	N/A	No	No	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	Yes	No	+/-	-
16	Kubicek	Yes	Yes	N/A	No	Yes	Yes	Yes	Yes	CS	CS	Yes	CS	No	No	Yes	No	+/-	-

Study	Author	Q1 Study Question	Q2 Population defined	Q3 Response rate	Q4 Dropout rate	Q5 drop out comparison	Q6 Descriptives	Q7 Incl/Exc	Q8 Outcome defined	Q9 Outcome reliability	Q10 Other outcomes excluded	Q11 Exposures defined	Q12 Exposures valid	Q13 Confounders	Q14 Confidence intervals	Q15 Evidence	Q16 Generalisable	Overall RoB	Overall Relevance
17	Lee	Yes	CS	N/A	No	No	No	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	No	-	-
18	Lund	Yes	Yes	N/A	N/A	N/A	No	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	+	+/-
19	McGonagle	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	+	+
20	Midtsundstad	Yes	Yes	N/A	N/A	N/A	Yes	N/A	Yes	Yes	Yes	Yes	CS	Yes	No	Yes	Yes	+	+
21	Mortelmans	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	CS	CS	CS	Yes	Yes	Yes	Yes	+/-	+/-
22	Pengcharoen	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	CS	No	CS	CS	Yes	Yes	CS	+/-	-
23	Robroek 2013	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	+	+
24	Robroek 2015	Yes	Yes	CS	Yes	CS	CS	Yes	Yes	Yes	Yes	Yes	CS	Yes	Yes	Yes	Yes	+	+/-
25	Schnalzenberger	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	+	+
26	Thorsen	Yes	Yes	Yes	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	+	+
27	Tuominen	Yes	Yes	Yes	N/A	N/A	No	Yes	Yes	Yes	CS	No	CS	Yes	Yes	Yes	CS	+/-	-
28	Van den Berg	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	+	+
29	Van Solinge 2010	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	CS	Yes	CS	Yes	Yes	Yes	CS	+	+/-
30	Van Solinge 2014	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	CS	Yes	CS	Yes	Yes	Yes	CS	+	+/-

Yes = Criteria fulfilled, No = criteria not fulfilled, N/A = Not applicable, CS = Cannot say. + = low risk of bias or high relevance, +/- = moderate risk of bias or moderate relevance, - = high risk of bias or low relevance.

4.4 Work-related exposures investigated in relation to retirement outcomes

26 of the papers found at least one work-related exposure that significantly associated with the risk of retirement. Of the papers with no significant results; Kim et al[155] and Pengcharoen et al[158] both utilised the same cohort (HRS) and very similar time periods, 1992-2000 and 1992-2002 respectively. Both datasets were collected very early in the time limits for this review and therefore may represent retirement mainly in the 1990s rather than post 2000. Robroek et al 2015[159] also found no significant associations between work factors and the risk of retirement using the definition of this review. However, one exposure (job control) was extremely close to statistical significance. De Preter et al 2013a[151] had only one exposure extracted (job satisfaction) and so in isolation does not provide evidence that work-related factors do not influence retirement decisions.

In the following tables, the categories of work-related exposures defined in Table 4-5 have been organised to show whether an exposure increased the likelihood of retirement, decreased the likelihood of retirement or was not statistically significantly associated in the published paper. Overall results from the risk of bias assessment are shown on the right:

RoB = overall risk of bias, + = low risk of bias, +/- = moderate risk of bias, - = high risk of bias.

Rel = overall relevance or generalisability of described cohort to the study question. + = high relevance, +/- = moderate relevance, - = low relevance.

4.4.1 **Age discrimination results**

Table 4-7   HEAF FIRST systematic review papers that measured the association between age

discrimination and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
01. Angrisani	Age discrimination (present)	**+/-**	**-**
26. Thorsen	Age discrimination (present)	**+**	**+**

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
10. De Wind	Age discrimination	**+**	**+**
15. Kim	Age discrimination (present)	**+/-**	**-**

Thorsen et al[160] found that age discrimination (measured by a single question from the
Copenhagen Psychosocial scale) was significantly associated with the risk of early retirement in a
Danish cohort. Similarly, Angrisani et al[149] found that age discrimination was associated with an
increased risk of retirement measured with two questions in the US Health and Retirement study
(HRS).

In contrast, Kim et al[155] found that age discrimination (measured by a single question in the US
Health and retirement study) was not significantly associated with the risk of retirement.
Similarly, De Wind et al 2015[152] found that age discrimination (measured with three items from
the Nordic Age discrimination scale) was not directly associated with the risk of early retirement
in the Dutch STREAM cohort.

Angrisani et al[149] and Kim et al[155] both conducted studies on the US Health and Retirement study
but it should be noted that the data used by Kim et al[155] related to much earlier retirements
dating from 1992-2000. It is possible that age discrimination was less of a factor in the earlier
period due to the relatively more straightforward retirement processes in place at the time and
without the recent drive for older workers to remain in the workplace.

Summary: Although four separate studies included 'age discrimination' as a risk factor for
retirement, the concept was captured with one, or at the most three, single-item questions which
asked people about their perception of age discrimination. Overall, the review found inconclusive
evidence as to whether age discrimination is associated with an increased risk of retirement. One
of the better quality, more relevant papers found it made retirement more likely whilst no effect
was found in another higher quality, equally relevant paper.

4.4.2   Age–related HR practices

Table 4-8   HEAF FIRST systematic review papers that investigated the association between age-related HR practices and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
13. Hermansen	Additional Leave	+	+

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
20. Midtsundstad	Inclusive working life measures	+	+

Two included papers examined the effects of age-related HR practices on the risk of retirement. Hermansen[134] and Midtsundstad et al[74] both looked at the risk of taking early retirement using the Norwegian contractual retirement (AFP) scheme. Midtsundstad et al[74] investigated whether the employer had enacted special policies for older workers such as bonuses, reduced working hours, or extra days off, but found no significant effect on retirement behaviour. Hermansen[134] found that where employers had offered older workers five or more days extra annual leave, this had a significant effect, reducing the likelihood of retirement by over 5% over two years.

Notably the risk factor in Midtsundstad et al[74] is access to a range of possible policies whereas Hermansen[134] investigated one rather more specific exposure.

Summary: Few studies have investigated age-related HR practices and their impact on retirement so that the evidence is limited. Access to a range of possible policies was not found to be associated with the risk of retirement. However, one good quality paper found that increased annual leave of ≥5 days per annum for older workers reduced the risk of retirement.

4.4.3   Appreciation results

Table 4-9   HEAF FIRST systematic review papers that investigated the association between appreciation and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
3. Carr	Recognition (low)	+	+/-
26. Thorsen	Low recognition from management	+	+

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
9. De Wind	Higher Appreciation	+	+
25. Schnalzenberger	Receives recognition (women)	+	+

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
10. De Wind	Appreciation	+	+
18. Lund	Low reward in work	+	+/-
25. Schnalzenberger	Receives recognition (men)	+	+

Seven of the included papers investigated the effects of appreciation or recognition in the workplace as a factor in retirement decisions.

In De Wind et al 2014[117] more appreciation was significantly associated with reduced odds of early retirement with a relatively large effect size (OR 0.58, 0.42-0.79 95% CI). This can be contrasted with De Wind et al 2015[152] where the authors found no direct effect of appreciation on the risk of early retirement but found that it influenced mediating exposures (work ability and attitude of colleagues/supervisor to working until 65) that, in turn, were significantly associated with retirement. Both analyses were conducted in a similar timeframe in the STREAM cohort. Therefore, the results are not entirely contradictory given that De Wind et al 2015[152] found that appreciation was still relevant to early retirement, albeit in this case on the pathway rather than directly significantly associated.

Schnalzenberger et al[24], the only paper in this category that separated analyses by sex, found that higher levels of appreciation reduced the likelihood of retirement in women but not men.

Carr et al[10] reported greater likelihood of work exit when the participants reported poor levels of recognition in a UK cohort (OR 1.23, 1.1-1.43, 95% CI), and Thorsen et al[160] reported a similar result in a Danish cohort (HR 1.69, 1.13-2.52 95% CI) in which the exposure used was poor levels of appreciation from management.

In contrast Lund et al[136] and colleagues reported that low levels of 'reward' were not associated with retirement. This exposure combined two questions on appreciation (one of which was the same used by Thorsen et al[160]) with a question on 'prospects' to define 'low reward'. The addition

of prospects into the measure perhaps renders the result unhelpful. Both Thorsen et al[160] and Lund et al[136] used a very similar study design and a Danish cohort, however Lund's data were from an earlier period (2000-2004) and Thorsen used a more contemporary dataset (2008-2012). Indeed, the result in Thorsen et al[160] was significantly associated despite the extracted data model possibly being over-adjusted and therefore understating the effect.

Summary: Perceived appreciation and/or recognition in the workplace has been investigated seven times in included studies. The review identified four papers which suggested that appreciation at work could affect retirement decisions (two showing that more appreciation/recognition reduced risk of retirement and two showing that less appreciation/recognition increased the risk of retirement). Setting aside Lund et al, one paper found no effect of appreciation/recognition on retirement and one found an effect only in women. Overall, there is enough evidence to suggest that higher appreciation could reduce the risk of retirement.

4.4.4   Effort-Reward Imbalance results

Table 4-10   HEAF FIRST systematic review papers that investigated the association between effort reward imbalance and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
04. Dal Bianco	Poor job quality (men)	+/-	+/-
04. Dal Bianco	Bad stress (women)	+/-	+/-

Retirement less likely			
Paper	Exposure name	RoB	Rel
04. Dal Bianco	Good stress (women)	+/-	+/-
25. Schnalzenberger	ERI 2nd tertile (medium) (men)	+	+

No significant Association			
Paper	Exposure name	RoB	Rel
04. Dal Bianco	Poor job quality (women)	+/-	+/-
04. Dal Bianco	Good stress (men)	+/-	+/-
04. Dal Bianco	Bad stress (men)	+/-	+/-
23. Robroek	ERI: low rewards high efforts	+	+
25. Schnalzenberger	ERI 3rd tertile (high)- women	+	+
25. Schnalzenberger	ERI 3rd tertile (high)- men	+	+
25. Schnalzenberger	ERI 2nd tertile (medium)– women	+	+
28. Van Den Berg	Effort Reward Imbalance	+	+
Related exposures, No significant Association			
Paper	Exposure name	RoB	Rel
23. Robroek	Low rewards	+	+

The effort reward imbalance model as proposed by Siegrist[139] is introduced in depth at para 5.2.3.6.

Variants of the effort-reward imbalance model were investigated in four of the included papers, all of which utilised the pan-European SHARE cohort. Dal Bianco et al[11] constructed three exposures from seven questions. 'Poor job quality' balanced stress and physical demands against freedom, skills, support, recognition and security, (note that freedom is a concept from the JDC model, not usually used in the ERI model). This was found significantly associated with an increased risk of retirement in men, but not women. The paper also balanced stress against the same five reward elements to create 'good stress' and 'bad stress' exposures. This was to identify jobs with high stress and good support and those with high stress and no support. The good and bad stress associated significantly with retirement in the expected directions for women but not men, although the effect size made very little difference when the final marginal change was calculated. Notably Dal Bianco et al[11] explored this exposure over the longest follow up time (seven years).

Van Den Berg et al[162] found no association at univariate level using a similar seven-item balance but with slightly different questions (salary and prospects in place of freedom and skills) and a shorter follow up (2 years). Van Den Berg's exposure compared the upper tertile (higher ERI,) with the lower two tertiles as the comparator. Schnalzenberger et al[24] utilised the same measurement tools in the same cohort over the same time period. However, Schnalzenberger defined the first tertile (low ERI, better job) as the comparator and explored second tertile (medium ERI) and third tertile (high ERI, worse job) as separate exposures. Schnalzenberger et al[24] generally found no significant association with retirement for the ERI exposures but with an anomalous and counter-intuitive significant association with mid-level ERI in men significantly reducing the risk of retirement. With a longer follow-up (5 years) Robroek et al 2013[12] found a similar non-significant result and in addition used the five reward items as a separate exposure, again finding no association.

Summary: Perceived ERI and variants of the same construct were investigated in four included papers but using a restricted sample of the validated ERI questions which varied between studies and different analysis approaches within the same cohort. The results are therefore inconsistent and difficult to interpret. Overall, the currently available evidence points to a limited effect of this construct on retirement decision-making.

4.4.5   Flexible hours

Table 4-11   HEAF FIRST systematic review papers that investigated the association between flexible working hours and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
1. Angrisani	Employee cannot reduce hours of work	**+/-**	**-**

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
17. Lee	Flexibility of hours (present)	**-**	**-**

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
22. Pengcharoen	Work schedule inflexibility item 1	**+/-**	**-**
22. Pengcharoen	Work schedule inflexibility item 2	**+/-**	**-**
30. Van Solinge	Working times/Workplace flexibility	**+**	**+/-**
Related exposures, No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
30. Van Solinge	Phased retirement	**+**	**+/-**

Angrisani et al[149] found that employees who could not reduce hours of work were 3% more likely to move into retirement in the HRS cohort. In South Korea, Lee et al[156] found that being in an industry that offered flexible hours made a participant less likely to retire. However Lee et al[156] also acknowledged the limitations of the exposure, which is based on the proportion of workers per industry who reported a 20% drop in hours during the study, which is an imprecise measure of flexibility.

In Pengcharoen et al[158] work schedule inflexibility was not associated with 'complete retirement' compared with 'not retired at all.' However, those who could not reduce their work schedule were 38% more likely to be completely retired and less likely to be partially retired. This suggests that flexibility still had a significant role to play in retirement decisions, albeit that the multi-outcome nature of the study restricted the conclusions for the purpose of this review.

Van Solinge et al 2014[114] used a measure composed of four questions which measured flexibility in hours. These cross over slightly with questions more usually used in workplace control exposures such as the ability to work from home or choosing start times. Nonetheless the authors found that this flexibility exposure was not associated with retirement, albeit in the relatively restricted NIDI cohort.

A related exposure is that of 'availability of phased retirement.' Van Solinge et al 2014[114] found that those who were involved in a phased retirement programme at baseline planned to retire earlier. However, when tested longitudinally, phased retirement had no significant effect upon retirement behaviour.

Summary: The availability of flexible working hours was explored as a risk factor for retirement decisions in in four included papers, with inconsistent results. Unfortunately, the definition of 'flexibility' varied in each of these studies and indeed interpretation of the results varied also. In consequence, there is currently limited evidence to suggest that availability of a phased retirement or flexible working hours does/does not affect the timing of retirement. The results are further restricted due to the relatively restricted cohorts utilised.

4.4.6 Irregular hours

Table 4-12   HEAF FIRST systematic review papers that investigated the association between irregular hours and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
None			

Retirement less likely			
Paper	Exposure name	RoB	Rel
11. Friis	Rotating shift patterns (women)	+	-
11. Friis	Evening work (women)	+	-

No significant Association			
Paper	Exposure name	RoB	Rel
11. Friis	Night work (women)	+	-
30. Van Solinge	Irregular working hours	+	+/-

The presence of irregular hours i.e., night shifts or rotating shifts in relation to retirement was only investigated in two included studies.

Friis et al[133] found mixed associations with retirement behaviour in a cohort of nurses. Using day work as the comparator, nurses who worked in the evening or had rotating shift patterns were less likely to retire, whilst doing night work was not associated with retirement. This is a relatively unique finding which could be seen as counterintuitive. Given the narrow cohort (Danish women, nurses) the results cannot be generalised to all workers.

Van Solinge et al 2014[114] defined irregular working hours as undertaking shift or evening/night work and found no significant association with retirement. Again, this is a relatively restricted cohort (NIDI) that is perhaps not generalisable to all workers.

Irregular hours are widely considered a negative feature of work. Therefore, it is perhaps surprising that only two studies examined this aspect in relation to retirement meaning no conclusion can be reached on their effects. It is possible that the presence of irregular working hours in itself, is not a factor in retirement decisions, but that suitability of the hourly pattern to the participants is prime.

Summary: As only two included papers investigated the effect of irregular hours on retirement decisions, no overall conclusion can be drawn. The nature of the restricted cohorts in the papers also limits the generalisability of the reported results. Data on this exposure among men were very limited.

4.4.7 Job control

Table 4-13 HEAF FIRST systematic review papers that investigated the association between job control and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
11. Friis	Low Influence (women)	+	-
23. Robroek	Job control (low)	+	+
28. Van Den Berg	Lack of job control	+	+

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
3. Carr	Decision authority (higher)	+	+/-
16. Kubicek	Job Resources (higher)	+/-	-

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
9. De Wind	Autonomy	+	+
18. Lund	Low decision authority	+	+/-
24. Robroek	Low job control	+	+/-
26. Thorsen	Low influence	+	+
Related exposures, No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
18. Lund	Low skill discretion	+	+/-

The concept of job control is exemplified in Karasek's job demand control model of job strain[121] (see para 5.2.3.6 for more details). The validated Karasek[163] model considers the imbalance of control or autonomy as compared with demands. In the current review, we identified nine included studies which evaluated the impact of perceived 'control' as a standalone exposure.

Friis et al[133] found that low influence at work was associated with an increased hazard of retirement amongst Danish nurses, however as noted previously the narrow scope of the cohort meant that generalisation should be approached cautiously. Robroek et al 2013[12] defined low job control using two items from Karasek's[163] job content questionnaire and found an association with retirement in a multivariate model with multiple outcomes. (HR 1.30, 1.08; 1.57 95% CI). Finally Van den Berg[162] found that lack of job control (two items combined, freedom to decide how to work and opportunities to develop new skills) was associated with retirement at an unadjusted,

univariate level, (whilst not presenting adjusted figures for this exposure). It should be noted that Robroek et al 2013[12] and Van Den Berg et al[162] performed their analyses within the same cohort.

Testing higher decision authority (two items combined, 'I feel I have control over what happens I most situations, and 'I have very little freedom to decide how I do my work'), Carr et al[10] found that this was associated with decreased odds of retirement. 'Job resources' tested in Kubicek et al[145] (two items combined, control over working hours and education required for the role) was found to have had an indirect effect on early retirement, operating through job satisfaction and work-related health, to affect retirement.

De wind 2014[117] found no association between retirement and autonomy, defined using five questions from Karasek's[163] job content questionnaire and, as such, is closest to using the validated scale. The study had a low risk of bias but only used a follow up period of one year and was focused on early retirement.

Similarly, Lund et al[136] found no significant association between 'low decision authority' and retirement. However, in a simpler statistical model, the exposure was significant and became non-significant only after mutual adjustment for multiple work exposures. It is possible that the exposure shows multicollinearity with some of the other exposures in the model which may have masked any effect. The sample size, n=365, is also the smallest in the review. Lund[136] also tested a very similar exposure called 'low skill discretion' (4 items combined on variability of work, initiative required, learning new things, and use of skills and expertise) This had no significant association with early retirement in the final model to the specified p<0.05, although the reported results suggest it came very close (OR 1.09, 1.00; 1.19 95% CI, p=0.05), whilst also showing a significant association with retirement in less adjusted models.

In Robroek et al 2015[159], low control was measured with five items, including the participant's influence and ability to execute their work as they saw fit. Again, although the exposure was not associated with retirement to the specified p<0.05, the effect size and confidence intervals suggested that it came extremely close (HR 1.15, 1.00; 1.32 95% CI). Notably the competing risks analysis used had five possible outcomes, which may have reduced power.

In Thorsen et al,[160] low influence was significantly associated with early retirement in models adjusted for several possible confounders but became non-significant when mutually adjusted for 15 other work factors. The extracted model is stated to be over-adjusted and therefore the result is not strong evidence of a non-effect.

Summary: Nine papers evaluated the influence of perceived job control or autonomy, five of which found a significant association. In three studies, perceived low job control /lack of job

control was associated with an increased risk of retirement although a fourth found a similar trend which did not attain statistical significance. More job resources or high decision authority were found to significantly reduce the risk of retirement in two papers. Overall, there is sufficient consistency among the results of the included studies to suggest that high levels of perceived control reduce the risk of retirement and that low perceived control increases the risk of retirement, although this was not found in all of the included studies.

The JDC model balances job demands against job control, with control regarded as a positive aspect of work. In this model job control is effectively mitigating the strain of job demands, reducing strain on the worker. However, the results of this review suggest more control could reduce retirement in its own right, even when investigated outside of more complex models which balance control with demands.

4.4.8 Job prospects

Table 4-14   HEAF FIRST systematic review papers that investigated the association between job prospects and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
26. Thorsen	low possibilities of development	+	+

Retirement less likely			
Paper	Exposure name	RoB	Rel
30. Van Solinge	Growth opportunities	+	+/-

No significant Association			
Paper	Exposure name	RoB	Rel
25. Schnalzenberger	Poor prospects (men)	+	+
25. Schnalzenberger	Poor prospects (women)	+	+

Under this category of 'job prospects', exposures relating to opportunities to develop or be promoted within a role were grouped. According to the ERI model, opportunities to develop in a job are regarded as positive aspects which are offset by the individual against negative aspects namely the effort that they perceive they are required to expend.

Thorsen et al's[160] 'low possibilities of development' exposure consisted of two questions asking about 'initiative' and 'the possibility to learn new things'. Low development opportunities were significantly associated with an increased risk of retirement (HR 1.98, 1.20; 3.27 95% CI). The exposure 'growth opportunities' in Van Solinge et al 2014[114] was slightly more focused on promotion with three items asking about promotion, growth and dead-end work. Higher scores for this were associated with a significantly lower hazard of retirement. Both these results were in

the expected directions and in the case of Thorsen[160] were significant, despite the model being potentially over-adjusted.

In contrast Schnalzenberger et al's[24] 'prospects' exposure which was focussed on promotion/advancement showed no association with retirement among men or women. Although the cohort in Schnalzenberger et al[24] was large, the study may have lost some precision due to the six possible outcomes and further splitting the analysis by biological sex.

Future prospects and are clearly a positive feature of employment, featuring a 'reward' in the ERI scale. However, it is possible that these aspects of 'future' employment are a feature valued earlier on in career trajectories and that older workers are less motivated by the prospects of future rewards. However, the results from this review has identified examples of prospects having a significant association with retirement decisions, which suggest that, at least in part, older workers are not disconnected with these aspects.

Summary: Only three included papers considered this exposure as a factor in retirement decision-making. There was some evidence to suggest that perceived opportunities for growth/development could postpone retirement and indeed that perceived lack of such opportunities could almost double the risk of retirement during follow-up but more studies are required using consistent case definitions.

4.4.9   Job satisfaction

Table 4-15   HEAF FIRST systematic review papers that investigated the association between job

satisfaction and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
21. Mortelmans	Higher job satisfaction	**+/-**	**+/-**
26. Thorsen	Low job satisfaction	**+**	**+**

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
4. Dal Bianco	High job satisfaction (men)	**+/-**	**+/-**
8. De Preter	Positive job satisfaction (women)	**+**	**+**
14. Joyce	High job satisfaction (2009)	**+/-**	**-**
14. Joyce	High job satisfaction (2011)	**+/-**	**-**
16. Kubicek	Higher job satisfaction	**+/-**	**-**

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
4. Dal Bianco	High Job satisfaction (women)	**+/-**	**+/-**
7. De Preter	Poor job satisfaction	**+**	**+**
8. De Preter	Positive job satisfaction (men)	**+**	**+**
14. Joyce	High job satisfaction (2010)	**+/-**	**-**
14. Joyce	High job satisfaction (2012)	**+/-**	**-**
17. Lee	Job satisfaction	**-**	**-**
22. Pengcharoen	Job satisfaction	**+/-**	**-**
25. Schnalzenberger	Not satisfied (women)	**+**	**+**
25. Schnalzenberger	Not satisfied (men)	**+**	**+**
25. Schnalzenberger	Satisfied (women)	**+**	**+**
25. Schnalzenberger	Satisfied (men)	**+**	**+**

Job satisfaction was measured similarly in 10 of the included papers. Generally, it was measured by a single question in which participants self-rated their satisfaction with their role (Dal Bianco[11], Joyce et al[154], Kubicek et al[145], Mortelmans et al[104], Pengcharoen et al[158], Schnalzenberger et al[24]). Slightly different from this, Thorsen[160] asked participants how 'pleased' they were with their job.

One paper reported an increased risk of retirement during follow-up amongst those with greater job satisfaction at baseline(Mortelmans et al[104]). This was based on the large EC household panel dataset, albeit measuring retirement between 1995-2001 making it one of the least contemporary papers in this review.

Thorsen et al[160] found a significant association between reporting low levels of job satisfaction and an increased hazard of early retirement (HR 3.33, 2.36-2.70 95% CI). The paper considered this a mediating exposure; therefore, it was not entered into the final mutually adjusted model, which, in any event, the authors reported might be over-adjusted.

Dal Bianco et al[11] found that men had a reduced risk of retirement when job satisfaction was good whilst for women there was no significant association. In contrast De Preter et al 2013b[13] found a significant association for women and not men. De Preter et al's[13] cohort were very similar to those included in Mortelmans et al,[104] being the EC household panel between 1994-2001.

In a cohort of Australian doctors beyond state retirement age, Joyce et al[154] found that higher job satisfaction reduced the likelihood of retirement in two of the four years explored. However, the results for the other two years were non-significant with no overall trend presented in the paper. This was of course a highly specific cohort of workers, which may prevent generalisation to other types of workers.

Kubicek et al[145] found a significant association between reported good job satisfaction and a reduced likelihood of retirement. In Kubicek et al's[145] model, job satisfaction had a direct effect on retirement whilst many other aspects of work only had indirect effects on retirement mediated through job satisfaction, marital satisfaction and/or health.

Pengcharoen et al[158] did not find any significant associations between reported job satisfaction and retirement in the HRS cohort. In South Korea, Lee et al[156] did not present the results for job satisfaction but stated that they had little effect on retirement decisions. Given the specificity of the cohort, this finding is probably of limited relevance.

Schnalzenberger et al[24] found no significant associations between job satisfaction and retirement in the SHARE cohort in a model with six work outcomes which may have reduced precision. Using higher job satisfaction as the reference category, being unsatisfied was associated significantly with being less likely to be working among women. De Preter et al 2013a[151] found no significant association in the same cohort in the same time period.

Summary: Job satisfaction has been widely investigated as a risk factor for retirement usually based on a single-item question. Ten papers investigated the effect of job satisfaction on retirement decisions, six papers found at least some association. However contrasting results, sometimes within the same paper, render it impossible to draw overall conclusions.

Given the imprecise nature of job satisfaction, being an amalgam of many aspects of work, it is perhaps unsurprising that the data presented in the review has no consistent trends. In addition it is highly likely that job satisfaction is collinear with many other work-related factors, a problem recognised by Thorsen et al[160] who left satisfaction out of the final model presented and Kubicek et al[145] who treated job satisfaction as an intervening variable. As such the extracted data may be over-adjusted in other instances. Finally, job satisfaction is subject to change over time, and so measurements at baseline may not reflect job satisfaction at the point of retirement.

4.4.10   Job security

Table 4-16   HEAF FIRST systematic review papers that investigated the association between job security and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
18. Lund	Job insecurity (high)	+	+/-
25. Schnalzenberger	Poor job security (women)	+	+
25. Schnalzenberger	Poor Job security (men)	+	+

Two papers evaluated the effect of perceived job security on the likelihood of retirement, both finding no significant association. In Lund et al[136], high levels of job insecurity was a significant predictor of early retirement in a minimally adjusted model but the significance was attenuated when adjustments for other work-related factors were made. Schnalzenberger et al[24] found no significant associations with retirement for either men or women, however, did find significant associations (effect size 9-14%) between poor job security and a decreased likelihood of working.

Ongoing job security is another positive feature of employment, again being classified as a 'reward' in the ERI scale. However, it is possible that this aspect of future employment matters less to people as they near retirement. In this respect there is a slight contrast with job prospects and training, both of which included results that were significantly associated with retirement.

Summary: With only two studies evaluating the effect of job security there is not enough evidence to categorically reject it as a factor in retirement decisions. However, both studies found no significant association between this factor and retirement.

4.4.11   Organisational change

Table 4-17   HEAF FIRST systematic review papers that investigated the association between
organisational change and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
2. Breinegaard	Change of management	+	-

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
2. Breinegaard	Merging Unit	+	-
2. Breinegaard	Relocation of unit	+	-
2. Breinegaard	De-merging unit	+	-
9. De Wind	Restructuring without redundancies	+	+
9. De Wind	Restructuring with redundancies	+	+

In De Wind et al 2014[117] participants were asked if enterprise re-structuring had occurred at their employer within the past 12 months, with or without redundancies. Neither exposure found an association with early retirement. However, this was over a relatively short follow-up period of one year. Breinegaard et al[98] gathered the organisational change data from managers rather than participants. Managers' responses about a change of management were consistently associated with the risk of early retirement across all regression models (HR 1.27, 1.03-1.57 95% CI). Merging and relocating work units was significantly associated with early retirement even when adjusted for demographic, health and financial status but the significance was non-significant when further adjusted for psychosocial work environment. It is possible that collinearity was a factor and that this final model was perhaps over-adjusted. De-merging of a work unit showed no effect on retirement decisions.

Summary: Only two studies explored the effects of organisational change on retirement decision-making and they took different approaches. Only one study, reporting managers' views about a change of management, suggested an association with the risk of early retirement. Clearly more research is required to better understand the impact of organisational factors on the risk of retirement. It is however possible that organisational change will impact other factors explored in this systematic review such as control, job satisfaction etc.

Both studies measured change by reference to an organisational event rather than how the participant was affected by that event. Indeed, in Breinegaard et al[98] information on change was collected from managers so the views of the worker were even further removed from the measure. Therefore, it is also possible that the exposures tested could be further refined to

understand the effects of the organisational change. As it stands changes that are experienced positively and negatively are bound up in the same exposures meaning that the non-significant results are perhaps unsurprising.

4.4.12 Organisational justice

Table 4-18   HEAF FIRST systematic review papers that investigated the association between organisational justice /fairness and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
2. Breinegaard	Low organisational justice	+	-

Retirement less likely			
Paper	Exposure name	RoB	Rel
None			

No significant Association			
Paper	Exposure name	RoB	Rel
18. Lund	Low predictability in work	+	+/-
26. Thorsen	Poor predictability	+	+
26. Thorsen	Low organisational justice	+	+

This category includes three Danish studies that asked a battery of six questions on communication, work conflicts and work distribution combined into different exposures to measure perceptions of fairness or justice at work.

Breinegaard et al[98] used six questions including work distribution, communication of information and conflict resolution to form the concept of organisational justice. Low organisational justice was found to be associated significantly with higher risk of early retirement.

Thorsen et al[160] amalgamated two of the six questions, both on communication of information, into 'poor predictability' which showed no significant association. Lund et al[136] also tested predictability using the same two questions and again did not find any association.

In Thorsen et al[160] the questions on conflict and work distribution were amalgamated into 'low organisational justice' which was not found to be associated with early retirement. However, although both exposures in Thorsen were not found to significantly associate with retirement in the final statistical models, in simpler models, adjusted for demographics and health without mutual adjustment for other work factors, both predictability (HR 1.42, 1.01-2.00 95% CI) and justice (HR 1.55, 1.05-2.31 95% CI) were associated significantly with increased risk of retirement.

Summary: Three included studies explored the concept of perceived organisational justice in relation to retirement decision making. Only one study found a significant association between

perceived low organisational justice and risk of early retirement in their finally adjusted model (HR 1.27, 1.10-1.47 95% CI)) but similar trends were shown in earlier less adjusted models in the other study. There currently insufficient evidence to understand the role of perceived organisational justice in retirement decision-making.

4.4.13 Perceptions of the culture of working at older ages

Table 4-19   HEAF FIRST systematic review papers that investigated the association between perception of the culture of working at older ages and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
None			

Retirement less likely			
Paper	Exposure name	RoB	Rel
10. De Wind	Positive attitude of colleagues/supervisor to working until 65	+	+
30. Van Solinge	Supervisor support for working longer	+	+/-

No significant Association			
Paper	Exposure name	RoB	Rel
27. Tuominen	Employer's age policy (model 1)	+/-	-
27. Tuominen	Employer's age policy (model 2)	+/-	-
30. Van Solinge	Peer retirement	+	+/-

In this category, I grouped exposures that explored the perceptions of working to older ages within an organisation, including social norms such as peer retirement.

The exposure in De Wind et al 2015[152] encompassed two items describing whether colleagues or supervisors thought it important to work until 65. The outcome was early retirement and as such these questions represent working up to SPA rather than beyond it. Nonetheless the positive attitude of colleagues and managers towards working up until 65 was associated significantly with a decreased likelihood of early retirement.

Van Solinge et al 2014's[114] supervisor support exposure was very similar but concentrated on management being supportive of work until 65. Positive supervisor attitude was associated with a reduced hazard of early retirement. Again, this was an early retirement study, so was not measuring any aspect of working beyond the SPA. In the same study, 'peer retirement' was assessed by asking whether peers were all retiring early. This exposure was not found significantly associated with early retirement.

In a Finnish cohort, Tuominen et al[161] tested whether an employer supported employees to continue to work until the SPA. This was not significantly associated with retirement.

Summary: Although a small number of studies considered the effects of perceived culture of working at older ages, two studies reported a beneficial effect of a supportive later-working culture on preventing early retirement. Although inconclusive, it does seem likely that 'normalising' of working to older ages within workplaces could be an important factor in retaining more older workers in the future but that changing policies alone may be insufficient.

4.4.14   Physical job demands

Table 4-20   HEAF FIRST systematic review papers that investigated the association between physical job demands and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
11. Friis	High physical demands (women)	**+**	**-**
18. Lund	Extreme Bending twisting of neck back	**+**	**+/-**
18. Lund	Working mainly standing/squatting	**+**	**+/-**

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
16. Kubicek	physical job demands (higher)	**+/-**	**-**

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
1. Angrisani	Physical requirements	**+/-**	**-**
3. Carr	Physical demands	**+**	**+/-**
9. De Wind	Physical demands (high)	**+**	**+**
9. De Wind	Physical demands (medium)	**+**	**+**
10. De Wind	Physical demands	**+**	**+**
15. Kim	Physically demanding work	**+/-**	**-**
18. Lund	Work with arms lifted/hands twisted	**+**	**+/-**
23. Robroek	Physically demanding job	**+**	**+**
24. Robroek	High physical demands	**+**	**+/-**
25. Schnalzenberger	Physically demanding (women)	**+**	**+**
25. Schnalzenberger	Physically demanding (men)	**+**	**+**
27. Tuominen	Physical strain (model 1)	**+/-**	**-**
27. Tuominen	Physical strain (model 2)	**+/-**	**-**
28. Van den Berg	High physical demands	**+**	**+**
30. Van Solinge	Physically demanding work	**+**	**+/-**

Fourteen of the included papers investigated the effect of physical job demands on retirement decisions. The definitions varied widely and as such, collating the results did not necessarily produce a strong evidence base. For example Kubicek et al[145] used a measure that included 'how dirty do you get on your job?' whilst Angrisani et al[149] used a measure that included 'my job requires good eyesight.'

Friis et al[133] found that physical demands at work (one item, 'How would you describe the physical strain of your chief occupation?') was associated with early retirement in a cohort of Danish women employed as nurses, although with a small effect size (HR 1.08, 1.00-1.17 95% CI). In a relatively small cohort of 365, Lund et al[136] explored the effect of three specific physical exposures of which two, 'extreme bending twisting of neck/back' and 'working mainly standing/squatting,' were found significantly associated with early retirement. However, 'work with arms lifted/hands twisted' showed no association. Counter-intuitively Kubicek et al[145] (3 items combined: 'how frequently does your job require lots of physical effort?', 'how dirty do you get on the job?', 'How many hours per week do you spend working with your hands, tools or equipment?') found that more physical job demands indirectly decreased the risk of early retirement mediated through job satisfaction.

In contrast, 12 other papers found no association between physical job demands and retirement decisions. Angrisani et al[149] (four items combined: 'My job requires….. lots of physical effort' 'good eyesight,' 'lifting heavy loads,' and 'stooping/kneeling or crouching') Carr et al[10] (two items combined, 'my job is physically demanding' and 'level of physical exertion'). Both De Wind[117, 152] papers (six items combined, including 'regular use of force,' 'use of vibrating tools,' and 'prolonged standing') were not associated with retirement. However, in De Wind et al 2015[152] there was a suggestion that physical demands may affect early retirement through mediating variables ('work ability' and 'attitude of supervisors to later working'). Kim[155] (one item 'my job requires physical efforts'). Robroek et al 2013[12] (one item, 'my work is physically demanding') were not found significantly associated. Robroek et al 2015[159] (three items combined, 'physically demanding work,' 'work that makes the worker sweat or out of breath,' 'heavy lifting, pulling or pushing, or use of heavy machinery') found no association between this exposure and the risk of early retirement but did find an association between this exposure and accessing disability benefits. Schnalzenberger et al[24] (one item, 'the job is physically demanding') found that this exposure was not associated with retirement for either men or women. Tuominen et al[161] did not find 'physical strain at work' was associated with retirement. Van Den Berg et al[162] (one item, 'my job is physically demanding') found no association at the univariate level, Van Solinge et al 2014[114] (two items combined, 'is your work physically demanding?,' 'is your work characterised by many inconveniences at work?') found no association.

It should be noted that Robroek et al 2013[12], Schnalzenberger et al[24] and Van Den Berg et al[162] investigated these factors in the same cohort which somewhat reduces the cumulative weight of evidence.

Summary: From the included studies there is reasonable evidence that physical work demands (as measured) were not significantly associated with retirement behaviour. However, the ways in which physical work exposures were measured were heterogeneous with widely varying definitions. Some papers combined multiple items into the measure some of which are not immediately obvious physical strains. The exposure measures of physical strain rarely asked the effects of the strains upon the participant.

4.4.15   Psychosocial Job demands

Table 4-21   HEAF FIRST systematic review papers that investigated the association between other psychosocial job demands and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
11. Friis	High work Pressure (women)	+	-
16. Kubicek	Psychosocial job demands (high)	+/-	-
29. Van Solinge	Job pressures (high)	+	+/-

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

Related exposures, Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
1. Angrisani	Employer accommodates lighter work	+/-	-
5. Damman	Higher work challenge (men)	+/-	-
6. Damman	Higher work challenge (women)	+/-	-

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
1. Angrisani	Level of difficulty and stress	+/-	-
3. Carr	Psychosocial demands	+	+/-
9. De Wind	Job demands	+	+
10. De Wind	Job demands	+	+
11. Friis	Busy at work (women)	+	-
12. Gortz	Child to teacher ratio (women)	-	-
15. Kim	Mentally challenging work	+/-	-
18. Lund	Intensive quantitative demands	+	+/-
23. Robroek	High time pressure	+	+
24. Robroek	Job demands (high)	+	+/-
25. Schnalzenberger	Time pressure (high) (women)	+	+
25. Schnalzenberger	Time pressure (high) (men)	+	+
26. Thorsen	Quantitative demands	+	+
26. Thorsen	Work pace	+	+
27. Tuominen	Mental strain (high) (model 1)	+/-	-
27. Tuominen	Mental strain (high) (model 2)	+/-	-
28. Van den Berg	High time pressure at work	+	+
30. Van Solinge	Job pressure	+	+/-
Related Exposures, No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
18. Lund	High emotional demands	+	+/-
18. Lund	High demands of bottling up emotions	+	+/-
26. Thorsen	Emotional demands (high)	+	+
30. Van Solinge	Job Challenge	+	+/-

This category is made up of exposures relating to perceived psychosocial demands which include any measure of mental, quantitative or time or pace-related demands at work. This category does not include perceived physical demands, which were evaluated separately.

Nineteen papers evaluated job demands through 28 exposures, although these were measured in a variety of different ways with some potential duplication of cohorts. Six of these exposures demonstrated significant associations with the risk of retirement.

Friis et al[133] found a significant association between high pressure at work and an increased hazard of early retirement in a cohort of nurses. However, this result must be contrasted with the finding in the same paper that the perception of being 'busy at work' was not significantly associated (both were measured with single questions).

Kubicek et al[145] used a two-item measure that coupled 'time pressure' and 'intense concentration.' Here 'psychosocial job demands' (high) was associated indirectly with an increased likelihood of early retirement, operating through the central exposures of 'job satisfaction' and 'health.' Van Solinge et al 2010[148] used a three item measure of 'job pressure' (work tension, pushing oneself and workload) in which a higher score was associated with an increased risk of early retirement.

Angrisani et al[149] found that workers who could move to a less demanding role were less likely to retire. The same study also tested a two-item measure of increasing difficulty and stress at work which was found to be almost significantly associated with increased risk of retirement (P<0.1). 'Level of difficulty and stress' exerted a significant effect before mutual adjustment. Therefore, the two findings were not necessarily contradictory.

A related but distinguishable measure used by Damman et al[147, 150] was 'work challenge' measured by three items which enquired about challenging and boring tasks. Therefore 'work challenge' was framed as a positive aspect of work and indeed higher challenge was associated with a reduced likelihood of retirement in Damman et al 2011[150] and Damman et al 2015[147]. However both papers were conducted within the same cohort, the same as that used in Van Solinge et al 2010[148] and 2014[114]. Van Solinge et al 2014[114] found no significant association between the same exposure and risk of retirement.

In this category 22 job-demand or related exposures were found not significantly associated with retirement decisions. Robroek et al 2013[12], Schnalzenberger et al [24] and Van den Berg et al[162] found no associations with single item measures of time pressures and retirement in the SHARE cohort. Similarly De Wind et al 2014[117] and 2015[152] found no association with 'job demands' (4 items combined, scale from the JCQ) and retirement in the STREAM cohort. Working pace/time pressure were tested in Carr et al's[10] psychosocial demands exposure (two items combined, 'working speed' and 'time pressure'), and Robroek et al's 2015[159] 'job demands' (two items combined, work at high pace' and 'working under time pressure'), neither of were found to

significantly associate with risk of retirement. A slightly wider measure of 'job pressure' was utilised by Van Solinge et al 2014[114] (three items combined, relating to job pressure, inability to finish work and doing utmost to perform well) but again no significant association was found.

In Danish cohorts, Thorsen et al[160] and Lund et al[136] found no significant association between retirement and 'work pace' and 'quantitative demands.' This was a consistent finding through the univariate and multivariate models used in these papers.

Related to this, Thorsen et al[160] and Lund et al[136] also investigated the role of 'emotional demands' in the workplace which were measured by asking about emotionally demanding situations. Although the questions were slightly different between the two studies, neither found a significant association with retirement. The exposures in Kim et al[155] (one item, 'mentally challenging work' yes/no) and Tuominen et al[161] (one item, 'mental strain of work') focussed on mental strains with no significant results. Gortz[153] utilised a unique exposure highly focused on a specific cohort of teachers only ('child to teacher ratio') and also found no association with risk of retirement.

Summary: This category related to perceptions of demands, pressure and stress in the workplace. Although a large number of included papers had considered these as factors relevant to retirement decision-making, many different approaches were taken to their classification and measurement. There was some evidence to suggest that perceiving some mental challenge improves work retention amongst men and women. This emphasises the complexity of analysing job demands in isolation. The distinction between a demand (negative) and a challenge (positive) is likely to be highly subjective. It is therefore unlikely that a single measure of perceived job demands will be able to define a job or, by extension, determine retirement decisions.

Two studies among men and women (and one among women only) suggested a higher risk of retirement with greater levels of perceived demands or pressure. The only study that considered the perceived availability of 'lighter work' found that it reduced the risk of retirement. However, overall, most of the studies (13/19) found no significant effect of these variables in their final adjusted models. It would appear that some 'challenge' at work is good, as is offering lighter work to older workers but otherwise, the evidence seems to suggest that the effect of these factors in isolation is relatively small. However more research using consistent measurement methods is required.

4.4.16   Social Support

Table 4-22   HEAF FIRST systematic review papers that investigated the association between social support and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
2. Breinegaard	Low social capital	+	-
10. De Wind	Good support from colleagues/supervisor	+	+

Retirement more likely, related exposures			
Paper	**Exposure name**	**RoB**	**Rel**
2. Breinegaard	Lower quality of management	+	-

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
12. Gortz	High proportion of trained teachers (women)	-	-

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
3. Carr	Low social support	+	+/-
9. De Wind	Social Support	+	+
9. De Wind	Social atmosphere good	+	+
18. Lund	Low social support	+	+/-
25. Schnalzenberger	Receives adequate support (women)	+	+
25. Schnalzenberger	Receives adequate support (men)	+	+
26. Thorsen	Poor trust between colleagues	+	+
26. Thorsen	Poor social community	+	+
Related Exposures, no significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
18. Lund	Poor management quality	+	+/-
26. Thorsen	Poor trust in management	+	+
26. Thorsen	Poor leadership quality	+	+

In this category were exposures relating to support at work, social atmosphere and interactions with management.

Breinegaard et al[98] investigated two relatively complex exposures which they defined as 'quality of leadership' (four items combined, including 'help and support from your immediate superior' and 'your immediate superior is good at work planning') and social capital (eight items combined including 'work is distributed fairly' and 'you and your colleagues take responsibility for a good atmosphere and tone at your workplace'). Low social capital and low management quality were found to both increase the risk of early retirement.

In contrast De Wind et al 2015[152] reported that participants with better social support at work (four items, including how often colleagues and supervisors helped or supported them, and showed a willingness to listen to problems) were more likely to retire early. The authors

hypothesised that this may be because the measure failed to capture how supportive the work environment was but instead measured the support given at work in response to life events that pushed towards retirement. In De Wind et al 2014,[117] the same exposure measured in the same cohort was not significantly associated with early retirement in the final statistical model. However, in less adjusted models, good social support was found significantly associated with a reduction in the risk of early retirement. In addition, De Wind et al 2014[117] examined the effects of social atmosphere (an amalgam of 'good social climate' and 'appreciation'). Good atmosphere at work reduced the odds of retirement in early minimally adjusted models but was not significant in the final fully adjusted model.

The study of Gortz[153] used the percentage of trained teachers present in a day care setting as a proxy for social support, notionally giving the participants opportunities for professional discussions and support. They showed that where the percentage of trained teachers was higher, there was a significant reduction in the risk of early retirement. However, this finding should be regarded as having limited generalisability given the very specific work setting and nature of the measure.

Carr et al[10] investigated the effect of a single measure of general support at work and found no significant association with retirement after adjustment for other work factors. However, Carr et al's measure of 'low social support' was significantly associated with increased risk of work exit in earlier statistical models, adjusted for demographics and health.

Lund et al[136] investigated a four-item measure of social support including support from colleagues and supervisors and also evaluated 'management quality.' Neither were found to show any significant association with retirement. In another Danish cohort, Thorsen et al[160] investigated 'poor trust in management' (single item concerning trusting information from management), 'poor social community at work' (single item on atmosphere), 'poor trust between colleagues' (single item on withholding information from colleagues) and 'poor leadership quality' (two items combined on management's planning ability and giving priority to job satisfaction). None of these factors were found significantly associated in the final model. However, the authors have reported that they believe this final model to be over-adjusted. In a less adjusted model, adjusted for demographics and health, 'poor trust in management' and 'poor leadership quality' were significantly associated with increased hazards of early retirement.

Schnalzenberger et al's[24] measure of 'receives adequate support' (single item concerning support in difficult situations) was not associated with retirement amongst men or women. However, the multinomial outcome investigated in this study with six outcome options may have reduced precision.

This review suggests that social support in the wider workplace is less important in retirement decisions. However closer analysis erodes this conclusion. Several of the statistical models extracted are perhaps over-adjusted (e.g. Thorsen et al[160]) and produce very different results when mutual adjustment for other work-related factors are excluded from the statistical models. Six of the nine papers that tested social support focused on early retirement as an outcome with four specifically using the Danish PEW which may also limit the general applicability of any results.

Summary: From the included studies the balance of evidence suggested that social support was not associated with retirement decisions. However, in actuality, the diversity of exposures investigated in this category was wide. This, along with the possibility of collinearity, may make comparisons unreliable.

4.4.17   Training

Table 4-23   HEAF FIRST systematic review papers that investigated the association between training and retirement

Retirement more likely			
Paper	**Exposure name**	**RoB**	**Rel**
None			

Retirement less likely			
Paper	**Exposure name**	**RoB**	**Rel**
8. De Preter	Vocational/training course (women)	+	+
8. De Preter	Vocational/training course (men)	+	+

No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
30. Van Solinge	Perceived schooling opportunities	+	+/-
Related exposures, No significant Association			
Paper	**Exposure name**	**RoB**	**Rel**
9. De Wind	Lack of knowledge	+	+

De Preter et al 2013b[13] investigated the relationship between training and retirement with a single question asking whether or not the participants had been involved in a vocational or training course in the past year. Attending a course in the last year was found significantly associated with reduced odds of retirement amongst men and women. Although this may represent a rather narrow definition of workplace training.

Van Solinge et al 2014's[114] investigated training through an exposure called 'perceived schooling opportunities.' This was not significantly associated with retirement but enquired whether training/schooling could be arranged in the work setting and therefore was a slightly wider exposure.

A related result is that of De Wind et al 2014[117] in which participants were asked for responses to the statement 'I lack new knowledge and skills that have become important due to changes in my work.' This was not found significantly associated with retirement.

Summary: Only two studies investigated the effects of workplace training but used completely different methods of assessment. According to one study, training in the past year was found to be reducing the risk of retirement but broader definitions were not explored Therefore, there is insufficient evidence to determine whether training opportunities can impact the retirement decision.

4.4.18   Work ability

Table 4-24   HEAF FIRST systematic review papers that investigated the association between work ability and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
27. Tuominen	moderate perceived work ability (model 2) (poor is reference)	+/-	-

Retirement less likely			
Paper	Exposure name	RoB	Rel
10. De Wind	Higher work ability	+	+
19. McGonagle	Higher work ability (2010)	+	+

No significant Association			
Paper	Exposure name	RoB	Rel
19. McGonagle	Higher work ability (2012)	+	+
27. Tuominen	High perceived work ability (model 1)	+/-	-
27. Tuominen	High perceived work ability (model 2)	+/-	-
27. Tuominen	Moderate perceived work ability (model 1)	+/-	-

Work ability is a subjective measure by an individual of their ability to work, both physically and mentally. De Wind et al 2015[152] (used a single item, Work ability index scale, 0-10 scale to which the individual is able to work) found that higher self-perceived work ability was significantly associated with a decreased likelihood of early retirement.

McGonagle et al[157] used a definition of work ability which included ability to work in relation to physical and mental demands all based on a 0-10 scale (four items combined, work ability on 0-10 scales in relation to, lifetime best, physical, mental and interpersonal demands). In a sample from the HRS, higher work ability scores were significantly associated with a reduction in likelihood of retirement at follow up in 2010 but not retirement at follow-up in 2012.

Tuominen et al[161] categorised self-perceived work ability into high and moderate work ability with low as a reference category. The study found no significant associations except an effect for moderate ability in the late-retirement model.

Both McGonagle et al[157] and De Wind et al 2015[152] used work ability as a mediating exposure in their models and had mixed results when considering other work-related exposures. Physical demands influenced work ability in De Wind et al 2015[152] and autonomy influenced work ability in McGonagle et al.[157]

Summary: The relationship between work ability and retirement is not demonstrated with clarity from the evidence in this review. Nonetheless a highly relevant study from De Wind 2015[152] did find a significant association between higher self-assessed work ability and decreased risk of early retirement.

4.4.19   Others

Table 4-25   HEAF FIRST systematic review papers that investigated the association between other work-factors and retirement

Retirement more likely			
Paper	Exposure name	RoB	Rel
18. Lund	High conflict in work	+	+/-
16. Kubicek	Work to family conflict (high)	+/-	-

Retirement less likely			
Paper	Exposure name	RoB	Rel
20. Midtsundstad	Presence of personnel manager	+	+

No significant Association			
Paper	Exposure name	RoB	Rel
1. Angrisani	Job requires people skills	+/-	-
1. Angrisani	Job requires use of computer	+/-	-
10. De Wind	Work engagement	+	+
18. Lund	Low meaning in work	+	+/-
23. Robroek	Demand-control: High demand low control	+	+
26. Thorsen	Role conflicts (high)	+	+
26. Thorsen	Low role clarity	+	+

Nine other factors were investigated in the 30 included papers that were distinguishable from the other categories explored.

'Conflict' was investigated in three papers but this exposure was measured differently. In Lund et al[136] high levels of conflict were found associated significantly with early retirement. Conflict levels were assessed by four questions that enquired about violence or harassment at work. Thorsen et al's[160] measure of conflict related to contradictory work demands and was not found

significantly associated. Kubicek et al[145] investigated work-family conflict asking participants whether work caused problems with home life. High levels of work-family conflict were significantly associated with an increased risk of retirement.

Midtsundstad et al[74] found that the presence of a personnel manager in the workplace was significantly associated with reduced likelihood of retirement.

Angrisani et al[149] explored two very specific exposures: the requirement for people skills in the participant's job and the requirement of computer use but neither of these were found significantly associated with risk of retirement.

In De Wind et al 2015,[152] 'work engagement,' created from six items measuring 'vigour' and 'dedication' was not found to be significantly associated with retirement.

Lund et al[136] also found no association with a measure that tested self-perceived meaning or importance of work. Thorsen et al[160] examined role clarity was attempting to measure knowledge of responsibilities and again did not find significant association with retirement.

In Robroek et al 2013[12] a demand-control measure which was composed of three questions was almost significantly associated with retirement (HR 1.25, 0.99-1.58 95% CI).

Summary: No conclusions can be drawn from the remainder of tested exposures but there are a few isolated results which may justify further consideration. Although there were limited and heterogeneous exposures in this category, the findings suggest that conflict at work (defined as violence or harassment at work), work-family conflict and perhaps the job demand control model may be important factors.

4.5   Summary of systematic review results

Table 4-26 presents a direction of effect table,[164] summarising the 169 exposures and their association with retirement, separated by sex and by category of retirement outcome, either 'early' or 'other'. Seventeen exposures were analysed in relation to retirement among men (either in studies which solely included men in the cohort or studies which analysed separately by sex), 26 exposures were analysed in relation to retirement among women and 126 were analysed in mixed sex cohorts. 94 exposures were analysed in relation to early retirement outcomes, whilst 75 exposures were analysed in relation to 'other' retirement, (in this case other is defined as any retirement which is not exclusively early retirement). The overall patterns of effect are not materially changed by analysing the results by sex or by category of retirement. However, in many sub-categories the numerical lack of exposures inhibits conclusions being drawn.

4.6 Summary of systematic review results table

Table 4-26 HEAF FIRST summary of systematic review results, stratified by sex and category of retirement

Category	Men Early	Men Other	Women Early	Women Other	Both Early	Both other	All papers
Age Discrimination (high)					1↑	1↑	2↑
Age Discrimination NS					1↔	1↔	2↔
Age Related HR Practices					1↓		1↓
Age Related HR Practices NS					1↔		1↔
Appreciation (Low)					1↑	1↑	2↑
Appreciation (High)				1↓	1↓		2↓
Appreciation NS		1↔			2↔		3↔
ERI (High)(poor job)		1↑		1↑			2↑
ERI (low) (good job)				1↓			1↓
ERI medium		1↓					1↓
ERI NS		3↔		3↔	2↔		8↔
ERI (related)					1↔		1↔
Flexible Hours Not Available						1↑	1↑
Flexible Hours Available						1↓	1↓
Flexible Hours NS						3↔	3↔
Flexible Hours (related)						1↔	1↔
Irregular hours (present)			2↓				2↓
Irregular hours NS			1↔			1↔	2↔
Job control (low)			1↑		2↑		3↑
Job control (high)					1↓	1↓	2↓
Job control NS					4↔		4↔
Job control (related)					1↔		1↔

Category	Men Early	Men Other	Women Early	Women Other	Both Early	Both other	All papers
Job Prospects (low)					1↑		1↑
Job Prospects (high)						1↓	1↓
Job Prospects NS		1↔		1↔			2↔
Job satisfaction (high)		1↓		1↓	1↓	1↑ 2↓	1↑ 5↓
Job satisfaction (low)					1↑		1↑
Job satisfaction NS		3↔		3↔		5↔	11↔
Job security NS		1↔		1↔	1↔		3↔
organisational change (management change)					1↑		1↑
organisational change NS					5↔		5↔
Organisational Justice (low)					1↑		1↑
Organisational Justice NS					3↔		3↔
Perceptions of culture of working at older ages (supportive)					1↓	1↓	2↓
Perceptions of culture of working at older ages NS					1↔	2↔	3↔
physical job demands (high)			1↑		2↑ 1↓		3↑ 1↓
physical job demands NS		1↔		1↔	8↔	5↔	15↔
Psy demands (high)			1↑		2↑		3↑
Psy demands (lighter work)						1↓	1↓
Psy demands (high challenge)	1↓		1↓				2↓
Psy demands NS		1↔	2↔	1↔	9↔	5↔	18↔
Psy demands (related)					3↔	1↔	4↔

Category	Men Early	Men Other	Women Early	Women Other	Both Early	Both other	All papers
Social support (low)					1↑		1↑
Social support (high)			1↓		1↑		1↑ 1↓
Social support NS		1↔		1↔	5↔	1↔	8↔
Social support (management quality low)					1↑		1↑
Social support (related)					3↔		3↔
training (high)		1↓		1↓			2↓
training NS						1↔	1↔
training (related)					1↔		1↔
work ability (moderate)						1↑	1↑
work ability (high)					1↓	1↓	2↓
work ability NS					2↔	2↔	4↔
other - work family conflict (high)					1↑		1↑
other - conflict at work (high)					1↑		1↑
other - personnel manager (present)					1↓		1↓
other - NS					5↔	2↔	7↔
Total	1 ↓	1↑ 3↓ 12↔	3↑ 4↓ 3↔	1↑ 4↓ 11↔	17↑ 8↓ 58↔	5↑ 8↓ 30↔	27↑ 28↓ 114↔

↑ = significantly associated (p<0.05) with increased risk of retirement, ↓ = significantly associated (p<0.05) with decreased risk of retirement, ↔ = no significant association with risk of retirement, 3↔ = three exposures with no significant effect, Early = studies that examined (in isolation or separately) 'early' retirement only. Other = studies that examined (in isolation or separately) retirement other than 'early'. Mixed = studies that examined retirement in mixed sex cohorts.

4.7   Discussion

This systematic review identified 30 papers which had explored the impact of work-related factors on the decision to retire amongst people aged >50 years in papers that explored retirement after 01 January 2000. Searching the literature produced no relevant RCTs, two retrospective experimental studies and 28 cohort studies. In total, the included papers explored the effect of 169 work-related exposures on retirement decisions. The tools used to measure these exposures varied, even where the exposure was notionally the same e.g. 'physical demands.' Further, some exposures were notionally similar but named and/or measured differently e.g. 'job control' and 'decision authority'. In order to pool and summarise the data, the 169 exposures were pragmatically grouped into 19 categories. Eighteen of the categories summarised the results for exposures which were similar and one category included the remaining 'other' factors. In the most adjusted models, 27 exposures were reported as making retirement significantly more likely (p<0.05), 28 significantly less likely (p<0.05) and 114 as having no significant effect. Given the heterogeneity, some studies found associations with a particular exposure (either 'pushing' toward retirement or 'pulling' back towards work) but other studies reported no effect for a similar exposure. In addition, the direction of effect of the exposures was measured differently between studies, for example using either high levels of job satisfaction or low levels of job satisfaction as an exposure, therefore changing the reference category in each case. However, I found relatively consistent evidence to suggest that the following exposures might have influenced retirement: Job control/autonomy (lower levels increased retirement, higher levels decreased retirement), and appreciation (lower levels increased retirement, higher levels decreased retirement). I also found limited evidence that the following exposures may have influenced retirement: having a better culture of working to SPA (decreased retirement in two studies), perceived age discrimination (higher levels increased retirement in two studies), flexible working hours (availability decreased retirement in one study, non-availability increased retirement in one study), job prospects (higher levels decreased retirement in one study, lower levels increased retirement in one study), offering additional paid annual leave, (decreased retirement in one study).

All the exposures were further explored in 19 pragmatic categories, stratified by cohort characteristics (men/women/mixed) and outcome type (early retirement/other retirement). These additional analyses did not suggest that there were major differences for men, as compared with women workers, or for early as compared with any other type of retirement, although the paucity of data in many sub-categories may have inhibited the analysis.

The included literature is complex, encompasses a wide range of different exposures and interpretation is hampered by a lack of consensus as to how to define and measure both retirement as an outcome and many of the work-related exposures for comparison across studies. In addition, many studies explored multiple work factors simultaneously and used different approaches to logistic regression modelling, sometimes utilising pre-defined mediating analyses. In particular, multivariable models were often mutually adjusted for other work-related factors, as well as demographic factors. In some papers this led to obvious collinearity. Given the divergence of statistical approaches utilised, this is a literature which precluded pooling of these data for comparison or meta-analysis.

Of course, the quality of a job cannot be measured by a single criterion, but rather by a range of factors. Widely used models of job strain attempt to measure perceived negative factors against perceived positive factors to establish a ratio of job strain which is often used as a proxy of job quality. For example, Karasek's[121] JDC model specifies that demands should be weighed against the more positive aspect of job control before arriving at a measure of job strain. Further, Karasek[121] used the term 'active' jobs to refer to work with high demands and high control which could nonetheless be considered 'good', whilst also describing passive jobs with low demands and low control which might be considered 'poor' jobs, further suggesting that the level of demands by itself is not instructive as to the quality of a job. Similarly in the ERI[122] model, efforts (a negative) are balanced against rewards (a positive). The Job-demands-resources (JDR)[165] model balances demands against resources. Although these three models measure different domains of work-related factors it is notable that all three models balance demands/efforts with more positive aspects of the workplace. Therefore, assessing a single negative aspect of work, or indeed a single positive aspect of work may not be instructive in determining the quality of a job. By extension it is possible that a single positive or negative work-related factor may not consistently predict retirement decisions.

The exploration of the effects of validated job strain models on retirement was surprisingly rare with only four papers investigating an ERI model, one investigating the JDC model and one investigating the JDR model. Unfortunately, in each case, these were investigated using a restricted sample of the validated questions, so that it is difficult to draw conclusions across studies. None of the included studies investigated the effects using the full validated tools (e.g. ERI, 10 questions at short form[139]) and the risk of retirement. Therefore, it may be advantageous to investigate these job-strain models using a complete, validated set of questions in order to better understand their influence on retirement.

Similarly, some exposures may have been oversimplified as measured by the studies in this review. For example, age discrimination could encompass a range of behaviours both direct and indirect and therefore measurement with limited questions (two of the papers used single items) is unlikely to give a full account of its effect in the workplace. Therefore, it may be appropriate to test a wider range of actions and behaviours to gain a fuller understanding of the role of age discrimination in retirement decision-making. No study in this review explored age discrimination in a UK cohort, where full legal protection from age discrimination in the workplace commenced relatively recently in 2011. Therefore, it is possible that age discrimination could remain a problem in the UK workplace and possibly influence retirement decisions.

In this review, I found that in some studies, exposures were split into several categories and tested against a reference category. For example, Schnalzenberger et al[24] investigated the effects of 'ERI third tertile' and 'ERI second tertile' upon risk of retirement using a reference category of 'ERI first tertile' for both men and women with no separate data presented for trends. In this case four exposures were extracted. Similarly, Tuominen split 'work ability' into high and medium categories with low as a reference in two separate models which compared different age groups. Therefore, four exposures were extracted for this analysis from the same study. The difficulty with this approach is that the exposures measured in this way cannot carry equal weight in the synthesis and no conclusion could be drawn simply by considering the number of significant and non-significant exposures.

Methodological divergence was also evident in the definition of the outcome. Retirement was established in a variety of ways including self-reported employment status, reducing hours to zero, and registry data. Nine of the studies utilised registry-based definitions of retirement. These may not represent the same outcome as self-reported retirement. When comparing German registry based pension data with the SHARE interview self-reported employment status data, Korbmacher[166] found large discrepancies. 12% of the participants who were drawing a pension using registry data did not declare their employment status as retired in contemporaneous self-reported data. Further, for those that were 'retired' in both datasets, there was a discrepancy between self-reported year of retirement (given retrospectively) and year of pension in 36.5% of cases. Therefore, the mixed results in this study may be due to inconsistencies in assessing the outcome measure.

The divergence in outcome is perhaps unsurprising given the range of locations and time points of the included studies and the changing landscape of retirement within our societies at this time. Retirement was likely to mean different things, both from a social perspective and from an administrative perspective, dependent on the location and date of the study. Many countries

formally had age-defined cut-offs, beyond which an individual became eligible for state pension (SPA) therefore, a relatively simple outcome of 'early retirement' could be defined as retiring before this age-defined cut-off. Sixteen of the papers investigated 'early retirement' using this approach without considering later transitions. Wang and Shultz[25] have suggested that early retirement is often incentivised by the employer, which means that details of any incentives would be required to contextualise the results. Therefore, in synthesising the retirement literature, considering determinants of early retirement alongside 'any retirement' should be done with caution, as the determinants of early retirement may represent a participant's response to a context-specific incentive, something that may not be applicable to any other timing of retirement. Further the current trend is to encourage working to older ages by increasing SPAs and abolishing mandatory retirement. With the gradual abandonment of such age-defined cut offs, it is possible that defining a retirement as early or late by reference to the SPA is no longer a meaningful definition of early retirement. As retirement is increasingly becoming more of a personal choice it may be that definition of 'early' or indeed 'on time' retirement becomes arbitrary. Indeed, there is growing evidence that people are 'unretiring'[61]. Clearly, some consensus is required around these important definitions if we are to better understand the determinants of retirement and factors that could be modified to encourage working to older ages.

Seven of the studies analysed pan-European cohorts as single entities, a very useful resource for establishing cross border trends. However, these results may not be generalizable to workers in each individual country, a point raised by Radl in their study of social class and retirement in the SHARE cohort.[105] An exposure may strongly associate with retirement decisions in one country, but if many countries are analysed as a single cohort then the significance of that result may regress towards the mean in the overall pooled analysis. In addition, each individual country will have different retirement systems which also leads to divergence in the outcome. These nuances may be lost when analysed as a whole.

The post-2000 time limit applied in this review ensured that the retirements were relatively contemporary in nature. However seven of the included studies had temporal windows for retirement of 10 years or more, such as Damman et al 2015[147] where the retirements took place between 2001-2011. This wide window may have reduced any effect of the rapidly changing retirement environment over the last decade. With the range of recent changes in the retirement landscape and the growing emphasis on individual responsibility[5] in retirement decisions, consideration must be given to the concept of retirement in each specific timeframe. For example, it is not clear if retirement in 2001 is the same as retirement in 2011, in any given location, as this will be dependent on localised policy changes. Notably retirement taken in the

early part of the 21st century may include job exits that were mandatory or automatic. Where retirement was not a free choice, work-related factors may well have been less important. For this reason, this review may understate the importance of work-factors. In addition, eight of the included studies included data on retirement from the 1990s because the window for outcomes stretched beyond 01/01/2000. This data may be too early to be reflective of contemporary retirement. Only 11 of the papers considered any retirement later than 2010. As discussed in paragraph 1.6 there have been many recent changes to the retirement landscape which may not be adequately reflected in the included papers. Therefore, there is a clear need for analysis of different cohorts and more contemporary retirements to fully understand retirement decisions today.

All papers in this study were longitudinal, with the outcome (retirement) established some years after the measurement of the exposure. Nineteen of the papers had follow up periods of five years or more. When measured at baseline, exposures such as work strain, job satisfaction and perceptions of hourly patterns might have been tolerable to workers. However, as the worker aged, the same exposures may have become more problematic. Therefore, it is possible that measuring exposures at an earlier date may miss any subsequent change in the worker's perception of the work environment. The length of the follow-up period may give considerable scope for the exposure to fundamentally change in character, or for workers to experience a change in their perception about that exposure which may result in a mismatch that may influence retirement. Consequently, results in this study may be understated due to the time delay between measurement of the exposure and the outcome.

Extracting data from the most adjusted statistical models ensured that the effects reported minimised confounding. However, this does run the risk that the results extracted from these final models were over-adjusted due to multicollinearity. The work factors explored in the included studies comprise a variety of physical and psychosocial work attributes. Many of these can be categorised under the broad umbrella of job quality measures and may therefore be inter-related. Conceptually if a person has a poor job it may be that their job control is low, their rewards are low and therefore their job satisfaction is low. It is therefore highly likely that each of these factors are inter-related. For example, Thorsen et al 's[160] second statistical model found nine work-related exposures which were significantly associated with risk of retirement. This reduced to just three in the mutually adjusted model. A similar scenario can be seen in Carr et al's[10] paper where three work-related exposures were found to significantly associate with risk of retirement but this reduced to just two exposures in the final mutually adjusted model. Both Carr et al[10] and Thorsen et al's[160] earlier models were adjusted for a number of demographic factors and health. If several work perceptions influence retirement decisions in combination but with relatively small

effects, then mutual adjustment of them in one model which effectively forces one measure to be the 'most important' might mislead as to which inter-related factors could be usefully measured and perhaps influenced to promote working to older ages. I hypothesise that the consistent use of mutual adjustment might lead to concealment of some of the important work factors with relatively small individual effects.

In this review there was no consistent finding that physical demands associated with retirement decisions. These results concur with the findings of earlier reviews by Van Den Berg et al[94] and Scharn et al[33] that identified three and two studies respectively measuring physical demands and found no conclusive evidence that physical demands associated with retirement decisions. However, this is in contrast with the results from qualitative research by Reeuwijk et al[106] and Van den Berg et al[94], both of whom reported that having high physical job demands were described by participants as a factor in their retirement decisions. They also contrast with studies that suggest higher physical strains associate with reduced likelihoods of working beyond SPA.[167]

Conceptually links between physically demanding work and retirement decisions are straightforward; the hypothesis being that as people age, they can no longer cope with physical work that may be a fundamental part of their role, which encourages retirement. Overwhelmingly the studies in the review used measures of physical work exposure that asked participants to describe or measure their physical work strains. However, this may overlook any interaction with the participants themselves i.e. whether the participants were coping with their physical work strains. Therefore, it may be that the effect of physical demands has been ineffectively measured in studies included in this review. It may be the case that physical demands only affect retirement when the participant is struggling to carry them out. This aspect of coping may well be drawn out in the qualitative results mentioned above, accounting for the apparent inconsistency.

The healthy worker effect may also be a relevant factor, a point made by both Robroek et al 2013[12] and Scharn et al[33]. The cohorts investigated in this review may well contain healthier people than the population in general, introducing selection bias. Unhealthier workers, or those who may be more affected by negative work environments such as high physical work demands, may have already left the workforce or found less physical jobs beforehand. Again, this may have led to an understatement of the reported effects of work-related exposures upon retirement decisions.

Evidence from qualitative work by Sewdas et al[95] and Van Der Zwaan et al[96] demonstrated that Dutch participants regarded access to flexible working arrangements as a pre-condition to working past retirement age. However, in this review I found that investigation of flexibility was restricted to the ability to modify working hours, with some restricted evidence that working

hours may associate with retirement decisions. Given that flexibility is in high demand amongst older workers in the UK[42] then it is clear that there is a need to investigate the effects of workplace flexibility on retirement decisions.

The measures of job satisfaction in this review were generally similar and as such represent the exposure that can be most reliably compared across papers. However, the results present a confusing picture with no overall trend apparent. The scattered results are similar to those of Topa et al[168] who, in meta-analysis, found that higher rates of job satisfaction reduced the likelihood of retirement but with a small effect size (weighted r=-0.02). In a later review of determinants of early retirement, Topa et al[22] again found that higher rates of job satisfaction reduced the likelihood of early retirement but again with a small effect size (weighted r=-0.16).

In this review, I found insufficient evidence that improving the work environment with age specific policies affected the timing of retirement. However, this may be due to the lack of relevant studies. A review by Cloostermans et al[169] also highlighted the lack of intervention studies in this area. However, given the examples of such exposures affecting the risk of retirement it is possible that improving the overall later-working environment, involving both national policies and individual support at employer-specific level may be an area to investigate further. However, any intervention or new policy would need to be carefully considered so as not to alienate their proposed beneficiaries. A qualitative study by Hennekam et al[135] found that the introduction of age-related HR policies could make older employees feel they are part of a devalued social group. However, the same study noted that the participants valued such policies and were keen for employers to accommodate their specific needs. This qualitative work suggests that age-related policies will need to be approached with sensitivity. In addition, policies that target older workers specifically could face legal or ethical implications. Generally, any intervention to encourage working to older ages would involve a positive change to the workplace. Targeting older workers without making corresponding improvements for other workers could be a form of age discrimination, a point made by Cloostermans et al[169] or, from a research-only perspective, be unethical in seeking positive change only for older workers. Further, Wainwright[21] reports a decline in 'managed retirement' since the abolition of mandatory retirement in the UK. Fear of contravening age discrimination laws may be preventing any employer-led discussion of retirement transitions or indeed making age-related changes in the workplace.

4.7.1   Limitations and Strengths

This review identified 30 relevant papers, none of which were RCTs, two of which were retrospective experimental studies and the remaining 28 were cohort studies, five of which were carried out on very limited populations. As such the evidence base, although wide, is weighted towards the lower end of the evidence hierarchy.

Data from these studies could not be pooled due to vast methodological heterogeneity. Divergence in defining outcome, measuring exposures and reporting results meant that a statistical meta-analysis was not possible.

Only three of the included studies reported separate results for men and women. One study reported results for men only whilst three reported results for women only. This meant that limited data was available to compare differences between sexes. Give this limitation, it is currently impossible to know whether retirement decisions will be influenced by the same factors in men and women.

Encouragingly 28 of the 30 included papers were rated at low or moderate risk of bias. However, given the specialised nature of the populations in some studies, only 11 were likely to yield findings that would be generalisable to populations of workers and another seven were rated as moderately generalisable. Unfortunately, despite the high number of studies with a low risk of bias, they came from a somewhat narrow geographical representation with 28 studies from Europe and the USA and only two outside of these areas. Moreover, I found that a number of the included studies provided analysis of the same exposures from the same cohorts so that only 18 separate cohorts were covered in the literature.

In the analysis, data was extracted from the most adjusted model presented by the paper and a significance level of $p<0.05$ was regarded as a significant association. Whilst this may have obscured more subtle effects, the decision was pragmatic, given the volume of data available from the studies. However, as the studies made different adjustments in their final models it is possible that this may have affected the results. Given the collinearity evident in the studies, as discussed above, it is likely that this approach generally led to an under-estimate of some of the effects.

Only papers published in English were included which is a possible source of bias. There may be studies not published in English and/or not available in international press that this review has overlooked, especially given the location-specific nature of retirement processes.

This systematic review was not limited by geographic area and included a wide definition of retirement. As such it represents a wide view of the available literature. Searches were carried out on six bibliographic databases, which also ensured a wide representation of the literature.

A systematic review protocol was drafted before the searches took place and followed throughout the review process. Any minor changes to the methodology were discussed and agreed with the team before being added to the protocol.

At all selection stages we employed a robust methodology to ensure that available studies and data were treated consistently. The search results screening process involved three researchers blinded to each other which ensured that inclusions and exclusion were consistent. The data extraction sheets were pre-defined to ensure consistency and were completed by three researchers blinded to each other. Further, a full risk of bias assessment of each paper was made to determine which of the papers carried more weight in the synthesis. This was carried out using relevant parts of the SIGN and STROBE checklists. Two researchers carried out this process who were again blinded to each other.

4.7.2   Conclusion

This review brings together studies that investigated the effect of work-related factors on the risk of retirement with a focus on contemporary retirement. Wide geographic inclusions and wide outcome definitions provided for an inclusive overview of the available literature.

Amongst all the included papers, the evidence was most convincing for job control and appreciation at work which came from more than one study and was consistent in direction of effect. Therefore, there is consistent evidence that increasing positive appreciation at work and giving workers more autonomy could delay retirement. More research is required to see if these exposures have an association with retirement in cohorts of contemporary workers. These positive results are perhaps more remarkable given the methodological inconsistencies in the papers included in this review which inhibited further conclusions.

There is also more limited evidence that age discrimination might increase the risk of retirement, whilst a positive later work culture, better job prospects, increasing days of annual leave and the availability of flexible hours may decrease the risk of retirement.

The exposures in the review were assessed using very different questions. In some instances, similar questions were formed into separate exposures in an inconsistent manner. Even where validated tools were said to be used, these were often truncated or simplified measures. This inhibited comparisons and indeed, decreases the validity of the measures. Future retirement

research should consider the use of validated measures and scales to allow comparisons with other studies. It is also clear that adjustments in statistical models needs to be considered carefully to avoid reducing effect sizes through multicollinearity.

The effect of work-related factors other than appreciation and control, on retirement behaviour is a confused picture. It is clear that work-factors do have an effect on retirement decisions but there are very few individual work-related factors that have been tested consistently and frequently enough to draw conclusions.

Therefore, more research is required to investigate the effects of work-factors on retirement decisions in new contemporary cohorts. Only one included study addressed the UK specifically. Given the recent wide-reaching changes to the UK retirement system described in paragraph 1.5, more UK-based research is recommended.

Chapter 5 Phase three: HEAF FIRST case control study: methods

5.1 Introduction

The aim of the phase three case-control study was to explore the relationship between work-related factors and contemporary retirement decisions in a UK cohort. The selection of the work-related factors investigated was informed by the qualitative phase described at Chapter 3 and the systematic review described at Chapter 4. The research question for the quantitative phase was:

'After adjustment for appropriate confounders, which work-related factors affect the decision to retire (negatively and positively) in 2013-2018 amongst a cohort of UK retirees and workers?'

5.2 Methods

5.2.1 Study design

HEAF FIRST phase three was a case-control study nested within the longitudinal HEAF cohort described at para 2.1. Data was gathered by sending a postal questionnaire to retirees (cases) and employees (controls). The questionnaire requested information about work-related factors in relation to workers' current jobs and retirees' former jobs.

5.2.2 Development of questionnaire

The HEAF FIRST phase one qualitative results and phase two systematic literature review highlighted a range of work-related factors that potentially influenced retirement decisions. The case-control study questionnaire was designed to explore these work-related factors further. I endeavoured to use validated tools, where available, to explore the relevant work-related factors.

The questionnaires were designed to be sent to workers and retirees. This necessitated a change in tense for the majority of questions as current workers were being asked about their existing job, whilst retirees were being asked about their last main job prior to retirement.

5.2.3 Work-related exposures included in the questionnaire

The work-related factors to be included in the phase three study were informed by the results obtained in phase one and phase two. The questionnaire was designed by inserting relevant

questions or validated tools that corresponded with each work-related factor that was identified as of possible relevance in the earlier phases. In many cases, the role of multiple work factors could be investigated by use of a single tool. For example, ERI enquires about an employee's perceptions of the effort they put into their work, the rewards they receive for it and their sense of appreciation at work. The specific work-related exposures included in the questionnaire are detailed in the paragraphs below and a full list of questionnaire items is available at Table 5-1.

5.2.3.1 Age discrimination

Perception of age discrimination in the workplace was highlighted by the systematic review as a potential factor in retirement decisions, see paragraph 4.4.1. The studies which measured this in the systematic review utilised between one and three questions. However, age discrimination is a very broad concept and may encompass a range of perceptions and therefore, to explore this factor further, I included a battery of six questions from the validated Nordic Age Discrimination Scale[170] (NADS). NADS included items that explored perceived contrasts between the treatment of older and younger workers in the areas of promotion, training, appraisals, work methods, wage increases and change processes. Three of the six questions had previously been included in a retirement study by De Wind et al[152] as described in para 4.4.1.

5.2.3.2 Community at work

Being part of a community at work formed part of the qualitative theme 'But work also pulled me back' (3.3.4.2) in phase one and seemed to act to prevent retirement. To explore this further in the current study a question from Copenhagen Psychosocial Questionnaire, COPSOQ III, Sense of Community at work Scale[171] was included, which specifically asked whether the participant felt part of a community at work. Note also that wider social support at work questions were also asked by including the DCSQ scale and I also devised a question about loyalty at work.

5.2.3.3 Commuting and overnight stays

Commuting and travel time were raised relatively regularly in qualitative phase one and were part of sub-themes 'grinding me down' (para 3.3.4.1.2) 'I've got no time' (para 3.3.4.1.3) and 'This hurts'(para 3.3.4.1.4). Overnight stays were also mentioned in the qualitative phase as being unappealing as the participant neared retirement age. In addition Cebulla et al[172] compared UK older employees to younger employees and found that those working beyond the SPA were travelling shorter distances to work. However, neither commuting nor overnight stays had been explored in any of the quantitative papers identified in the systematic review. A search revealed no existing appropriate tool. Therefore, I devised questions with the intention of exploring the duration of time spent commuting and how well the participant perceived that they were coping

with that commute. I also included a question about the frequency of overnight stays required by their job.

5.2.3.4 Constant availability

Being constantly available for work, especially due to mobile technology, was cited as a factor which pushed towards retirement in qualitative phase one and was part of the sub-theme 'I've got no time' (para 3.3.4.1.3). Once again, this work-related aspect had not been specifically explored in any of the quantitative studies identified in the systematic review. Therefore, I devised three questions to explore this aspect further. These addressed: being contacted outside of working hours; answering work enquiries/e-mails outside of hours; and completing work tasks at home.

5.2.3.5 Declining standards at work

A sense of declining standards at work was highlighted as a push towards retirement in qualitative phase one, sub-theme 'You've changed.' 3.3.4.1.1. This was however nuanced: change at work didn't necessarily push towards retirement but change that was perceived as a decline in standards seemed to be a push factor. Therefore, I devised a question to explore this factor by asking whether standards at work had become worse over the past two years.

5.2.3.6 Effort reward imbalance and demand control support models

Respondents' perceptions of the workplace psychosocial environment and/or work quality was assessed using Karasek's'[121] Demand-Control model (JDC, also termed job strain) and Siegrist's[122] Effort Reward Imbalance (ERI) model. Both models were developed to quantify stress in the workplace and both have been shown to predict health outcomes[173, 174] and job burnout[175]. There have been limited uses of the models in the retirement literature although several studies in the systematic review (see para 4.4.4) have used modified questions from one or both of these tools as exposures in their own right, or formulated reduced subscales of the models[10-12]. However, to my knowledge no study has investigated retirement decisions using a fully validated ERI or JDC questionnaire. In addition, subscales and individual questions within both models address several other aspects of work that were highlighted by phases one and two as being relevant in retirement decisions. The phase two systematic review suggested that lack of appreciation was associated with increased risk of retirement and vice-versa that more appreciation reduced the risk of retirement (para 4.4.7). Appreciation was also raised in phase one sub theme 'you've changed' (3.3.4.1.1) and theme 'But work also pulled me back' (3.3.4.2). Autonomy or control at work was an important factor in the systematic review and was also found to be important in phase one qualitative interviews sub-theme 'You've changed' (para 3.3.4.1.1) and theme 'But work also pulled me back.(para 3.3.4.2). Change at work was raised in phase one sub-theme

'You've changed' (3.3.4.1.1). There was also limited evidence that job prospects may be important in retirement decisions from the systematic review (4.4.8).

Using a validated version of each model represented an opportunity to formally test the models in relation to retirement decisions as well as exploring more specific points raised by the qualitative interviews. The effort-reward imbalance model was investigated by including Siegrist's short form ERI questionnaire.[139] The JDC model was incorporated by reproducing the validated Swedish Demand–Control–Support Questionnaire (DCSQ)[176], a shorter modified version of the JDC questionnaire. The ERI and JDC models can be said to complement each other and can be used in conjunction.[173]

> 'The two models complement each other, with the first one focusing on work content, and the second highlighting violations of reciprocity exchanges.' [177]

The JDC model postulates that job stress (or strain) will occur in roles that place high demands upon the worker whilst simultaneously allowing the worker very little control or autonomy over how to perform that role. In addition, high demands coupled with perceived autonomy can create an 'active' job whilst low demands and poor control create a 'passive job', see Figure 5-1.
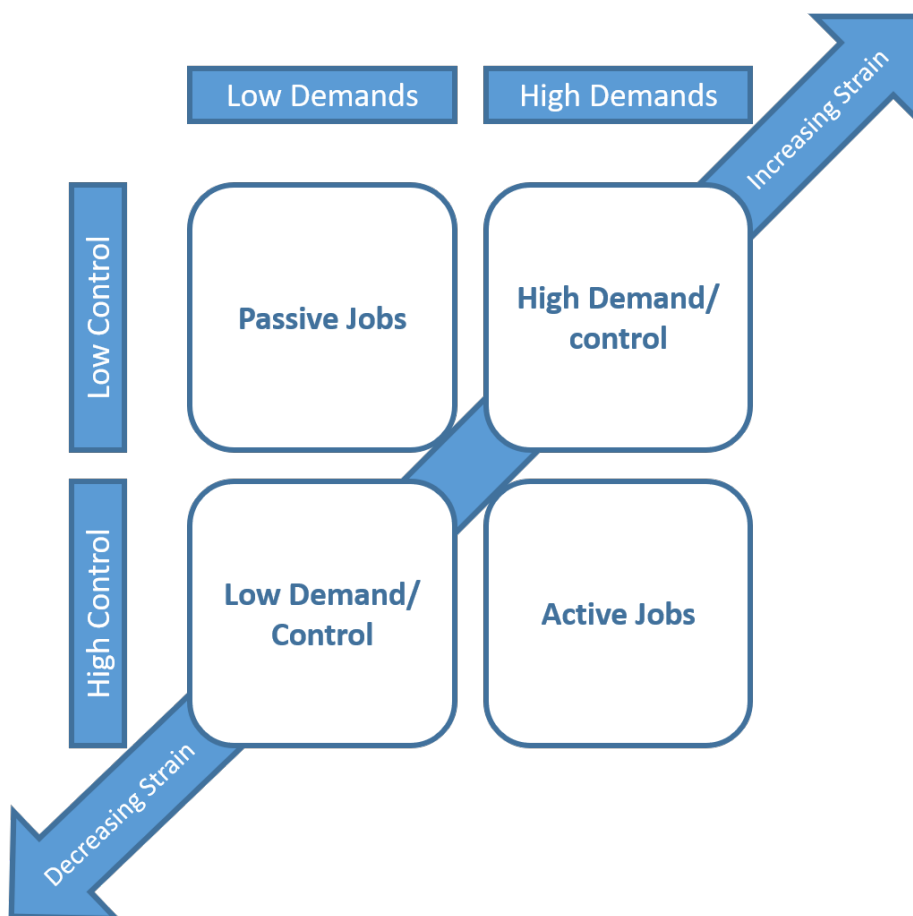
Figure 5-1   Diagram to show an overview of the job-demand-control model questionnaire tool

As well as assessing an overall categorisation of JDC, the DCSQ questionnaire can also be broken into three subscales; psychosocial demands; decision latitude; social support. Decision latitude (called control in this study) can be further broken down into two further subscales: skill discretion and decision authority, Figure 5-2. Note that social support is not used to calculate the overall DCSQ job type.
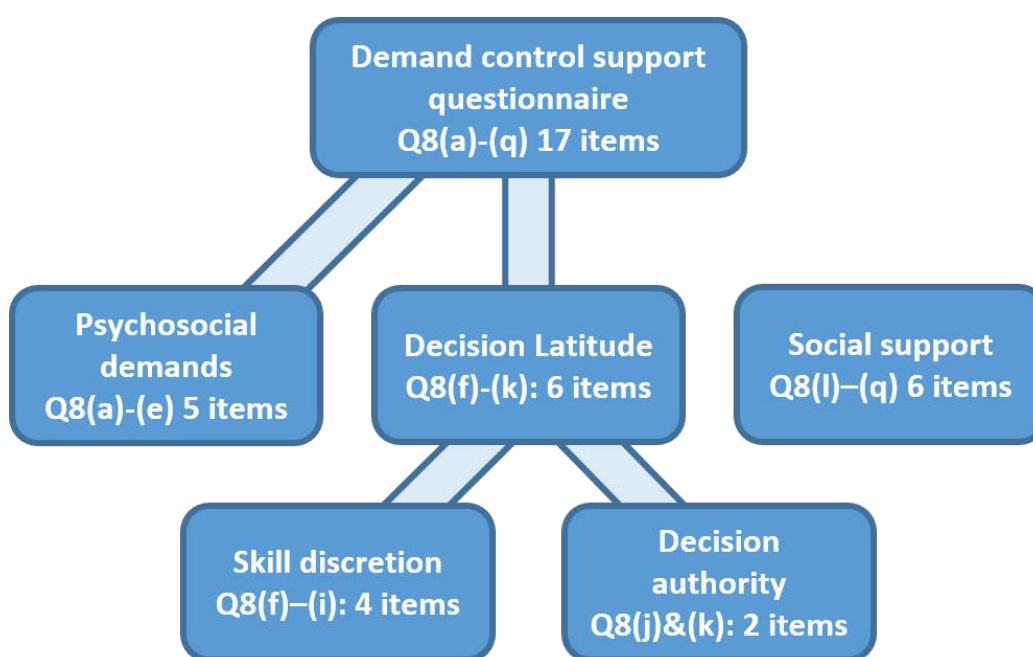
Figure 5-2   Diagram to show the job demand control support questionnaire scales

In a similar manner the effort reward imbalance model postulates that stress/strain will occur in job roles that have a combination of high work efforts coupled with low perceived rewards. The ERI model constructs a ratio or fraction where the value given to efforts is divided by the value given to rewards. In contrast to JDC, the ERI model provides a scale of stress/strain, see Figure 5-3, categorised into quartiles[178] rather than the JDC model which categorises four job types based on high/low measurements of two exposures.
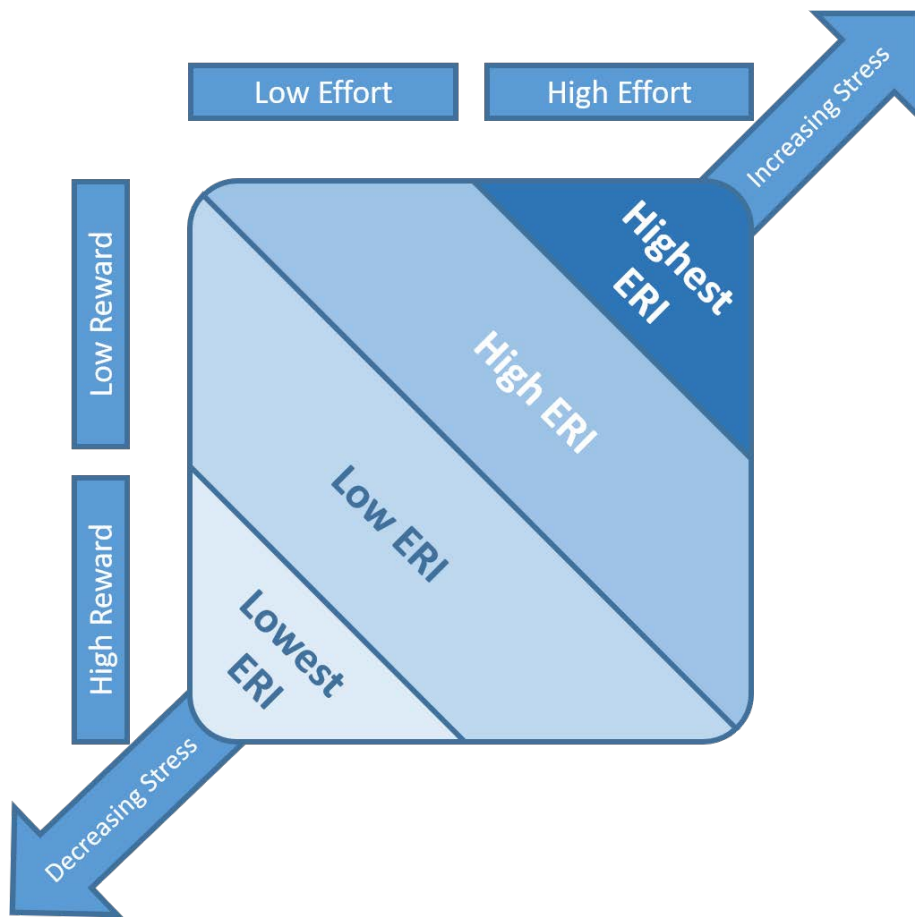
Figure 5-3   Diagram to show an overview of the effort reward imbalance model questionnaire tool

As well as assessing an overall ERI score, the ERI short form questionnaire can be broken down into five subscales; efforts; rewards; esteem; promotion and security as per Figure 5-4. Esteem seems to be a measure of appreciation as per the definition in the systematic review (see para 4.4.3) and therefore in this study it will be referred to as appreciation.
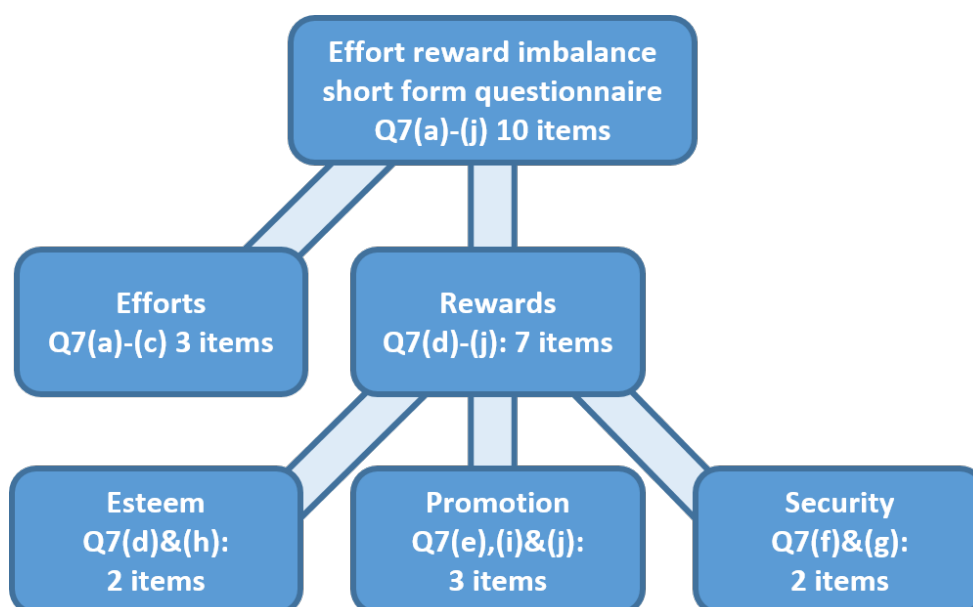
Figure 5-4   Diagram to show the effort reward imbalance questionnaire scales

5.2.3.7   Flexibility

Participants in qualitative phase one described the role of flexibility at work and lack of flexibility seemed to push participants towards retirement in sub-theme 'I've got no time' (para 3.3.4.1.3). Moreover, having flexibility could also pull participants back towards work in theme 'But work also pulled me back' (para 3.3.4.2). Flexibility was not much studied in the systematic review but conflicting results were obtained for the effect of having flexible hours upon the risk of retirement (para 4.4.5). Importantly, flexibility at work can encompass more than work-hours[64] and therefore I included a wider range of flexibility at work measures. I devised a battery of five flexibility questions that encompassed: reducing hours; changing to a lighter role; time off for emergencies; managers allowing flexible working; and availability of a phased retirement.

5.2.3.8   Hours: irregular and happiness

Only two studies in the systematic review investigated the association between retirement and irregular hours (para 4.4.6). However, the topic had been raised as a push factor in the qualitative phase, sub-theme 'I've got no time' (para 3.3.4.1.3). Importantly the irregular hours seemed to push towards retirement when the participant was dissatisfied with their schedule. Therefore, a question was included from the Cardiff mood disorder and work questionnaire[179] that asked whether a participant worked in a rotating, irregular or contract work schedule. However, a wider question asking about the participant's happiness with their pattern of work hours was also included.

5.2.3.9   Isolation

A feeling of isolation at work pushed towards retirement in phase one, sub-theme 'grinding me down' (para 3.3.4.1.2). Note that this perception of isolation was distinguishable from working alone. The qualitative comments on this subject also seemed separate from the wider concept of loneliness (although the two may well be interrelated), in that this sense of isolation was specifically at work. No study in the systematic review had asked about isolation at work Therefore, I included a question that explored whether work made the participants feel isolated.

5.2.3.10   Job satisfaction

The association between job satisfaction and retirement did not display any consistent trends in the phase two systematic review (para 4.4.9). However two meta-analyses by Topa et al have found small but significant associations between job satisfaction and risk of retirement[168] and risk of early retirement.[22] Therefore, I included a single-item measure of job satisfaction which had also been asked in earlier HEAF questionnaires.

5.2.3.11   Loyalty

Attachments to people at work (co-workers or customers) seemed to discourage retirement in qualitative phase one and formed part of the theme 'But work also pulled me back' (para 3.3.4.2). This seemed to manifest itself as a desire not to disappoint other people by retiring and thus leaving the workplace. Although wider social support questions were included in the DCSQ model, this specific aspect of loyalty to people in the workplace did not seem to be encompassed. Therefore, I devised a question that asked participants whether there were people at work who they didn't want to 'let down.'

5.2.3.12   Later working culture

Perceptions of the culture of working at older ages, particularly managers' support for later working, were investigated by some studies included in the systematic review (see para 4.4.13) and the limited evidence available suggested a possible association with risk of retirement. However, the studies which included this aspect were concerned with the risk of early retirement and therefore the questions asked specifically about managers' and colleagues' support for working up until the SPA. Therefore, I explored this factor further by widening the question to ask participants whether their workplace (rather than a manager) encouraged working beyond the SPA.

5.2.3.13   Physical job demands

Physical work-exposures did not consistently associate with the risk of retirement in the systematic review (para 4.4.14). However, perceptions of physical work demands coupled with physical declines formed the bulk of comments in the qualitative subtheme 'This hurts.' (para 3.3.4.1.4) which pushed towards retirement. Similar results have also been found in other qualitative studies by Reeuwijk et al[106] and Van den Berg et al.[94] Therefore physical work exposures were explored using a battery of nine individual work exposures, e.g. kneeling/squatting and hard physical work. The items have been used in prior HEAF questionnaires[111] and can be expressed as a six-item physical scale of hard work. In addition, a question on coping with physical work exposures, also used previously in HEAF, was included.

5.2.3.14   Us vs them

The qualitative phase highlighted a recurring perception amongst the retirees that they had become disconnected from high levels of management or colleagues in their organisations. This caused a conflict, often expressed in scenarios where the participant and close colleagues were allied against management. This pushed towards retirement in sub-themes 'You've changed' (para 3.3.4.1.1) and 'grinding me down' (para 3.3.4.1.2). Therefore, a question was included that asked participants whether they felt disconnected with 'higher levels' of their organisation.

5.2.3.15   Value mismatch

A perception amongst retirees that their work no longer matched their own values seemed to push towards retirement in the qualitative phase sub-theme 'You've changed' (para 3.3.4.1.1). This perception could be linked with specific work policies but could also be a general feeling that the organisation and participants no longer had the same goals. Therefore, I devised a question that asked participants whether they shared the same work goals as their organisation.

5.2.3.16   Work-life conflict

Work-life conflict (also called work-family conflict) was explored by Kubicek et al[145] who found a significant association with the risk of retirement (included in the systematic review para 4.4.19). In addition, conflicts between work and life were raised in the qualitative theme 'I had my reasons' (para 3.3.4.4). Therefore the work-life dimension from the Copenhagen Psychosocial Questionnaire version 3[171] (COPSOQ) was included in HEAF FIRST. This is a battery of five questions designed to assess the level of incompatibility between work demands and personal demands. Specifically, the questions ask about work that: causes time conflicts with home; drains energy; takes excessive time; interferes with private life; and changes private plans.

5.2.3.17   Summary of work-related exposures included in the HEAF FIRST questionnaire

Table 5-1   HEAF FIRST phase three case-control study: work-related exposures included in questionnaire

Exposure	Questions	How to Calculate	References and notes
Age discrimination 6 item scale, binary split on median	**Q9(a)-(f) six items** (a) Older workers are passed over in cases of promotion or internal recruitment (b) Older workers do not have equal opportunities for training during work time (c) Younger workers are preferred when new equipment, activities or working methods are introduced (d) Older workers less often take part in development appraisals with their manager than younger workers (e) Older workers have less wage increase than younger workers (f) Older workers are not expected to take part in change processes and new working methods to the same degree as younger workers	5 response Likert scale. Totally disagree = 1, Disagree to some extent = 2, neutral = 3, Agree to some extent = 4, Totally agree = 5. Mean of 6 questions Binary split on median score higher score = higher age discrimination.	Nordic age discrimination scale,[170] Furunes[180] Included after systematic review results, in particular De Wind et al[152] Thorsen et al[160]
Community at work 1 item binary exposure	**Q7(p)** I feel part of a community at my place of work	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher score = better community.	Adapted from of Copenhagen Psychosocial Questionnaire, COPSOQ III, Sense of Community at work Scale[171] Topic raised in qualitative interviews theme 'But work also pulled me back'

Exposure	Questions	How to Calculate	References and notes
Commute: coping 1 item binary exposure	**Q13.** How well do you cope with your commute?	Five response Likert scale. Easily, just about, with some difficulty, with great difficulty, not coping higher scores Binary split on easily vs not easily	Bespoke question based on results of qualitative phase one, sub-themes 'grinding me down' 'I've got no time' and 'This hurts.'
Commute: travel time 1 item binary exposure	**Q12.** On a typical working day how long does it take you to get to and from work? Please add up the time it takes to get to work plus the time it takes to return home again	Four response Likert scale. Less than 30 minutes, 30 - 59 minutes, 1 hour-2 hours, More than 2 hours Binary split on less than 30 mins vs 30mins+	Bespoke question based on results of qualitative phase one, sub-themes 'grinding me down' 'I've got no time' and 'This hurts.'
Constant availability/ mobile technology 3 item scale score split into quartiles	**Q18(f)–(h)** (f) Work contacts me outside of my normal working hours if there is an emergency (g) I complete work tasks at home outside of my normal working hours (h) I answer work enquiries or e-mails outside of my normal working hours	Five response Likert scale: Never/hardly ever =1, Seldom =2, Sometimes=3, Often=4, Always=5 Mean of three questions x3 (range 3-15) Split into quartiles Higher values = higher constant availability	Bespoke questions based on results of qualitative phase one, sub-theme 'I've got no time'
Declining standards at work 1 item binary exposure	**Q7(k)** Standards at work have become worse over the past 2 years	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher scores indicate worse situation	Bespoke question based on results of qualitative phase one, sub-theme 'You've changed.'

Exposure	Questions	How to Calculate	References and notes
Demand control support Questionnaire (DCSQ) 17 item tool, 5 sub-scales split into binaries at median values DCSQ type: 4 category job type	**Q8(a)–(q)** (a) I have to work very fast b) I have to work very intensively (produce a lot in a little time) (c) My work demands too much effort (d) I have enough time to do everything (e) My work involves conflicting demands (f) I have the possibility of learning new things through my work (g) My work requires a high level of skill or expertise (h) My work requires me to be creative/show initiative (i) I have to repeat the same tasks over and over again at work (j) I can choose HOW I do my job (k) I can choose WHAT I do in my job (l) There is a calm and pleasant atmosphere where I work (m) There is a good spirit of unity at work (n) I can rely on the support of my co-workers (o) If I'm having a bad day my co-workers understand (p) I get on well with my superiors at work (q) I get on well with my co-workers	17 items, 4 response Likert scale, Frequently = 4, Some of the Time = 3, rarely = 2, never = 1 Reverse coding for items four, Q8(d) (enough time), and nine, Q8(i) repetition **Psychosocial demands** Q8(a) –8(e): mean of 5 items x5 to account for possible missing item, (range 5-20), median split of scale values used to calculate high and low psychosocial demands. High values = higher psychosocial demands **Decision latitude** Q8(f)-(k): 6 questions, mean 6 items x6, (range 6–24) Binary split on median. High scores show higher decision latitude,– **Skill discretion**: Q8(f) – 8(i), 4 questions, mean 4 items x4 (range 4 –16) Binary split on median. High values show higher skill discretion **Decision authority**, Q8(j) & 8(k), 2 questions, mean 2 items x2 (range 2-8) Binary split on median. High values show higher decision authority **Social support at work,** Q8(l)–(q), 6 questions, mean 6 items x6 (range 6-24) Binary split on median. High values show higher social support, **DCSQ job type:** Four strain categories **High strain:** high demands, low decision latitude **Low strain:** low demands, high decision latitude **Active job:** High demands, high decision latitude **Passive job:** Low demands, low decision latitude	The Swedish Demand-Control-Support Questionnaire Mauss et al[181] Chunkham et al[182] Sanne et al.[176] Based on job content questionnaire by Karasek.[121] Control highlighted in phase two systematic review and raised in phase one qualitative interviews, sub-theme 'You've changed' and theme 'But work also pulled me back.'

Exposure	Questions	How to Calculate	References and notes
Effort reward imbalance (ERI) 10 item scale exposure split into quartile**s**	**Q7(a)-(j)** (a) I have constant time pressure due to a heavy work load (b) I have many interruptions and disturbances while performing my job (c) Over the past few years, my job has become more and more demanding (d) I receive the respect I deserve from my superior or a respective relevant person (e) My job promotion prospects are poor (f) I have experienced or I expect to experience an undesirable change in my work situation (g) My job security is poor (h) Considering all my efforts and achievements, I receive the respect and prestige I deserve at work (i) Considering all my efforts and achievements, my job promotion prospects are adequate. (j)Considering all my efforts and achievements, my salary / income is adequate	Ten questions, four response Likert scale. Strongly disagree = 1, Disagree = 2, agree = 3, strongly agree = 4 7(e),7(f),7(g) are reverse coded 7(a)-(c) are **Efforts** (E) mean of three items x3 (range 3-12) 7(d)-(j) are **Rewards** (R) mean of 7 items x7 (range 7-28) C = correction factor in this case 3/7 = 0.429 ERI = E/(R x C) = range of 0.25 up to 4 Split into quartiles. Higher scores indicate more efforts for less reward. Lowest quartile is lowest ERI i.e. better job Note that 3 extra subscales of reward can be obtained, **Appreciation (esteem)**, mean of 7(d) & (h) **Promotion**, mean of (e),(i),(j) **Security**, mean of 7(f) 7(g)	Effort reward imbalance. Siegrist[178] Appreciation: important in systematic review and raised in phase one qualitative interviews sub theme 'you've changed' and theme 'But work also pulled me back' Prospects: limited evidence of effect in systematic review Change at work raised in phase one qualitative interviews sub-theme 'You've changed'
Flexibility of work 5 item scale score split into quartiles	**Q17(a)-(e)** (a)My workplace would allow me to reduce my working hours if I wanted to (b)I would be allowed time off at short notice for an emergency (c) If my job became too intense I would be allowed to change to a lighter role (d) My manager allows me to work flexibly when required (e) My workplace supports phased retirement arrangements	Five-point Likert scale, Strongly disagree=1, disagree=2, don't know=3, agree=4, strongly agree=5. Mean of five items x5 scale range (5-25) Scale reversed so lower scores indicate higher flexibility Split at quartiles. Lowest quartile = highest flexibility	Bespoke questions based on results of qualitative phase one, theme 'But work also pulled me back and sub-theme 'I've got no time'

Exposure	Questions	How to Calculate	References and notes
Hours - irregular 1 item binary exposure	**Q6.** Is your work schedule best described as a:	4 response: Regular schedule, Rotating schedule, Irregular schedule, Contract work Separated into binary 0 =regular hours 1= rotating, irregular, contract work	Cardiff mood disorder and work questionnaire[179] Topic raised in qualitative interviews sub-theme 'I've got no time'
Hours - unhappy 1 item binary exposure	**Q17(f)** I am happy with my pattern of work hours	Five response Likert scale, Strongly disagree, disagree, don't' know, agree, strongly agree. Split into binary: strongly disagree, disagree, don't know vs agree, strongly agree	Bespoke questions based on results of qualitative phase one, sub-theme 'I've got no time'
Isolation 1 item binary exposure	**Q7(m)** My work makes me feel isolated	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher scores = more isolated	Bespoke question based on results of qualitative phase one, sub-theme 'grinding me down
Job satisfaction 1 item binary exposure	**Q5.** How satisfied have you been with your job as a whole, taking everything into consideration?	4 response Likert scale. Very satisfied, Satisfied/fairly satisfied, Dissatisfied, Very dissatisfied. Separated into binary 0=very satisfied/satisfied, 1 = dissatisfied/very dissatisfied Higher scores = less satisfied	Previously used in earlier HEAF questionnaires.
Later working culture 1 item binary exposure	**Q9(g)** My workplace encourages work beyond the state pension age	Totally disagree = 1, Disagree to some extent = 2, neutral = 3, Agree to some extent = 4, Totally agree = 5 Split into binary, 1-3=not encouraged, 4-5 = encouraged. Higher score = more supportive employer.	Bespoke question based on perception of later working culture section of systematic review, in particular: De Wind et al[152] Van Solinge et al[114]
Loyalty 1 item binary exposure	**Q7(n)** There are people at work who I don't want to let down	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher = more loyalty	Bespoke question based on results of qualitative phase one, theme 'But work also pulled me back'.

Exposure	Questions	How to Calculate	References and notes
Overnight stays 1 item binary exposure	**Q14.** Does your job require overnight stays away from home? (Tick one box)	Four response Likert scale No–never, Yes 1-10 nights per year, Yes 11-20 times per year, Yes more than 20 times per year Split on binary never vs any Higher scores = more overnight stays	Bespoke question based on results of qualitative phase one, sub-themes 'grinding me down' 'I've got no time' and 'This hurts.'
Physical Job demands 9 binary exposures Hard work scale exposure binary (low/high)	**Q15(a)-(i)** In your main job, does an average day at work involve any of the following activities? (a) Kneeling or squatting for longer than 1 hour per day in total (b) Climbing a ladder (c) Climbing up and down more than 30 flights of stairs per day (d) Digging or shovelling (e) Lifting weights of 10 kg (25 lbs) or more by hand (f) Standing or walking for most of the day (g) Standing or walking for more than 3 hours at a time (h) Hard physical work that makes you hot or sweaty (i) Sitting for most of the day	Binary answers yes=1 no=0 6 items used for hard work scale (a) kneeling, (b) climbing ladder (d) digging) (e) lifting weights (g) standing or walking for more than 3 hours at a time (h) hard physical work. Scale 0-6, split on median into low/high	Previously used in earlier HEAF questionnaire. Highlighted as topic in qualitative phase one, sub-theme 'This hurts.'
Physical work coping 1 item binary exposure	**Q16.** Currently, how well do you cope with the physical demands of your job?	Five response Likert scale: Easily, Just about, With some difficulty, With great difficulty, Not coping. Split for binary easily vs others Higher scores are worse physical coping	Previously used in earlier HEAF questionnaire. Highlighted as topic in qualitative phase one, sub-theme 'This hurts.'
Us vs them 1 item binary exposure	**Q7(o)** I feel disconnected with colleagues at higher levels in my organisation.	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher score = worse job, more disconnection	Bespoke question based on results of qualitative phase one, sub-theme 'You've changed' and 'grinding me down'.

Exposure	Questions	How to Calculate	References and notes
Value mismatch 1 item binary exposure	**Q7(l)** I share the same work goals as my organisation	4 response Likert scale: Strongly disagree, Disagree, agree, strongly agree. Constructed as binary: Strongly disagree/Disagree vs agree/strongly agree Higher score indicates better job, less value mismatch	Bespoke question based on results of qualitative phase one, sub-theme 'You've changed.'
Work-life conflict 5 item scale score split into quartiles.	**Q18(a)-(e)** (a)Are there times when you need to be at work and at home at the same time? (b) Do you feel that your work drains so much of your energy that it has a negative effect on your private life? (c) Do you feel that your work takes so much of your time that it has a negative effect on your private life? (d) The demands of my work interfere with my private and family life (e) Due to work-related duties, I have to make changes to my plans for private and family activities.	Five item Likert scale response Never/hardly ever =1, Seldom =2, Sometimes=3, Often=4, Always =5 Calculated mean of 5 questions Split into quartiles Higher values = high work life conflict	COPSOQ[171] work-life conflict. Burr et al[183] Topic raised in qualitative interviews in theme 'I had my reasons' and systematic review Kubicek et al.[145]

5.2.4   Demographic and non-work factors

The HEAF FIRST questionnaire also included other (non-work) factors which were likely to be of relevance to retirement decision making. Details of these questions and data extracted from other HEAF questionnaires for the analyses, as well as the coding of these factors are included in Table 5-2.

Data extracted from other HEAF questionnaires included: date of birth; biological sex; date of retirement; marital status; self-rated financial status; and self-rated health.

The HEAF FIRST questionnaire also asked for the respondent's date of birth (DoB). This allowed confirmation of their identity and was used to calculate: participant's age at time of questionnaire (January 2020); their SPA (calculated on a rolling basis dependant on DoB); whether they had retired before or after SPA; and whether they were working before or after SPA.

Respondents were asked to provide the title and industry of their current job (workers), whilst retirees were asked the same details about their last-held job. The responses were coded to the SOC 2010[112] to categorise the jobs. They were also converted to NS-SEC[113] to obtain socio-economic classification in a similar method used for job titles in the HEAF study, see para 2.1. The three-tier NS-SEC classification was used to stratify the jobs of respondents into 'higher managerial/administrative and professional occupations,' and 'intermediate occupations' and 'routine and manual occupations.'

Table 5-2   HEAF FIRST phase three case-control study: demographic and non-work factors in the study

Factor	Questions	How to Calculate	References and notes
Age	**HEAF FIRST Q1.** Please fill in your date of birth	26 Jan 2020 (end of data collection) minus date of birth (DOB)	
Age of retirement	**HEAF follow-ups. Various:** When did you leave the job?	Calculated for cases (retirees). Date participant left job(HEAF FU1-4) minus date of birth (HF).	
Caring hours	**HEAF FIRST Q3(b)** In an average week, roughly how many hours would you spend doing the following activities? Giving personal care to someone in your home or family	Responses as hours per week. Converted to binary: 1 no caring, 2 some caring	Asked in prior HEAF questionnaires
Date of retirement	**HEAF follow-ups. Various:** When did you leave the job?		
Ethnic origin	**HEAF baseline, Q3** Please indicate your ethnic origin	a)White b) Black-Caribbean c) Black-African d) Black-Other e) Indian f) Pakistani g) Bangladeshi h) Chinese i) Other	
Managing financially	**HEAF baseline Q54** How well do you feel you are managing financially these days?	1 living comfortably, 2 doing alright, 3 just about getting by, 4 finding it difficult to make ends meet, 5 finding it very difficult to make ends meet Converted to binary 1 doing better (living comfortably, doing alright) vs 2. Doing worse (just about getting by, finding it difficult to make ends meet, finding it very difficult to make ends meet)	
Marital status	**HEAF baseline Q4**'What is your current marital status? (Tick one box)'	1 married, 2 single, 3 civil partnership, 4 widowed, 5 divorced Categorised as binary, 0 Married/Civil partnership 1 Single/widowed/divorced	
NS-SEC status	**HEAF FIRST Q4.**What is your MAIN occupation at the moment? and in what industry do you work?	Jobs coded into SOC 2010 categorisation. Converted into NS-SEC socio economic position. 3 categories 1 'Higher managerial' 2 'Intermediate' 3 'Routine & manual'	SOC 2010[112] NS-SEC[113]

Factor	Questions	How to Calculate	References and notes
Paid work hours	**HEAF FIRST Q3(a)** In an average week, roughly how many hours would you spend doing the following activities? Working in a paid job (whether employed or self-employed)	Responses as hours per week. Converted to tertiles of distribution: 1 No work hours 2 Low work hours (>0 –25) 3 High work hours (26-82)	Asked in prior HEAF questionnaires
Retired relative to SPA		Cases: Date of retirement minus SPA. SPA= bespoke date based on date of birth and HM government SPA timetable[54] 3 categories 1 Below SPA 2 At SPA (defined as retirement within 6 months either side of SPA, 12-month window): 3 After SPA	HM government SPA timetable[54]
Self-rated health	**HEAF baseline Q66.** In general, would you say your health is?	1 excellent, 2 very good, 3 good, 4 fair, 5 poor Categorised as binary 0 Excellent/very good/good vs 1 fair/poor	
Sex	**HEAF baseline Q2** Please fill in….. your sex	1+ Male, 2 Female	
SOC 2010 Major Groups	**HEAF FIRST Q4.**What is your MAIN occupation at the moment? and in what industry do you work?	Jobs coded into SOC 2010 categorisation which is a four-digit code. SOC 2010 can be split into broad descriptive groups by reference to the first digit of this number: 1. managers, directors and senior officials, 2. professional occupations, 3. associate professional and technical occupations, 4. administrative and secretarial occupations, 5. skilled trades occupations, 6. caring, leisure and other service occupations 7. sales and customer service occupations 8. process, plant and machine operatives 9. elementary occupations	SOC 2010[112]
Volunteering hours	**HEAF FIRST Q3(c)** In an average week, roughly how many hours would you spend doing the following activities? Working in an unpaid job for others outside your home and family (e.g. as a volunteer for a charity)	Responses as hours per week. Converted to binary: 1 no caring, 2 some caring	Asked in prior HEAF questionnaires

Factor	Questions	How to Calculate	References and notes
Working relative to SPA		Workers (controls)Difference between age and SPA. SPA, bespoke variable based on date of birth and government timetables 1 'Below SPA' 2 'At SPA' age within 6 months either side of SPA, 12-month window) 3 'After SPA'	HM government SPA timetable[54]

5.2.5   Patient and public involvement

The first draft of each of the workers' and retirees' questionnaires were presented to the
Southampton Medical Research Council Lifecourse Epidemiology Unit Research Review Panel on
26 March 2019 for patient and public involvement input. I sought feedback on the entire
questionnaire and particularly emphasised the new questions I had needed to devise. The
responses from the public panel were extremely positive about the questionnaires who only
suggested minor amendments. In particular, the panel advised that the flexibility questions should
include a 'don't know' response box. These amendments were adopted before the questionnaires
were sent for ethical approval.

5.2.6   Ethics application

As noted above in para 2.1, HEAF has an ongoing ethics approval with NHS Health Research
authority, North West, Liverpool East Research Ethics Committee IRAS PROJECT ID 103258, REC
Reference 12/NW/0500. HEAF FIRST Phase three was submitted as a substantial amendment
(number 9) to the existing project and protocol along with proposed questionnaires, information
sheets and template letters on 29 May 2019. A favourable opinion was obtained from the
committee 01 July 2019 with HRA approval being granted on 04 July 2019.

5.2.7   Sampling and matching
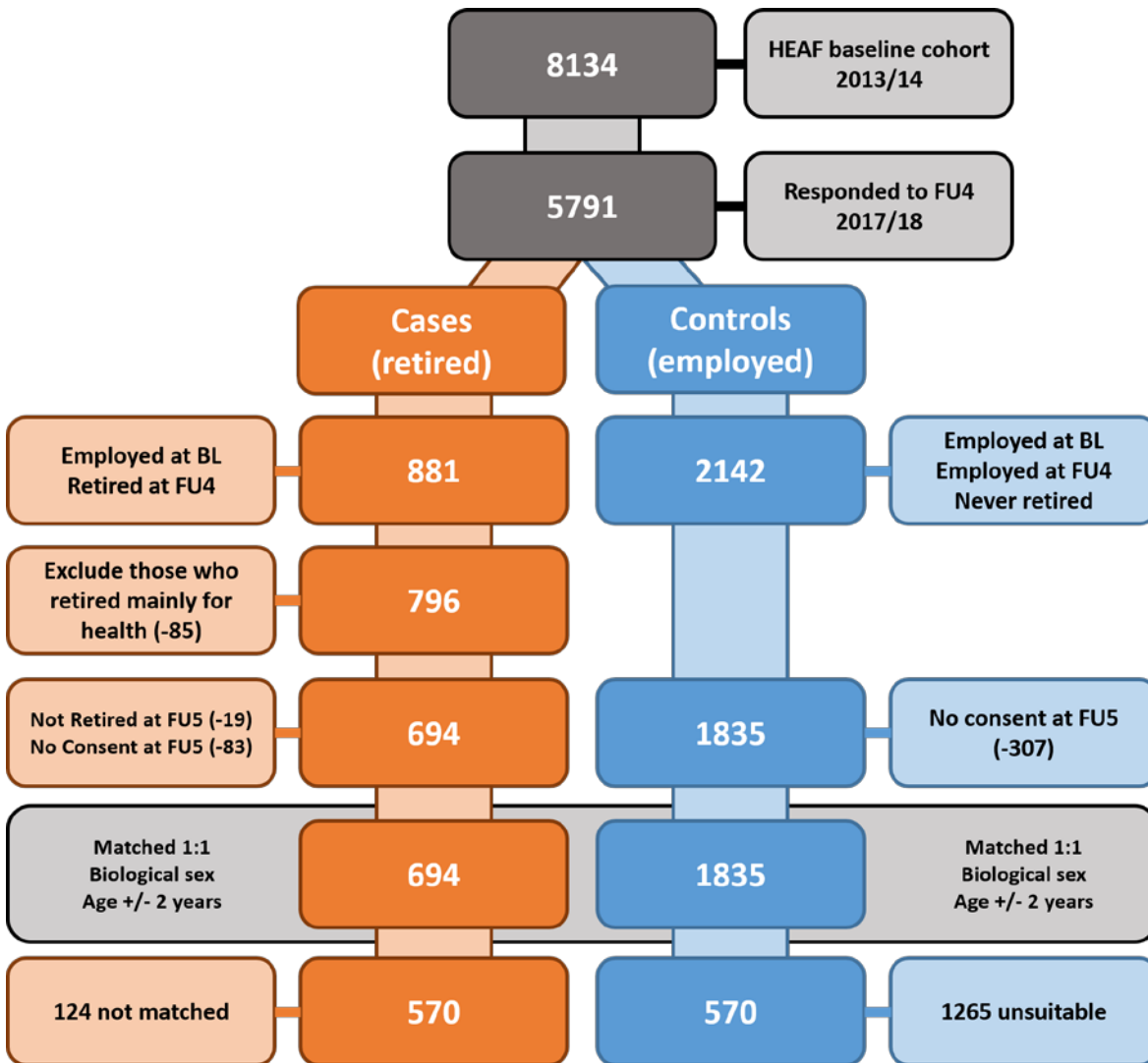
Figure 5-5   HEAF FIRST phase three case-control study: participant sampling flow-chart

Participants for the current study were sampled from amongst members of the existing HEAF cohort who answered FU4 (2017-2018) and had re-affirmed their consent to participate in further questionnaires at FU5 (2019) as shown in Figure 5-5.

At HEAF baseline (2013-2014) participants were asked *'Which of the following best describes your present work situation?'*. The four possible responses were: *'a) Employed, b) Self-employed, c) Unemployed, d) Retired.'* All participants in HEAF FIRST phase three had reported that they were employed at baseline. This was in order to ensure that any retirement decision would be contemporary and incident during the HEAF follow-up. Self-employed participants at baseline were excluded in order to focus upon the potential effects of work-related factors that may be modifiable by an employer. The question described above was asked at every subsequent follow-up in order to assess changes over time.

Potential cases (retirees) were participants who had reported that their employment position had changed to retirement at, or before, FU4 (2017-2018). Cases may have first reported being retired at either FU1 (2015-2016), FU2 (2016-2017), FU3 (2016-2017) or FU4 (2017-2018), however all had reported being retired at FU4. Note that each self-report of retirement status was retrospective in respect of the prior year. Consequently, if a participant first reported retirement at FU3, then they had retired at some point between FU2 and FU3. The specific month and year of retirement were collected in a separate question.

If HEAF participants reported leaving a job, they were directed to a further question which asked, *'Did you leave because of a health problem?'*. Responses were *'a) No, not at all, b) Yes, a health problem was the main reason for leaving, c) Yes, a health problem was part of the reason for leaving'* Participants who retired and reported that this was mainly for a health reason were excluded, whilst those who reported retirement as partly or not at all for a health reason were eligible for the current study. The retirement decisions that were primarily motivated by health were excluded from the study as they were the least likely to be affected by modifiable work-factors.

In the summer of 2019 members of the HEAF cohort were sent a FU5 questionnaire and asked to reaffirm their consent to receive postal questionnaires for a period of five years. By necessity the HEAF FIRST cases were restricted to those who had affirmed consent and were still retired at FU5 (2019). This group numbered 694 retirees as of 25 October 2019.

Controls (workers) were also participants who reported being employed at baseline. However, in contrast the controls were eligible if they reported being employed at FU4 and FU5. The controls had never been retired at any follow-up and had re-confirmed their consent to participate in the HEAF study in the summer of 2019. On 25 October 2019 these comprised a pool of 1835.

The case pool were matched with the control pool on a one-to-one basis utilising matching factors of age (+/-2 years) and biological sex. Suitable matches were found between 570 cases with 570 controls with ongoing consent in the HEAF cohort. 124 cases had no suitable match. This left a cohort of 1,140 which consisted of 570 retirees and 570 matched workers. Study invitations and questionnaires were posted to the 1,140 eligible participants commencing 30 October 2019.

Cases and controls were selected based on information on employment status from FU4 and FU5 (mid-2019). It was envisaged that some of the potential participants would have changed employment status between HEAF FU5 and the HEAF FIRST questionnaire. As cases (retirees) were sent a different questionnaire from the controls (workers) (worded in different tenses deliberately to be relevant for each group), respondents who had changed their work status since

the most recent follow-up would have received the incorrect questionnaire. For this reason, any respondents for whom this applied were excluded from analyses.

5.2.8   Definition of outcome (retirement)

The principal outcome for the current study was self-reported retirement. I sought to explore the determinants of retirement decisions and therefore chose not to consider risk factors for retirement 'intention' (when respondents think they will retire), in line with the systematic review described in Chapter 4. In order to send the correct questionnaire, participants were defined by their self-reported employment status at FU4 as: retired (cases) or employed (controls). However, their status was then re-assessed in the HEAF FIRST questionnaire. Possible responses were *'a) Employed, b) Employed off sick, c) Self-employed, d) Self-employed off sick, e) Unemployed and seeking work, f) Unemployed but not seeking work, g) Retired, no paid work, h) Retired, but doing some paid work.'*

Cases who reported that they were retired, either with or without paid work were confirmed as cases for the analyses and controls who reported that they were employed or employed off-sick were confirmed as controls. Note that this self-reported definition of retirement allows a person to be retired but still carry out some paid work in line with the Feldman definition described at para 1.2.3.

5.2.9   Data Entry

Completed questionnaires were double entered by data management staff at the MRC LEU Southampton. Discrepancies between the two data entry sets were resolved by members of data management staff. I carried out any further data cleaning.

5.2.10   Missing data

Where exposures were constituted of two or fewer questionnaire items, no missing data was permitted and participants with missing answers were dropped from relevant analysis. Where exposures consisted of scales constructed of three or more questionnaire items, a single missing item was permitted and the score calculated from the mean value of the remaining items.

For the cases (retirees) I constructed date and age of retirement descriptive variables from prior HEAF data. Where respondents had not given a specific date for their retirement (n=43), I assumed a date of 01 January on a year-by-year basis which represented the commencement of a follow-up questionnaire. Therefore, if the participant had not specified a retirement date but had

first reported retirement at FU1 (mailed out in 2014/15) then I chose the date of 01/01/2014 as date of retirement. This also represents the effective midpoint between follow up questionnaires which were sent over a period of two years. Note that the date and age of retirement was used to describe the cohort and is not used in any analytical models.

5.2.11 Data analysis

Relationships between exposures and retirement were explored using unconditional logistic regression. In their paper on this topic Pearce[184], [185] reported that adjustment for matching factors is almost always necessary in case control studies, as the process of matching does not control for confounding by the matching factors. Further they state that an unconditional analysis rather than a conditional analysis results in no loss of validity and can even increase precision. This position is supported by Mansournia et al.[186], [187] In addition a conditional analysis would require dropping participants where the corresponding matched questionnaire was not returned. Therefore, I decided to proceed with an unconditional analysis that would allow me to include all the valid responses whilst also adjusting for the matching factors (age and sex). Descriptive statistics were compiled for cases and controls and differences between groups were assessed utilising logistic regression with adjustments for age and sex (matching factors).

I also set out to investigate the role of non-work factors in the decision to retire in order to make appropriate adjustment to logistic regression models.

All data analysis was carried out utilising Stata© v16.1.[188]

5.2.12 Stratification by sex

A priori stratification of results by sex can be justified due to the systemic differences in retirement for men and women. Although equalised during the period 2010-2018, women's SPA were typically five years below that of men see para 1.5.2. For this cohort, SPA's were extended for women and men on an incremental basis. Therefore, it is possible that different factors affect the retirement decision for men and women.

The data analysis was carried out on the whole cohort, and then separately for women and men. I will present the results for these three groups in the next three chapters respectively.

Chapter 6 Phase three: case-control study results (whole cohort)

6.1 Results: whole cohort

In this chapter, I will present the results from analysis of the whole HEAF FIRST cohort. Results for women only and men only will follow in the next two chapters.

6.1.1 Responses

Questionnaires were posted to 1,140 potential participants commencing 30 October 2019 to the last address provided by each HEAF cohort member. In total, 1,001 questionnaires were returned (response rate 88%). Two of these were unusable as the respondents had not completed sufficient information for there to be certainty that they were the intended HEAF cohort participant. Amongst the remainder, given that six months had passed between FU5 and the sending of the HEAF FIRST questionnaire, as expected, some respondents had changed their employment status. Ten cases (retirees) had subsequently returned to paid work, whilst 53 controls (employees) identified themselves as retired. Due to their changed status these 63 participants had not received the appropriate questionnaire and so were excluded from the sample. Responses to the questionnaire are summarised in Figure 6-1 below.
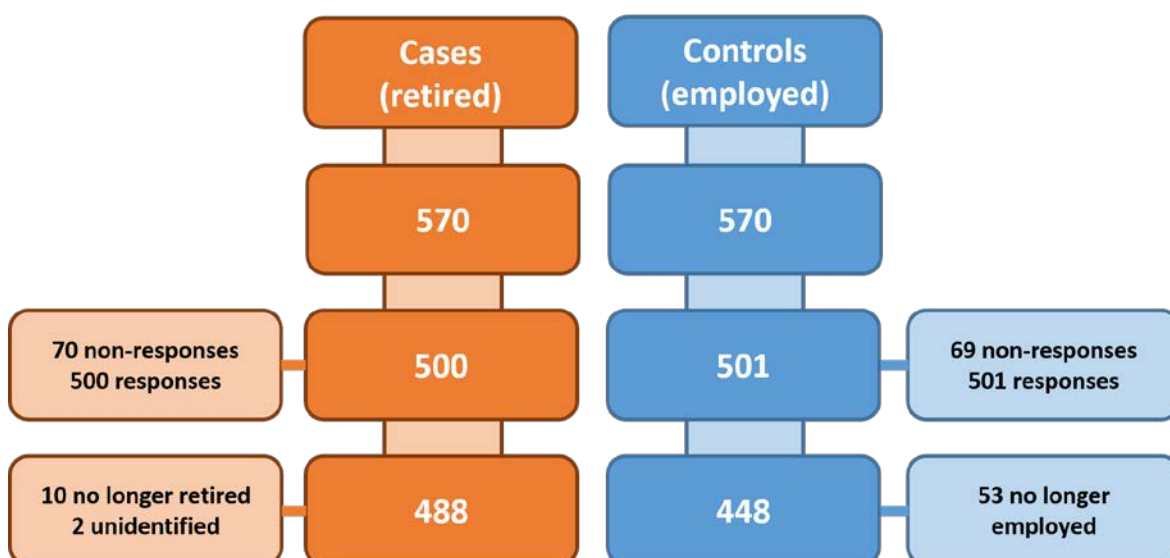
Figure 6-1   HEAF FIRST phase three: flow-chart of questionnaire responses

The final cohort consisted of 936 participants, 488 of whom identified themselves as retired (cases) whilst 448 identified themselves as employed (controls).

6.1.2 **Demographic characteristics**

Table 6-1 describes the demographic characteristics (age, sex, marital status, ethnicity, self-reported employment status, hours per week spent working, hours per week spent delivering unpaid care and hours per week spent volunteering) of the HEAF FIRST participants. The cohort of 936 were predominantly women (61%) and median and mean age was 65 years old. A high proportion were white (99%) and most were married or in a civil partnership (70%). 17% of the cohort had some caring responsibilities whilst 19% participated in some voluntary work.

Table 6-1   Demographic characteristics of respondents to the HEAF FIRST questionnaire

Characteristic	N	%	Mean	SD
N=936				
Sex:				
Female	573	61.2%		
Male	363	38.8%		
Age	936		65.12	3.47
Age median			65.03	
Marital status (BL)				
married/civil part	649	70%		
single/widowed/ divorced	278	30%		
Ethnicity (BL)				
White	921	98.7%		
Black	5	0.5%		
Indian	2	0.2%		
Chinese	1	0.1%		
Other	4	0.43%		
Employment status (HF)				
Employed	434	46.4%		
Employed off sick	14	1.5%		
Retired, no paid work	436	46.6%		
Retired, some paid work	52	5.6%		
Paid Job (hours) (HF)				
No work hours	436	46.6%		
Low work hours	200	21.4%		
High work hours	300	32.0%		
Personal care (hours) (HF)				
No caring	776	82.9%		
Some caring	160	17.1%		
Volunteering (hours) (HF)				
No volunteering	763	81.5%		
Some volunteering	173	18.5%		

6.1.3 Health and socio-economic position

Table 6-2 describes the responses of the whole cohort to the questions about health and socio-economic characteristics. 23% of the cohort reported that they were struggling financially (just about getting by, finding it difficult to make ends meet or finding it very difficult to make ends meet). 15% reported fair/poor self-rated health at HEAF baseline. When using the NS-SEC[113] three-tiered system of socio-economic position, 44% of the HEAF FIRST cohort were classified as higher managerial, 29% intermediate and 27% routine and manual, see Figure 6-2.

Table 6-2   Health and socio-economic characteristics of respondents to the HEAF FIRST questionnaire

Characteristic	N	%	Mean	SD
	N=936			
Managing financially (BL)				
Doing better	712	77.3%		
Doing Worse	209	22.7%		
Social class (HF)				
Routine and Manual	255	27.2%		
Intermediate	273	29.2%		
Higher Managerial	408	43.6%		
Self-rated health (BL)				
at least good	790	85.1%		
fair/poor	138	14.9%		
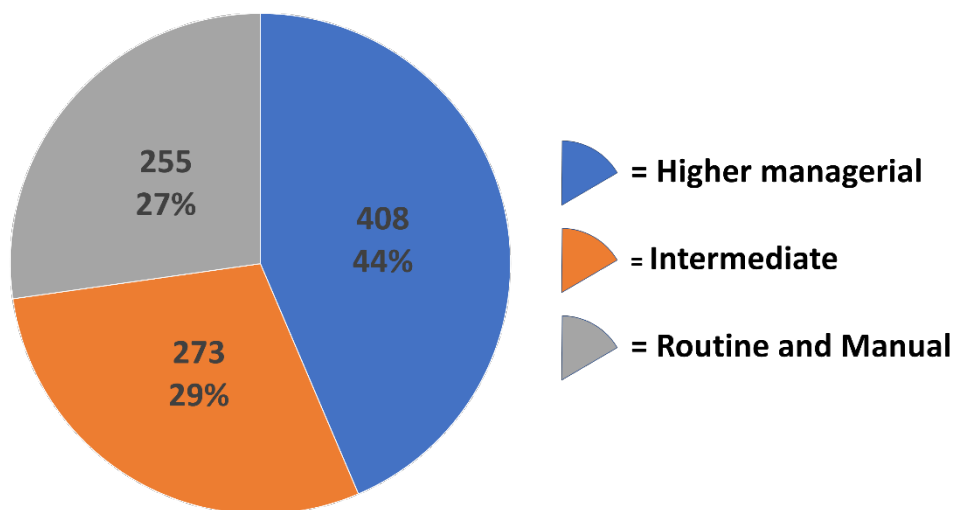
Figure 6-2   Pie chart of NS-SEC status of the whole sample of respondents to the HEAF FIRST questionnaire

6.1.4   SOC 2010 major job groups (whole cohort)

Figure 6-3 shows the distribution of job titles when classified using the SOC 2010[112] system. Retirees tended to report working in jobs that were in higher SOC 2010 categories than workers. (note that the SOC 2010 classifications are the basis of, but are not directly comparable with, NS-SEC[113] scores). Major groups 1-3 including managers, professionals and associate professionals made up 51% of retirees compared with 36% of workers.
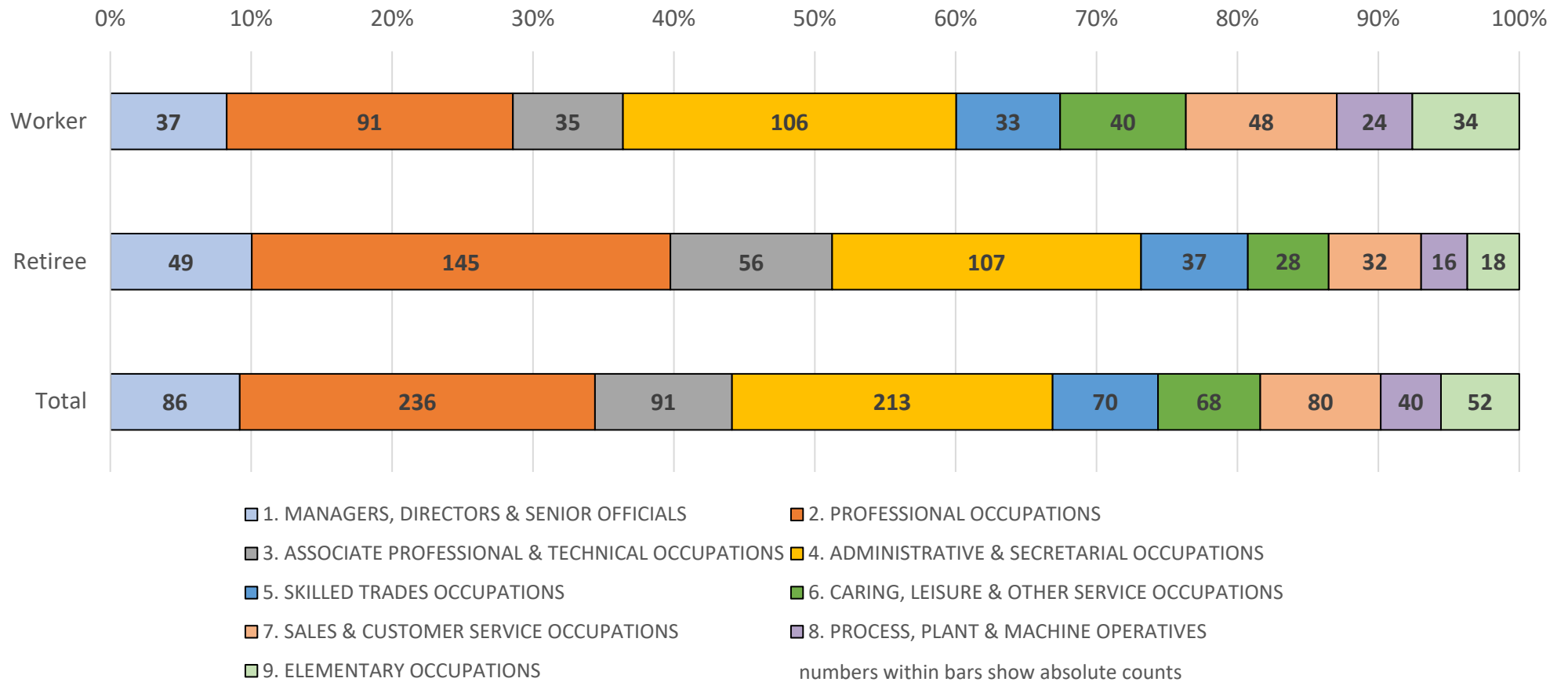
Figure 6-3   Graphical representation of job-roles in HEAF FIRST cohort: distribution of SOC 2010 major groups by case-control status.

6.1.5   Age profile of whole cohort

Age was calculated at the end of data collection (January 2020). The median ages of the HEAF FIRST cohort are described in further detail in Table 6-3. Retirees were older than workers, and men generally older than women.

Table 6-3   Median age of the respondents to the HEAF FIRST questionnaire as of January 2020

	N	Median age	Lower IQR	Higher IQR	Min	Max
Retirees Male	192	66.37	63.53	68.69	57.31	71.86
Retirees Female	296	65.97	62.98	67.95	57.16	72.02
Retirees Total	488	66.05	66.05	68.15	57.16	72.02
Workers Male	171	64.85	63.45	66.85	57.42	71.76
Workers Female	277	64.15	62.68	65.85	57.17	72.02
Workers Total	448	64.49	62.90	66.15	57.17	72.02

Chapter 6

Cases (retirees) retired between June 2013 and April 2018 and had a median age of 61.8 at retirement. Men generally retired at older ages than women, see Table 6-4.

Table 6-4   Retirees' median age of retirement in the respondents to the HEAF FIRST questionnaire

	N	Median	Lower IQR	Higher IQR	Min	Max
Retirees Male	192	62.38	59.55	64.99	52.42	69.39
Retirees Female	296	61.51	59.00	63.95	53.62	69.25
Retirees Total	488	61.80	59.10	64.43	52.42	69.39

During the period of data collection for the HEAF study, the UK government increased state pension age on a rolling basis, within the range of 60-67 for women and 65-67 for men. Those with later dates of birth (younger) generally had their SPA raised more than older participants. 64% of the retirees in HEAF FIRST retired before SPA. A higher proportion of women reported retirement dates after SPA, when compared with men. The cohort included men and women who retired before, at, and after SPA, see Table 6-5.

Table 6-5   Retirees' age of retirement, in relation to state pension age, in the respondents to the HEAF FIRST questionnaire

	Retired below SPA	Retired +/- 6 months SPA	Retired after SPA	Total
Male	**132** 68.75%	**33** 17.19%	**27** 14.06%	**192** 100%
Female	**182** 61.49%	**19** 6.42%	**95** 32.09%	**296** 100%
Total	**314** 64.34%	**52** 10.66%	**122** 25%	**488** 100%

At the date of questionnaire, the cohort included workers who were working before, at and after their state pension ages, as described in Table 6-6. 28% of the workers were working after SPA. A higher proportion of men reported working after SPA when compared with women.

Table 6-6   Age of workers, in relation to state pension age, in the respondents to the HEAF FIRST questionnaire

	working pre-SPA	working +/- 6 months SPA	working after SPA	Total
Male	**104** 60.82%	**12** 7.02%	**55** 32.16%	**171** 100%
Female	**193** 69.68%	**15** 5.42%	**69** 24.91%	**277** 100%
Total	**297** 66.29%	**27** 6.03%	**124** 27.68%	**448** 100%

6.2   Results: whole cohort by case-control status

The tables in this section describe the results for the whole cohort stratified by case-control status. The final column in most tables displays the result of a logistic regression which was performed in order to compare that exposure between retirees and workers. In each case, this regression has been adjusted for the matching factors in the case-control study (age and sex).

6.2.1   Power calculations

Power calculations were conducted utilising the Wald test as detailed by Demidenko[189] with calculations being carried out on the author's accompanying website.[190] This enabled calculation of the minimum detectable odds ratio, for binary work-related exposures of varied prevalence in the sample. All calculations assumed 80% power and a 5% significance level.

Table 6-7   HEAF FIRST phase three case-control study: power calculations

Exposure	Sample size	Outcome prevalence (retirement)	Exposure prevalence	Minimum detectable OR
Job dissatisfaction	936	52.14%	8.45%	2.07
Highest effort reward imbalance	936	52.14%	24.38%	1.55
Commute time ≥30 minutes	936	52.14%	61.95%	1.46
Declining standards in last 2 years	936	52.14%	48.02%	1.45

Therefore, the HEAF FIRST cohort of 936 is powered to detect minimum odds ratios of 1.45-2.07 dependant on the prevalence of the exposure, see Table 6-7.

6.2.2   Demographic characteristics (by case-control status)

Participant characteristics of the HEAF FIRST cohort by case-control status are summarised in Table 6-8. Retirees (median age 66.05) were significantly older than workers (median age 64.49) and were more likely to be married. Of the retirees, 436 reported being retired with no paid work whilst 53 reported undertaking some paid work, whilst workers reported mean weekly working hours of 31.76. Retirees reported spending more hours per week carrying out caring responsibilities (mean 3.06) and undertaking voluntary work (mean 1.81) when compared with those in work (1.78 and 0.57 respectively).

Table 6-8   Demographic characteristics of the respondents to the HEAF FIRST questionnaire (by case-control status)

Characteristic	Cases(Retirees) N=488				Controls(Workers) N=448				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, CI	p
Sex:										
Female	296	60.7%			277	61.8%			ref	
Male	192	39.3%			171	38.2%			1.00 (0.77,1.31)	0.98
Age	488		65.67	3.64	448		64.53	3.18	**1.10 (1.06,1.14)**	**<0.001**
Age median			66.05				64.49			
Marital status (BL)										
married/civil part	364	75.2%			285	64.3%			ref	
single/widowed/ divorced	120	24.8%			158	35.7%			**0.59 (0.44,0.78)**	**<0.001**
Ethnicity (BL)										
White	480	98.8%			441	98.7%				
Black	2	0.41%			3	0.67%				
Indian	0	0.0%			2	0.45%				
Chinese	1	0.21%			0	0.0%				
Other	3	0.62%			1	0.22%				
Employment status (HF)										
Employed	0	0.0%			434	96.9%				
Employed off sick	0	0.0%			14	3.1%				
Retired, no paid work	436	89.3%			0	0.0%				
Retired, some paid work	52	10.7%			0	0.0%				
Paid Job (hours) (HF)	488		1.01	4.06	448		31.76	11.99		
No work hours	435	89.1%			1	0.2%				
Low work hours	51	10.5%			149	33.3%				
High work hours	2	0.4%			298	66.5%				
Personal care (hours) (HF)	488		3.06	11.96	448		1.78	7.22		
No caring	396	81.1%			380	84.8%				
Some caring	92	18.9%			68	15.2%				
Volunteering (hours) (HF)	488		1.81	3.97	448		0.57	2.60		
No volunteering	356	73.0%			407	90.8%				
Some volunteering	132	27.0%			41	9.2%				

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors). Age adjusted for sex only, sex adjusted for age only.

6.2.3 Health and socio-economic position (by case control status)

Table 6-9 compares the health and socio-economic characteristics of the HEAF FIRST cohort by case-control status. Retirees were more likely to be of a higher socio-economic position when job titles were categorised utilising the SOC 2010[112] and NS-SEC[113] system (see Figure 6-4) and were more likely to report that they were doing better financially at baseline. Self-rated health reported at HEAF baseline was not significantly different between retirees and workers.

Table 6-9   Health and socio-economic characteristics of respondents to the HEAF FIRST questionnaire (by case-control status)

Characteristic	Cases(Retirees) N=488				Controls(Workers) N=448				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, CI	p
Managing financially (BL)										
Doing better	419	87.3%			293	66.4%			ref	
Doing Worse	61	12.7%			148	33.6%			**0.28 (0.20,0.40)**	**<0.001**
Social class (HF)										
Routine and Manual	100	20.5%			155	34.6%			ref	
Intermediate	141	28.9%			132	29.5%			**1.78 (1.25,2.54)**	**0.001**
Higher Managerial	247	50.6%			161	35.9%			**2.71 (1.95,3.77)**	**<0.001**
Self-rated health (BL)										
at least good	412	84.6%			378	85.7%			ref	
fair/poor	75	15.4%			63	14.3%			1.04 (0.72,1.51)	0.817

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).
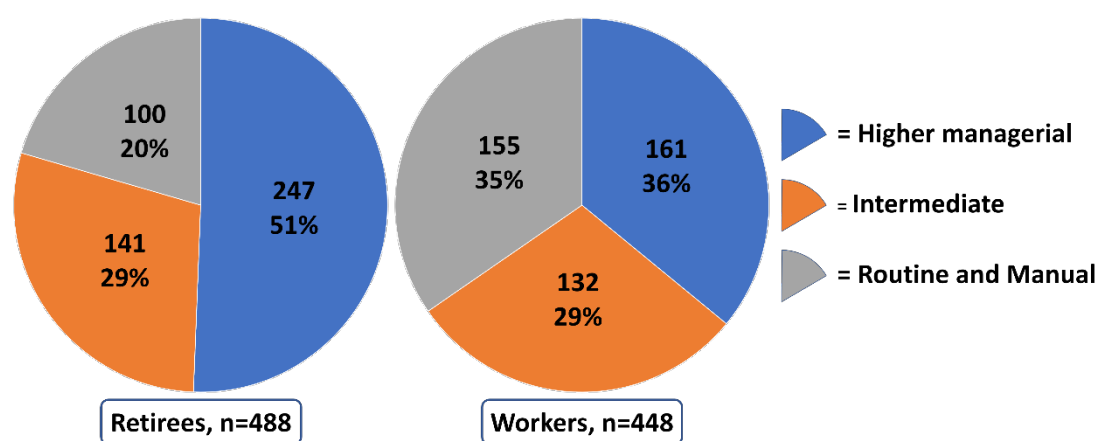
Figure 6-4   Pie chart of NS-SEC status of respondents to the HEAF FIRST questionnaire stratified by case-control status

6.2.4   Job satisfaction and working hours (by case-control status)

Table 6-10 describes job satisfaction and responses to the working hours questions by case-control status. A higher proportion of retirees reported being dissatisfied with their jobs compared with current workers, although this difference failed to reach statistical significance when adjusted for age and sex. Retirees were also more likely to have worked irregular hours and report being unhappy with their pattern of work hours.

Table 6-10   Descriptive results: job satisfaction and working hours exposures in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
Satisfaction						
satisfied	440	90.3%	416	92.9%	ref	
dissatisfied	47	9.7%	32	7.1%	1.54 (0.96,2.48)	0.076
Hours - irregular						
Regular hours	380	78.4%	386	86.5%	ref	
Irregular hours	105	21.6%	60	13.5%	**1.76 (1.23,2.52)**	**0.002**
Hours - unhappy						
Happy	407	84.1%	391	87.5%	ref	
Not happy	77	15.9%	56	12.5%	**1.57 (1.06,2.32)**	**0.023**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).

Table 6-11 describes the participants who reported working irregular hours (rotating schedule, irregular schedule and contract work) by SOC 2010[112] major job group. Of those who reported

working irregular hours, 35% worked in professional jobs (which includes most medical clinicians and nurses). These results varied by sex, with 45% of women who worked irregular hours being in professional jobs compared with 23% of men. 20% of men who reported working irregular hours were in the process, plant and machine operatives SOC 2010[112] major group.

Table 6-11   Descriptive results: participants who work irregular hours in SOC 2010 major job groups from the HEAF FIRST questionnaire (whole cohort, women and men)

SOC 2010 Major group	Whole cohort		Women		Men	
	n	%	n	%	n	%
1. Managers, directors & senior officials	20	12.1%	6	6.6%	14	18.9%
2. Professional occupations	58	35.2%	41	45%	17	23%
3. Associate professional & technical occupations	15	9.1%	9	9.9%	6	8.1%
4. Administrative & secretarial occupations	10	6.1%	7	7.7%	3	4.1%
5. Skilled trades occupations	15	9.1%	3	3.3%	12	16.2%
6. Caring, leisure & other service occupations	16	9.7%	12	13.2%	4	5.4%
7. Sales & customer service occupations	10	6.1%	9	9.9%	1	1.4%
8. Process, plant & machine operatives	16	9.7%	1	1.1%	15	20.3%
9. Elementary occupations	5	3%	3	3%	2	2.7%
Total	165	100%	91	100%	74	100%

6.2.5   Effort-reward imbalance and subscales (by case-control status)

Table 6-12 describes the results from ERI exposures by case-control status. Retirees were more likely to report higher levels of effort-reward imbalance, indicating potentially higher job-strain, based on the ERI short form questionnaire. Of the ERI sub-scales, efforts were reported to be consistently higher by retirees. However, answers to the rewards scale were not significantly different between cases and controls. The rewards scale can be broken down into three further subscales (see para 5.2.3.6) and when this was done, retirees were more likely to report better promotion opportunities but poorer job security. Appreciation was not significantly different between the groups. Further information on the job groups represented by the four categories of ERI is provided in Figure 6-5. The proportions of SOC 2010[112] major groups were relatively consistent in each of the four ERI categories.

Table 6-12 Descriptive results: effort-reward imbalance exposures in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
ERI (quartiles)					**1.29 (1.15,1.46)**	**<0.001**
Lowest ERI	110	22.9%	139	31.5%	ref	
Low ERI	116	24.1%	115	26.0%	1.34 (0.93,1.93)	0.117
High ERI	122	25.4%	96	21.7%	**1.86 (1.27,2.70)**	**0.001**
Highest ERI	133	27.7%	92	20.8%	**2.11 (1.45,3.07)**	**<0.001**
Efforts (quartiles)					**1.42 (1.26,1.59)**	**<0.001**
Lowest Efforts	153	31.4%	199	44.4%	ref	
Low Efforts	88	18.1%	85	19.0%	**1.47 (1.01,2.14)**	**0.043**
High Efforts	107	22.0%	88	19.6%	**1.83 (1.27,2.63)**	**0.001**
Highest Efforts	139	28.5%	76	17.0%	**2.97 (2.06,4.28)**	**<0.001**
Rewards (quartiles)					0.97 (0.87,1.09)	0.639
Lowest Rewards	152	31.5%	137	30.9%	ref	
Low Rewards	96	19.9%	87	19.6%	0.98 (0.68,1.43)	0.929
High Rewards	120	24.9%	113	25.5%	0.97 (0.68,1.37)	0.843
Highest Rewards	114	23.7%	106	23.9%	0.92 (0.64,1.31)	0.635
Appreciation (quartiles)					1.01 (0.88,1.15)	0.921
Lowest Appreciation	156	32.2%	127	28.5%	ref	
Low Appreciation	198	40.9%	203	45.6%	0.79 (0.58,1.08)	0.144
High Appreciation	48	9.9%	62	13.9%	**0.59 (0.38,0.93)**	**0.023**
Highest Appreciation	82	16.9%	53	11.9%	1.21 (0.79,1.85)	0.374
Promotion (quartiles)					**1.34 (1.16,1.56)**	**<0.001**
Lowest Promotion	110	22.8%	133	30.0%	ref	
Low Promotion	196	40.6%	204	45.9%	1.13 (0.82,1.56)	0.464
High Promotion	119	24.6%	73	16.4%	**2.13 (1.43,3.15)**	**<0.001**
Highest Promotion	58	12.0%	34	7.7%	1.95 (1.18,3.22)	0.009
Security (quartiles)					**0.79 (0.70,0.90)**	**<0.001**
Lowest Security	212	43.9%	155	34.8%	ref	
Low Security	145	30.1%	154	34.5%	**0.67 (0.49,0.91)**	**0.012**
High Security	75	15.5%	68	15.2%	0.73 (0.49,1.09)	0.12
Highest Security	50	10.5%	69	15.5%	**0.45 (0.30,0.70)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).
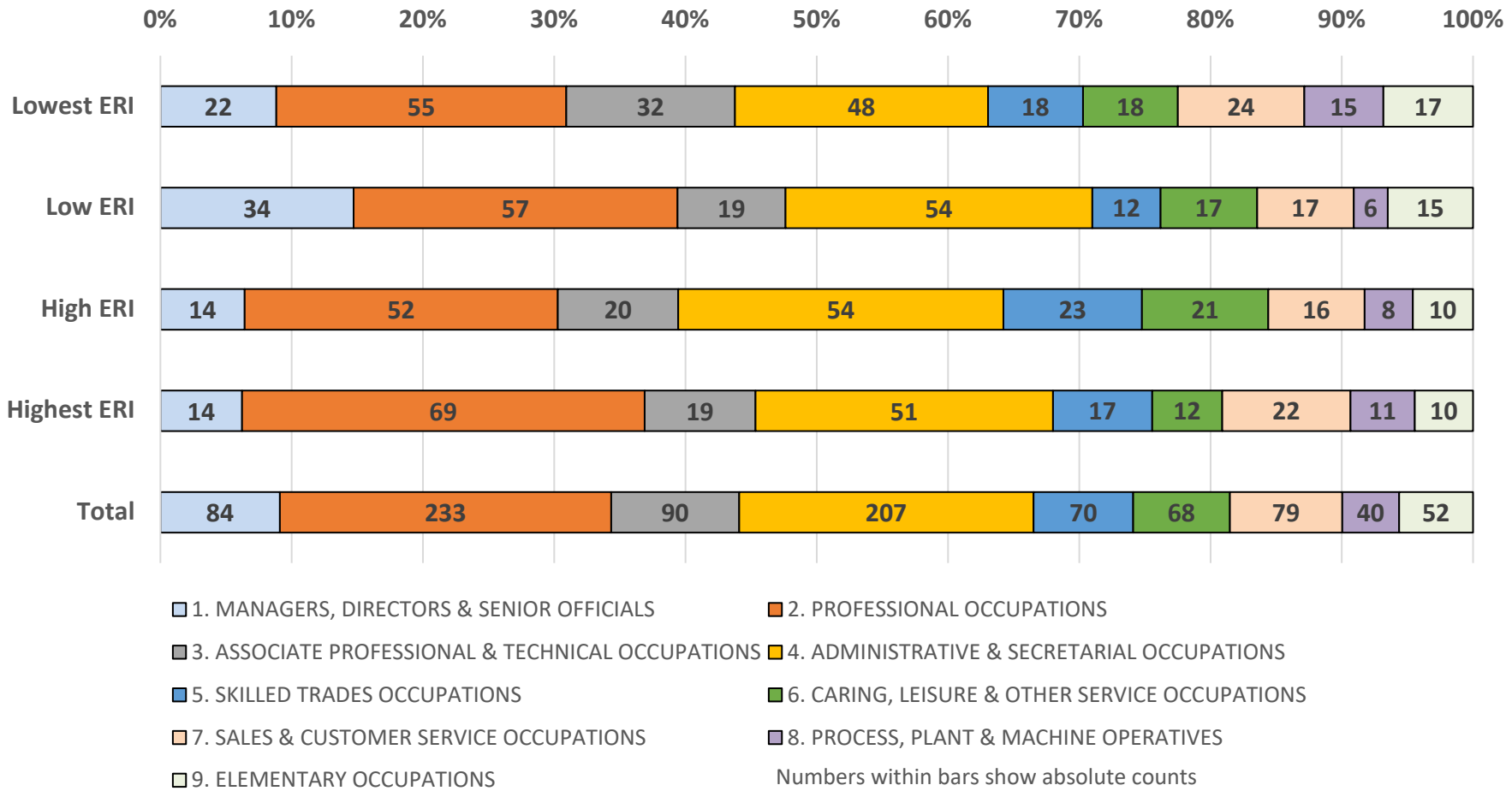
Figure 6-5   Graphical representation of job-roles of HEAF FIRST cohort: distribution of SOC 2010 major groups by ERI in quartiles.

6.2.6 Workplace decline and workplace community (by case-control status)

Table 6-13 describes the responses of participants about perceived workplace decline and feeling of community by case-control status. Retirees were more likely to report that standards had declined over the past two years of their work. They were also more likely to report that their work made them feel isolated and a feeling of disconnection with colleagues at higher levels in their organisation, although these two items did not reach statistical significance when adjusted for age and sex. Workers were less likely to report a feeling of loyalty (not wanting to let people down at work).

Table 6-13   Descriptive results: workplace decline and community exposures in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
Declining standards						
No decline	230	47.2%	256	57.1%	ref	
Decline	257	52.8%	192	42.9%	**1.58 (1.21,2.05)**	**0.001**
Shared goals						
Shared goals	392	80.7%	354	79.2%	ref	.
No shared goals	94	19.3%	93	20.8%	0.93 (0.67,1.28)	0.64
Isolation						
No Isolation	412	84.6%	391	87.5%	ref	
Isolation	75	15.4%	56	12.5%	1.31 (0.90,1.91)	0.165
Loyalty						
Loyalty	443	91.2%	387	86.8%	ref	.
No loyalty	43	8.8%	59	13.2%	**0.58 (0.38,0.89)**	**0.012**
Us VS Them						
No Disconnection	262	54.0%	265	59.6%	ref	
Disconnection	223	46.0%	180	40.4%	1.29 (0.99,1.68)	0.062
Community at work						
Part of community	401	82.3%	357	79.9%	ref	.
Not Part of community	86	17.7%	90	20.1%	0.86 (0.62,1.20)	0.379

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).

6.2.7 Demand-control support model (by case-control status)

Table 6-14 describes the descriptive results from DCSQ exposures by case control status. The demand control support model categorises jobs into four types of which low demand/high control was used as a reference category in HEAF FIRST. Those with active jobs (high demands, high control) were more likely to be retirees as were those with high demand/low control. Workers were more likely to be in low demand/high control and passive jobs (low demands, low control). Higher levels of psychosocial demands were reported by retirees whilst workers reported higher levels of job control (decision latitude) but social support was not significantly different between the groups. The DCSQ control exposure can be further divided into subscales that show contrasting results in this cohort, with more skill discretion reported by workers but more decision authority reported by retirees.

Figure 6-6 gives further details of the job titles of participants in the four DCSQ groups. Notionally the highest levels of job-strain will occur in the high demand/low control roles and these contain a relatively high proportion of jobs in the lower groups in the SOC 2010[112] (elementary, process and sales groups represent 25% of the total). However, these lower SOC 2010 groups have an even higher prevalence in the passive DCSQ roles (elementary, process and sales groups, 33%). Low demand/high control is notionally the category with the least job strain; however, it included a relatively high proportion of jobs in the higher SOC 2010 groups (managers, professionals and associate professionals, 59%). However active jobs had an even higher proportion of these job roles (managers, professionals and associate professionals, 68%), driven by a high proportion of professional jobs (46%) which includes medical staff such as doctors and nurses.

Table 6-14   Descriptive results: DCSQ exposures in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
DCSQ type						
Low Demand/high control	147	30.4%	150	33.5%	ref	
Active Job	114	23.6%	55	12.3%	**2.44 (1.62,3.66)**	**<0.001**
Passive Job	114	23.6%	148	33.0%	0.77 (0.54,1.08)	0.125
High Demand/low control	109	22.5%	95	21.2%	1.27 (0.88,1.84)	0.208
Psychosocial Demands						
Low	261	53.8%	298	66.5%	ref	
High	224	46.2%	150	33.5%	**1.93 (1.46,2.54)**	**<0.001**
Control (decision Latitude)						
High	261	53.8%	205	45.8%	ref	
Low	224	46.2%	243	54.2%	**0.70 (0.54,0.91)**	**0.008**
Social support						
High	226	46.7%	199	44.5%	ref	
Low	258	53.3%	248	55.5%	0.94 (0.72,1.22)	0.644
Skill Discretion (sub cat of DL)						
High	215	44.2%	146	32.6%	ref	
Low	271	55.8%	302	67.4%	**0.57 (0.43,0.75)**	**<0.001**
Decision authority (Sub cat of DL)						
High	152	31.3%	152	34.0%	ref	.
Low	333	68.7%	295	66.0%	1.13 (0.86,1.50)	0.383

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).
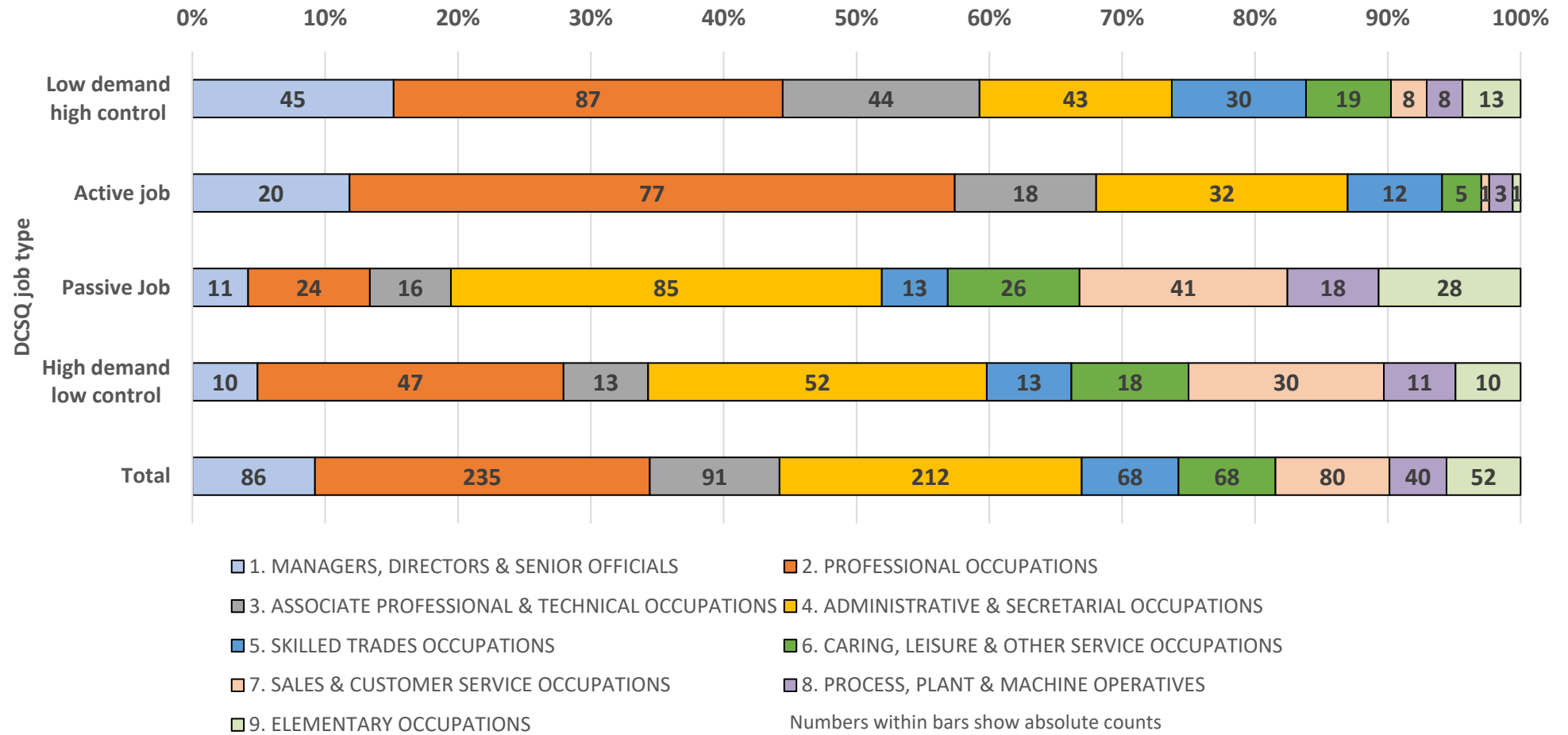
Figure 6-6   Graphical representation of job-roles of HEAF FIRST cohort: distribution of SOC 2010 major groups by DCSQ job type.

6.2.8 Age discrimination and later working culture (by case-control status)

Table 6-15 describes the questionnaire responses about age discrimination and later working culture by case-control status. Workers reported experiencing more age discrimination than retirees but the difference did not reach statistical significance when adjusted for age and sex. In the whole cohort, 54% of participants reported working in a workplace that does not encourage work beyond the SPA. Retirees were more likely to report being in a workplace that did not encourage working beyond the SPA, almost doubling the risk of being retired after adjustment for age and sex (OR 1.90, 95% CI 1.45-2.49).

Table 6-15   Descriptive results: age discrimination and later working culture in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
Age discrimination						
Low	264	54.8%	228	51.0%	ref	.
High	218	45.2%	219	49.0%	0.82 (0.63,1.07)	0.148
workplace encourages work post-SPA						
encouraged	200	41.7%	241	53.9%	ref	
not encouraged	280	58.3%	206	46.1%	**1.90 (1.45,2.49)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).

6.2.9 Physical work exposures (by case-control status)

Table 6-16 describes the results from physical work exposures by case-control status. The prevalence of individual physical work exposures was not consistently different between retirees and workers. A higher proportion of workers reported climbing ladders, lifting ≥10kg weights, standing/walking for most of the day, standing/walking for more than 3 hours per day and hard work that made them hot/sweaty. Retirees reported more kneeling/squatting, and sitting at work, whilst climbing stairs and digging were broadly similar between the two groups. When physical work exposures were expressed as a scale (6-items: kneeling/squatting, climbing ladders, lifting weights ≥10 kg, standing/walking for 3hrs+, hard physical work, categorised as low/high, Cronbach's alpha 0.74), workers reported more physically demanding exposures and reported a higher prevalence of not coping with those demands.

Table 6-16   Descriptive results: physical work exposures in respondents to the HEAF FIRST
questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
Physical exposures						
Kneeling/squatting	86	17.7%	64	14.3%	1.31 (0.91,1.88)	0.14
climbing ladder	69	14.2%	68	15.2%	0.88 (0.60,1.28)	0.506
30+ flights stairs	67	13.8%	60	13.4%	1.01 (0.69,1.48)	0.969
digging	14	2.9%	13	2.9%	0.96 (0.44,2.12)	0.926
lifting weights ≥10 kg	107	22.0%	104	23.2%	0.88 (0.63,1.21)	0.426
Standing/walking day	187	38.4%	191	42.6%	0.80 (0.61,1.04)	0.1
standing/walking 3hrs+	145	29.8%	163	36.4%	**0.71 (0.54,0.94)**	**0.017**
hard work	74	15.2%	80	17.9%	0.83 (0.58,1.18)	0.302
sitting	285	58.5%	224	50.0%	**1.48 (1.14,1.93)**	**0.003**
Physical work scale						
Low	271	55.6%	226	50.4%	ref	
High	216	44.6%	222	49.6%	**0.76 (0.58,0.99)**	**0.04**
Physical coping						
easily	357	73.3%	297	66.4%	ref	.
not easily	130	26.5%	150	33.6%	**0.72 (0.54,0.96)**	**0.025**

*Final column shows associations between characteristics and retirement status after logistic
regression adjusted for age and sex (matching factors).

6.2.10   Commuting and overnight stays (by case-control status)

Table 6-17 describes responses to questions about commuting and overnight stays by case-control status. Retirees were more likely to have commuted for more than 30 mins per day, however the reported levels of coping with commutes were similar between groups. Retirees reported a greater prevalence of overnight stays in their jobs and this exposure therefore had a relatively large effect size (OR 2.59, 95% CI 1.90-3.54) when adjusted for age and sex.

Table 6-17   Descriptive results: commuting and overnight stay exposures in respondents to the HEAF FIRST questionnaire (by case-control status)

Exposure	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
	N	%	N	%	OR, 95% CI	p
Commute time						
<30m	166	34.6%	186	41.8%	ref	.
≥30m	314	65.4%	259	58.2%	**1.43 (1.09,1.88)**	**0.009**
Commute coping						
easily	384	79.3%	352	79.3%	ref	.
not easily	100	20.7%	92	20.7%	1.05 (0.76,1.45)	0.765
Overnight stays						
No overnight	303	62.6%	354	79.4%	ref	.
some overnight	184	37.4%	92	20.6%	**2.59 (1.90,3.54)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).

6.2.11   Flexibility, constant availability and work-life conflict (by case-control status)

Table 6-18 describes the questionnaire responses about flexibility, constant availability and work-life conflict by case control status. Retirees reported that they had less flexibility at work on the flexibility scale (five questions, Cronbach's alpha 0.74) although when adjusted for age and sex this result did not reach statistical significance (p=0.132). A higher prevalence of retirees perceived that they had needed to be available out-of-hours on the constant availability scale (three items, Cronbach's alpha 0.78). More availability out of hours produced bigger effect sizes after adjustment for age and sex. Retirees also reported more work-life conflict (five items, Cronbach's alpha 0.89).

Table 6-18   Descriptive results: flexibility, constant availability and work-life conflict scales, in respondents to the HEAF FIRST questionnaire (by case-control status)

	Cases(Retirees) N=488		Controls(Workers) N=448		Regression*	
Exposure	**N**	**%**	**N**	**%**	**OR, 95% CI**	**p**
Flexibility Scale Quartiles (trend)					1.10 (0.97,1.23)	0.132
Highest flex	100	20.7%	93	20.8%	ref	
High flex	91	18.8%	96	21.5%	0.93 (0.62,1.40)	0.738
Low flex	140	28.9%	139	31.1%	0.98 (0.67,1.43)	0.919
Lowest flex	153	31.6%	119	26.6%	1.31 (0.90,1.91)	0.165
Constant availability quartiles (trend)					**1.45 (1.28,1.63)**	**<0.001**
Lowest constav	115	23.7%	176	39.3%	ref	.
Low constav	150	30.9%	130	29.0%	**1.87 (1.33,2.63)**	**<0.001**
High constav	83	17.1%	68	15.2%	**2.01 (1.34,3.02)**	**0.001**
Highest constav	137	28.2%	74	16.5%	**3.26 (2.23,4.77)**	**<0.001**
Worklife Quartiles (trend)					1.27 (1.12,1.43)	<0.001
Lowest conflict	109	22.4%	134	29.9%	ref	.
Low conflict	144	29.6%	139	31.0%	**1.39 (0.98,1.98)**	**0.067**
High conflict	121	24.9%	87	19.4%	**2.05 (1.39,3.02)**	**<0.001**
Highest conflict	112	23.0%	88	19.6%	**1.91 (1.29,2.82)**	**0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age and sex (matching factors).

6.2.12 Adjustment for non-work factors.

Table 6-19 shows the associations between work-related exposures and retirement status after adjustment for relevant non-work factors.

6.2.12.1 Socio-economic status

As described in methods (para 5.2.11), all results to this point have been adjusted for the matching factors age and sex, and these results are shown in Table 6-19, model one. However, I anticipated that other (non-work) factors would play a role in retirement decision-making and wanted to evaluate these and take them into account. First, I considered socio-economic factors. Longitudinal data from the main HEAF study provided four measures of socio-economic position: managing financially (HEAF baseline), home ownership (HEAF baseline), expecting private pension (HEAF baseline) and highest educational qualification (HEAF baseline). The HEAF FIRST data provided an additional measure of social class (NS-SEC[113], three class system based on job coding from HEAF FIRST). These factors were unsurprisingly highly interrelated, chi^2 p<0.01 in all cases when considered pairwise. Based on consideration of pairwise tables and strength of chi^2 associations it was apparent that NS-SEC and educational qualifications were strongly correlated (64% of higher managerial class had university education whilst only 9% of routine and manual held the same qualifications), as were managing financially and housing tenure (12% of people who owned their homes were struggling financially compared with 62% who rented).

NS-SEC[113] and managing financially were also correlated but seemed to reflect different aspects of socio-economic position, therefore I decided to include them both as adjustment factors in the next models. Logistic regression models were run with adjustment for age and sex, managing financially and NS-SEC (separately and together) see Table 6-19, models 2-4. The logistic regression model remained stable with both managing financially and NS-SEC added to the model. Both managing financially and NS-SEC remained significant when mutually adjusted and therefore both were retained as adjustment factors in the developing model.

6.2.12.2 Marital status

HEAF baseline collected a measure of familial relationships by asking participants about marital status. This was found significantly associated with being retired (single/widowed/divorced negatively associated with retirement (OR 0.59, 95% CI 0.44,0.78), see Table 6-8. marital status remained a significant independent predictor of the risk of being retired in HEAF FIRST and therefore was taken forward as an adjustment factor, see Table 6-19, model five.

6.2.12.3   Adjustment for self-rated health

Self-rated health was not significantly associated with retirement in this cohort (OR 1.04, 95% CI 0.72,1.51), see Table 6-9. Therefore, this measure was not added as an adjustment factor.

6.2.13   Logistic regression models adjusted for non-work factors

Table 6-19   Results of logistic regressions showing the association between work-related exposures and retirement status, adjusted for non-work factors, in respondents to the HEAF FIRST questionnaire

Exposure	Model 1 OR, 95% CI	p	Model 2 OR, 95% CI	p	Model 3 OR, 95% CI	p	Model 4 OR, 95% CI	p	Model 5 OR, 95% CI	p
Dissatisfaction	1.54 (0.96,2.48)	0.076	**1.65 (1.01,2.70)**	**0.044**	**2.32 (1.38,3.91)**	**0.002**	**2.34 (1.38,3.98)**	**0.002**	**2.32 (1.36,3.95)**	**0.002**
Hours – irregular	**1.84 (1.29,2.61)**	**0.001**	**1.76 (1.23,2.52)**	**0.002**	**1.72 (1.19,2.47)**	**0.004**	**1.67 (1.15,2.41)**	**0.006**	**1.65 (1.14,2.39)**	**0.008**
Hours – unhappy	**1.49 (1.02,2.18)**	**0.038**	**1.57 (1.06,2.32)**	**0.023**	**1.92 (1.28,2.88)**	**0.002**	**1.93 (1.27,2.91)**	**0.002**	**1.97 (1.30,2.99)**	**0.001**
ERI (low-high)	**1.29 (1.15,1.46)**	**<0.001**	**1.30 (1.15,1.47)**	**<0.001**	**1.43 (1.25,1.62)**	**<0.001**	**1.42 (1.24,1.61)**	**<0.001**	**1.43 (1.26,1.63)**	**<0.001**
ERI – Efforts	**1.42 (1.26,1.59)**	**<0.001**	**1.36 (1.21,1.53)**	**<0.001**	**1.45 (1.29,1.64)**	**<0.001**	**1.41 (1.24,1.59)**	**<0.001**	**1.42 (1.25,1.61)**	**<0.001**
ERI - Rewards	0.97 (0.87,1.09)	0.639	0.91 (0.81,1.02)	0.105	**0.85 (0.75,0.96)**	**0.01**	**0.82 (0.72,0.93)**	**0.002**	**0.80 (0.71,0.91)**	**0.001**
ERI - Appreciation	1.01 (0.88,1.15)	0.921	0.94 (0.82,1.08)	0.36	0.90 (0.78,1.03)	0.13	**0.86 (0.75,0.99)**	**0.039**	**0.85 (0.73,0.98)**	**0.022**
ERI -Promotion	**1.34 (1.16,1.56)**	**<0.001**	**1.24 (1.07,1.44)**	**0.005**	**1.17 (1.01,1.37)**	**0.039**	1.12 (0.96,1.31)	0.163	1.11 (0.95,1.30)	0.196
ERI – Security	**0.79 (0.70,0.90)**	**<0.001**	**0.76 (0.67,0.87)**	**<0.001**	**0.70 (0.61,0.81)**	**<0.001**	**0.69 (0.60,0.79)**	**<0.001**	**0.68 (0.59,0.78)**	**<0.001**
Declining standards	**1.58 (1.21,2.05)**	**0.001**	**1.70 (1.29,2.23)**	**<0.001**	**1.89 (1.43,2.51)**	**<0.001**	**1.96 (1.47,2.61)**	**<0.001**	**2.01 (1.51,2.68)**	**<0.001**
Shared goals	0.93 (0.67,1.28)	0.64	0.99 (0.71,1.38)	0.947	1.05 (0.75,1.48)	0.775	1.09 (0.77,1.54)	0.635	1.08 (0.77,1.53)	0.651
Isolation	1.31 (0.90,1.91)	0.165	1.33 (0.90,1.95)	0.147	**1.70 (1.13,2.56)**	**0.01**	**1.68 (1.12,2.53)**	**0.013**	**1.79 (1.18,2.71)**	**0.006**
Loyalty	**0.58 (0.38,0.89)**	**0.012**	0.70 (0.45,1.08)	0.103	0.70 (0.45,1.09)	0.112	0.80 (0.51,1.25)	0.322	0.81 (0.52,1.28)	0.372
Us VS Them	1.29 (0.99,1.68)	0.062	**1.37 (1.04,1.79)**	**0.024**	**1.46 (1.11,1.93)**	**0.007**	**1.51 (1.14,2.00)**	**0.004**	**1.50 (1.13,1.99)**	**0.005**
community at work	0.86 (0.62,1.20)	0.379	0.90 (0.64,1.26)	0.537	1.00 (0.70,1.41)	0.981	1.01 (0.71,1.44)	0.959	0.99 (0.69,1.41)	0.962

Exposure	Model 1 OR, 95% CI	p	Model 2 OR, 95% CI	p	Model 3 OR, 95% CI	p	Model 4 OR, 95% CI	p	Model 5 OR, 95% CI	p
DCSQ type										
Low Demand/high control	ref		ref		ref		ref		ref	
Active Job	**2.44 (1.62,3.66)**	**<0.001**	**2.35 (1.56,3.55)**	**<0.001**	**2.40 (1.58,3.65)**	**<0.001**	**2.33 (1.53,3.55)**	**<0.001**	**2.36 (1.55,3.61)**	**<0.001**
Passive Job	0.77 (0.54,1.08)	0.125	1.00 (0.70,1.44)	0.999	0.89 (0.62,1.27)	0.522	1.08 (0.75,1.58)	0.673	1.12 (0.77,1.63)	0.564
High Demand/low control	1.27 (0.88,1.84)	0.208	**1.54 (1.05,2.26)**	**0.028**	**1.60 (1.08,2.37)**	**0.019**	**1.82 (1.22,2.72)**	**0.004**	**2.00 (1.33,3.01)**	**0.001**
DCSQ- Psychosocial demands (high)	**1.93 (1.46,2.54)**	**<0.001**	**1.86 (1.40,2.46)**	**<0.001**	**2.05 (1.53,2.74)**	**<0.001**	**1.98 (1.48,2.65)**	**<0.001**	**2.07 (1.54,2.78)**	**<0.001**
DCSQ – decision latitude (low)	**0.70 (0.54,0.91)**	**0.008**	0.91 (0.68,1.21)	0.503	0.84 (0.64,1.11)	0.22	1.02 (0.76,1.37)	0.887	1.07 (0.79,1.44)	0.656
DCSQ - Social support (low)	0.94 (0.72,1.22)	0.644	0.98 (0.75,1.28)	0.872	1.08 (0.82,1.42)	0.6	1.10 (0.83,1.45)	0.518	1.12 (0.85,1.49)	0.414
DCSQ- skill discretion (low)	**0.57 (0.43,0.75)**	**<0.001**	**0.73 (0.55,0.98)**	**0.039**	**0.67 (0.50,0.89)**	**0.005**	0.80 (0.59,1.09)	0.162	0.83 (0.61,1.13)	0.237
DCSQ – decision authority (low)	1.13 (0.86,1.50)	0.383	**1.35 (1.01,1.80)**	**0.045**	1.28 (0.96,1.71)	0.098	**1.45 (1.07,1.95)**	**0.016**	**1.50 (1.11,2.04)**	**0.008**
Age discrimination	0.82 (0.63,1.07)	0.148	0.92 (0.70,1.21)	0.561	0.92 (0.70,1.21)	0.532	0.99 (0.75,1.31)	0.95	0.99 (0.75,1.31)	0.95
Not encouraged post-SPA	**1.90 (1.45,2.49)**	**<0.001**	**1.86 (1.41,2.45)**	**<0.001**	**1.98 (1.49,2.62)**	**<0.001**	**1.95 (1.47,2.59)**	**<0.001**	**1.97 (1.48,2.63)**	**<0.001**
Kneeling/squatting	1.31 (0.91,1.88)	0.14	**1.69 (1.15,2.47)**	**0.007**	1.41 (0.97,2.06)	0.071	**1.71 (1.15,2.53)**	**0.007**	**1.70 (1.14,2.52)**	**0.009**
Climbing ladder	0.88 (0.60,1.28)	0.506	1.12 (0.76,1.67)	0.559	0.95 (0.65,1.41)	0.816	1.14 (0.76,1.71)	0.524	1.14 (0.76,1.71)	0.529
30+ flights stairs	1.01 (0.69,1.48)	0.969	1.12 (0.75,1.66)	0.584	1.14 (0.76,1.71)	0.52	1.21 (0.80,1.83)	0.357	1.28 (0.84,1.95)	0.255
digging	0.96 (0.44,2.12)	0.926	1.33 (0.60,2.98)	0.485	1.07 (0.47,2.43)	0.867	1.36 (0.59,3.12)	0.469	1.42 (0.62,3.27)	0.41

Exposure	Model 1 OR, 95% CI	p	Model 2 OR, 95% CI	p	Model 3 OR, 95% CI	p	Model 4 OR, 95% CI	p	Model 5 OR, 95% CI	p
lifting weights ≥10 kg	0.88 (0.63,1.21)	0.426	1.09 (0.77,1.53)	0.631	1.00 (0.71,1.40)	0.979	1.16 (0.82,1.65)	0.411	1.17 (0.82,1.67)	0.39
standing	0.80 (0.61,1.04)	0.1	1.01 (0.76,1.34)	0.957	0.89 (0.67,1.17)	0.408	1.04 (0.78,1.39)	0.778	1.03 (0.77,1.38)	0.858
standing/walking 3hrs+	**0.71 (0.54,0.94)**	**0.017**	0.88 (0.66,1.18)	0.392	0.82 (0.61,1.10)	0.183	0.94 (0.70,1.28)	0.71	0.95 (0.70,1.28)	0.717
hard work	0.83 (0.58,1.18)	0.302	1.17 (0.80,1.72)	0.414	0.98 (0.67,1.43)	0.919	1.26 (0.85,1.88)	0.249	1.26 (0.85,1.88)	0.255
sitting	**1.48 (1.14,1.93)**	**0.003**	1.22 (0.92,1.60)	0.163	**1.34 (1.02,1.76)**	**0.038**	1.17 (0.88,1.55)	0.286	1.19 (0.89,1.59)	0.232
Physical work scale	**0.76 (0.58,0.99)**	**0.04**	0.98 (0.74,1.30)	0.881	0.90 (0.68,1.18)	0.434	1.07 (0.80,1.44)	0.642	1.05 (0.78,1.41)	0.747
Physical coping	**0.72 (0.54,0.96)**	**0.025**	0.85 (0.63,1.15)	0.291	0.89 (0.66,1.21)	0.469	1.00 (0.73,1.36)	0.979	1.02 (0.75,1.40)	0.901
Commute ≥30mins	**1.43 (1.09,1.88)**	**0.009**	1.29 (0.98,1.71)	0.073	**1.45 (1.09,1.93)**	**0.01**	**1.34 (1.00,1.78)**	**0.048**	**1.36 (1.02,1.82)**	**0.039**
Commute cope	1.05 (0.76,1.45)	0.765	0.96 (0.69,1.34)	0.811	1.16 (0.83,1.63)	0.387	1.07 (0.76,1.51)	0.687	1.12 (0.79,1.58)	0.526
Overnight stays	**2.59 (1.90,3.54)**	**<0.001**	**2.09 (1.51,2.90)**	**<0.001**	**2.26 (1.64,3.11)**	**<0.001**	**1.95 (1.40,2.73)**	**<0.001**	**1.94 (1.39,2.72)**	**<0.001**
Flexibility (high-low)	1.10 (0.97,1.23)	0.132	**1.16 (1.02,1.31)**	**0.02**	**1.20 (1.06,1.36)**	**0.005**	**1.24 (1.09,1.40)**	**0.001**	**1.25 (1.10,1.42)**	**0.001**
Constant availability (low-high)	**1.45 (1.28,1.63)**	**<0.001**	**1.32 (1.16,1.50)**	**<0.001**	**1.39 (1.23,1.57)**	**<0.001**	**1.31 (1.14,1.49)**	**<0.001**	**1.30 (1.14,1.49)**	**<0.001**
Work-life conflict (low-high)	**1.27 (1.12,1.43)**	**<0.001**	**1.22 (1.08,1.39)**	**0.002**	**1.39 (1.22,1.59)**	**<0.001**	**1.35 (1.18,1.54)**	**<0.001**	**1.35 (1.18,1.55)**	**<0.001**

Model 1: adjusted for age and sex, Model 2: adjusted for age, sex and NS-SEC, Model 3: adjusted for age, sex and managing financially, Model 4: adjusted for age, sex managing financially and NS-SEC, Model 5: adjusted for age, sex managing financially, NS-SEC and marital status.

6.3   Work-related exposures that have a statistically significant association with retirement status

Table 6-20 summarises those work-exposures that were found to have a statistically significant association (p<0.05) with retirement status after adjustment for age, sex, managing financially, NS-SEC[113] and marital status (model five).

After full adjustment, job satisfaction was strongly associated with retirement status, with work-dissatisfied participants more likely to be retirees (OR 2.32, 95% CI 1.36,3.95). Participants who reported that their work involved irregular hours were more likely to be retired as were those unhappy with their pattern of hours.

As ERI increased per quartile (increasing job strain) participants were more likely to be retired (OR 1.43, 95% CI 1.26,1.63). Of the ERI subscales, efforts had the most consistent effect associating with an increased risk of being retired. More perceived rewards, appreciation or job security were associated with a decreased risk of being retired. Note that appreciation and job security are derivatives of the rewards scale.

A perception that standards at work had declined over the past two years was found associated with an increased risk of being retired, as did increased perception of isolation and a feeling of disconnection from higher level colleagues.

In the DCSQ, active jobs and high demand/low control jobs were associated with an increased risk of being retired compared with low demand/high control jobs. Amongst DCSQ subscales, more perceived psychosocial demands was associated with being retired, whilst control (decision latitude) did not associate significantly. However, reduced decision authority (a constituent of control) was found associated with an increased risk of being retired.

The NADS age discrimination scale did not seem to associate with retirement status. However, reporting being in a workplace that did not encourage working beyond SPA was associated with an increased risk of being retired (OR 1.97, 95% CI 1.48,2.63).

The physical workplace exposures were generally not associated with retirement status, either as standalone exposures or amalgamated into a scale, nor the measure for coping with physical strains. The exception was kneeling /squatting at work which was associated with an increased risk of being retired.

Commuting for more than 30 mins per day was associated with an increased risk of being retired as did reporting that work involved overnight work stays. Perceived coping with commutes was not associated with retirement status.

As flexibility decreased per quartile, the risk of being retired increased significantly (OR 1.25, 95% CI 1.10,1.42). Similarly, as constant availability and work-life conflict increased per quartile so did the risk of being retired.

Note that from this point onwards I have treated ERI and DSCSQ as individual exposures, without separate consideration of their subscales.

Table 6-20   Work-related exposures with statistically significant (p<0.05) associations with being retired, after adjustment for non-work factors, in respondents to the HEAF FIRST questionnaire

	Regression*	
Characteristic	OR, 95% CI	p
Dissatisfaction	**2.32 (1.36,3.95)**	**0.002**
Hours – irregular	**1.65 (1.14,2.39)**	**0.008**
Hours – unhappy	**1.97 (1.30,2.99)**	**0.001**
ERI (low to high)	**1.43 (1.26,1.63)**	**<0.001**
Declining standards	**2.01 (1.51,2.68)**	**<0.001**
Isolation	**1.79 (1.18,2.71)**	**0.006**
Us Vs Them	**1.50 (1.13,1.99)**	**0.005**
DCSQ type		
Low Demand/high control	ref	
Active Job	**2.36 (1.55,3.61)**	**<0.001**
Passive Job	1.12 (0.77,1.63)	0.564
High Demand/low control	**2.00 (1.33,3.01)**	**0.001**
Not encouraged post-SPA	**1.97 (1.48,2.63)**	**<0.001**
Kneeling/squatting	**1.70 (1.14,2.52)**	**0.009**
Commute ≥30mins	**1.36 (1.02,1.82)**	**0.039**
Overnight stays	**1.94 (1.39,2.72)**	**<0.001**
Flexibility (high to low)	**1.25 (1.10,1.42)**	**0.001**
Constant availability (low to high)	**1.30 (1.14,1.49)**	**<0.001**
Work-life conflict (low to high)	**1.35 (1.18,1.55)**	**<0.001**

*All factors adjusted for sex, age, managing financially, NS-SEC, and marital status

6.4   Mutually adjusted logistic regression model

The final stage of analysis was to build a logistic regression model which mutually adjusted for work-related factors. The base model included the five adjustment factors (age, sex, NS-SEC[113], managing financially and marital status) and these were included in all versions of the model.

I added work-related factors to the base model in order of effect, having regard to the magnitude of odds ratio and statistical significance. If the addition of a work-related factor destabilised the overall model it was discarded. I continued in this manner until no further work-related factors could be added to the model.

Table 6-21 shows the mutually adjusted associations between work-related factors and retirement status for the entire cohort. Increasing levels of ERI per quartile consistently associated with an increased risk of being retired in the mutually adjusted model. Being in a workplace that did not encourage working post-SPA was associated with an increased risk of being retired with a relatively large effect size (OR 1.94, 95% CI 1.44-2.62). Staying away overnight for work increased the risk of being retired as did reporting a perception of declining standards in the past two years. Finally, higher scores on the constant availability scale (being contacted outside of working hours, answering work enquiries/e-mails outside of hours and completing work tasks at home) also associated with an increased risk of being retired.

Table 6-21   Mutually adjusted logistic regression model, showing the associations between work-related exposures and retirement status, in respondents to the HEAF FIRST questionnaire

Characteristic	Regression*	
	OR, 95% CI	p
Sex (men)	0.81 (0.59,1.11)	0.183
Older age	**1.16 (1.11,1.22)**	**<0.001**
NS-SEC (low to high)	0.83 (0.68,1.01)	0.061
Managing financially (doing worse)	**0.31 (0.21,0.45)**	**<0.001**
Marital status (single/widowed /divorced)	**0.65 (0.47,0.90)**	**0.009**
ERI (low to high)	**1.25 (1.07,1.46)**	**0.005**
Overnight stays	**1.84 (1.28,2.65)**	**0.001**
Not encouraged post-SPA	**1.94 (1.44,2.62)**	**<0.001**
Declining standards	**1.57 (1.12,2.21)**	**0.009**
Constant availability (low to high)	**1.20 (1.03,1.38)**	**0.016**

*All factors mutually adjusted

6.5   Summary

In this chapter I have presented results for the whole cohort of HEAF FIRST case-control study. In the following two chapters I will present results for the same cohort stratified by sex. The results for women are in the next chapter.

Chapter 7   Phase three: case-control study results (women only)

7.1   Women only

7.1.1   Women: demographic characteristics

Table 7-1 describes the demographic characteristics of the women in the HEAF FIRST cohort. Retirees were older than workers (OR 1.11, 95% CI 1.05-1.16) and were more likely to be married (73% retirees, 59% workers). Of the retirees, 11% were still carrying out some paid work, whilst workers undertook 28 hours work per week on average. Workers were less likely to be doing any caring or voluntary work.

Table 7-1   Demographic characteristics of respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Characteristic	Cases(Retirees) N=296				Controls(Workers) N=277				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, 95% CI	p
Age	296		65.50	3.58	277		64.33	3.16	**1.11 (1.05,1.16)**	**<0.001**
Age median			65.97				64.15			
Marital status (BL)										
married/civil part	212	72.6%			159	58.5%			ref	
single/widowed/divorced	80	27.4%			113	41.5%			**0.50 (0.35,0.72)**	**<0.001**
Ethnicity (BL)										
White	291	98.6%			274	99.3%				
Black	2	0.7%			1	0.4%				
Indian	0	0.0%			1	0.4%				
Chinese	1	0.3%			0	0.0%				
Other	1	0.3%			0	0.0%				
Employment status (HF)										
Employed	0	0.0%			268	96.8%				
Employed off sick	0	0.0%			9	3.2%				
Retired, no paid work	265	89.5%			0	0.0%				
Retired, some paid work	31	10.5%			0	0.0%				
Paid Job (hours) (HF)	296		0.84	3.51	277		27.68	11.01		
No work hours	265	89.5%			1	0.4%				
Low work hours	30	10.1%			125	45.1%				
High work hours	1	0.3%			151	54.5%				
Personal care (hours) (HF)	296		3.84	14.07	277		1.97	7.10		
No caring	235	79.4%			228	82.3%				
Some caring	61	20.6%			49	17.7%				
Volunteering (hours) (HF)	296		1.79	3.67	277		0.51	2.60		
No volunteering	211	71.3%			254	91.7%				
Some volunteering	85	28.7%			23	8.3%				

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor). Result for age is not adjusted.

7.1.2   Women: health and socio-economic position

Table 7-2 describes the responses to the health and socio-economic questions among the women in HEAF FIRST stratified by case-control status. Workers were more likely to report that they were doing worse financially (34%) compared with retirees (13.8%) and this result was significant when adjusted for age. Retirees were more likely to be in higher NS-SEC[113] categories than workers (see Figure 7-1), a pattern also seen in the whole cohort (see Figure 6-4). Self-rated health was similar in both groups.

Table 7-2   Health and socio-economic characteristics of respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Characteristic	Cases(Retirees) N=296				Controls(Workers) N=277				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, 95% CI	p
Managing financially (BL)										
Doing better	249	86.2%			179	65.8%			ref	
Doing Worse	40	13.8%			93	34.2%			**0.31 (0.20,0.47)**	**<0.001**
Social class (HF)										
Routine and Manual	56	18.9%			90	32.5%			ref	
Intermediate	95	32.1%			92	33.2%			**1.87 (1.19,2.94)**	**0.007**
Higher Managerial	145	49.0%			95	34.3%			**3.02 (1.94,4.70)**	**<0.001**
Self-rated health (BL)										
at least good	251	85.1%			235	86.7%			ref	
fair/poor	44	14.9%			36	13.3%			1.07 (0.66,1.74)	0.773

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).
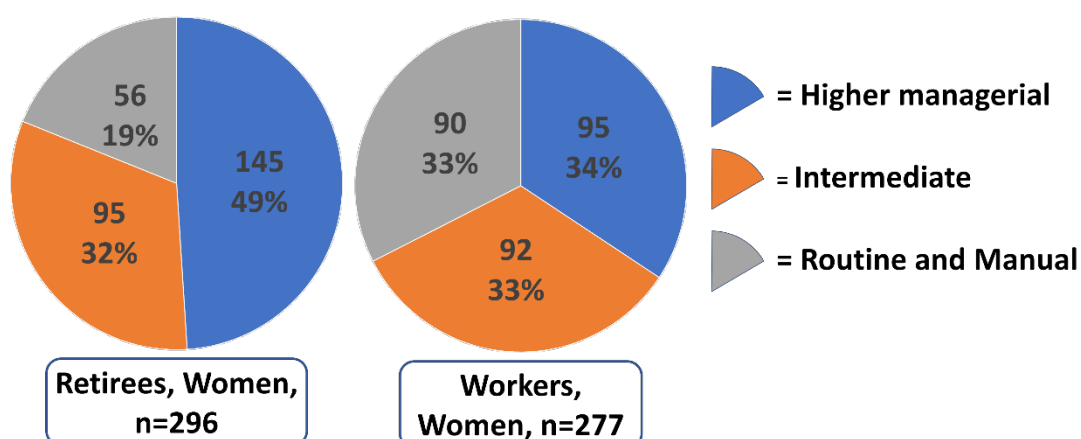
Figure 7-1   Pie chart of NS-SEC status of women in the HEAF FIRST cohort, stratified by retirement status

7.1.3   Women: SOC 2010 major job groups

Figure 7-2 shows the SOC 2010[112] major groups of occupation stratified by case control status in the women in the HEAF FIRST cohort. In a similar pattern to the full cohort, the retirees tended to have jobs that were higher in SOC 2010 major groups than the workers. 48% of retirees had jobs in major groups 1-3 compared with 35% of workers.
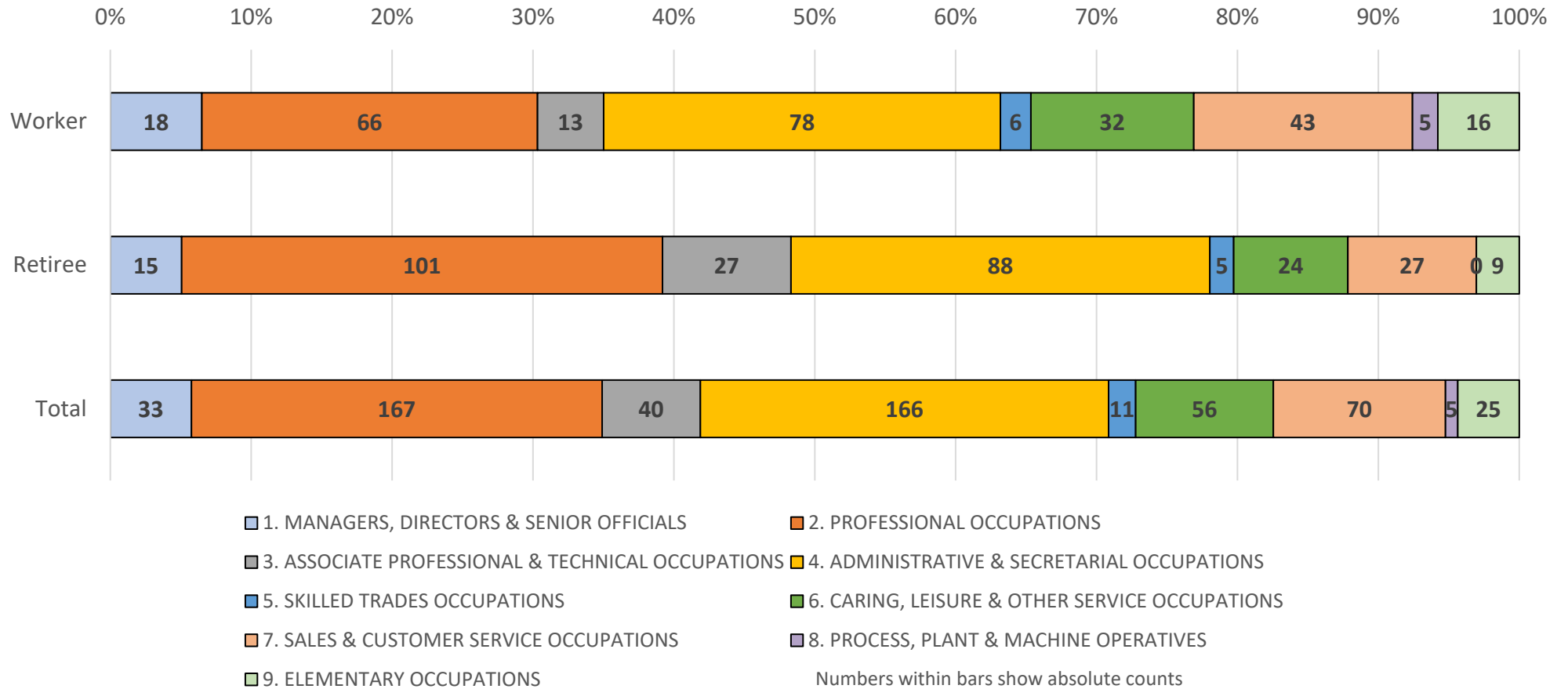
Figure 7-2   Graphical representation of job-roles of women in the HEAF FIRST cohort: distribution of SOC 2010 major groups by case-control status.

Legend:
- 1. MANAGERS, DIRECTORS & SENIOR OFFICIALS
- 2. PROFESSIONAL OCCUPATIONS
- 3. ASSOCIATE PROFESSIONAL & TECHNICAL OCCUPATIONS
- 4. ADMINISTRATIVE & SECRETARIAL OCCUPATIONS
- 5. SKILLED TRADES OCCUPATIONS
- 6. CARING, LEISURE & OTHER SERVICE OCCUPATIONS
- 7. SALES & CUSTOMER SERVICE OCCUPATIONS
- 8. PROCESS, PLANT & MACHINE OPERATIVES
- 9. ELEMENTARY OCCUPATIONS

Numbers within bars show absolute counts

Data from the chart:

	1	2	3	4	5	6	7	8	9
Worker	18	66	13	78	6	32	43	5	16
Retiree	15	101	27	88	5	24	27	0	9
Total	33	167	40	166	11	56	70	5	25

7.1.4   Women: job satisfaction and working hours

Table 7-3 describes responses to questions about job satisfaction and working hours in women, in the HEAF FIRST cohort, stratified by case-control status. Retirees were more likely to report dissatisfaction with work with a relatively large effect size (OR 1.98, 95% CI 1.08-3.61). Retirees were more likely to be working irregular hours although this result failed to reach statistical significance. A stronger effect was seen for satisfaction with hours, with retirees being significantly more likely to be unhappy with their hours.

As described in Table 6-11a high proportion of women (45%) who worked irregular hours were in professional jobs (SOC 2010[112] major group). Nurses were the most prevalent SOC 2010 job title in the women who worked irregular hours.

Table 7-3   Descriptive results: job satisfaction and working hours exposures in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
Exposure	**N**	**%**	**N**	**%**	**OR, 95% CI**	**p**
Satisfaction						
satisfied	262	88.8%	258	93.1%	ref	
dissatisfied	33	11.2%	19	6.9%	**1.98 (1.08,3.61)**	**0.027**
Hours - irregular						
Regular hours	242	82.3%	236	85.8%	ref	.
Irregular hours	52	17.7%	39	14.2%	1.29 (0.82,2.04)	0.273
Hours - unhappy						
Happy	238	81.5%	245	88.8%	ref	
Not happy	54	18.5%	31	11.2%	**1.93 (1.19,3.12)**	**0.008**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

7.1.5   Women: effort-reward imbalance and subscales

The results from ERI exposures amongst women by case-control status are described in Table 7-4. Higher overall ERI scores significantly associated with an increased risk of being retired, with larger imbalance scores having larger effect sizes. A similar pattern occurred in the efforts subscale. Scores in the rewards subscale were not significantly different between groups,

however retirees reported better promotion opportunities, and this was statistically significant when adjusted for age.

Figure 7-3 shows the distribution of SOC 2010[112] major groups in each quartile of ERI amongst women. The jobs groups in each category of ERI were relatively consistent, a pattern similar to the whole cohort (see Figure 6-5).

Table 7-4   Descriptive results: effort-reward imbalance exposures in respondents to the HEAF
            FIRST questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
ERI (quartiles)					**1.31 (1.13,1.53)**	**<0.001**
Lowest ERI	64	22.1%	81	29.8%	ref	
Low ERI	63	21.8%	69	25.4%	1.22 (0.75,1.98)	0.417
High ERI	71	24.6%	64	23.5%	1.57 (0.97,2.54)	0.067
Highest ERI	91	31.5%	58	21.3%	**2.29 (1.42,3.69)**	**0.001**
Efforts (quartiles)					**1.43 (1.23,1.66)**	**<0.001**
Lowest Efforts	89	30.2%	114	41.2%	ref	
Low Efforts	48	16.3%	52	18.8%	1.37 (0.83,2.25)	0.215
High Efforts	65	22.0%	67	24.2%	1.44 (0.92,2.26)	0.115
Highest Efforts	93	31.5%	44	15.9%	**3.36 (2.09,5.40)**	**<0.001**
Rewards (quartiles)					1.00 (0.86,1.15)	0.987
Lowest Rewards	95	32.8%	85	31.1%	ref	
Low Rewards	59	20.3%	59	21.6%	0.87 (0.54,1.38)	0.546
High Rewards	64	22.1%	69	25.3%	0.82 (0.52,1.30)	0.399
Highest Rewards	72	24.8%	60	22.0%	1.04 (0.66,1.64)	0.863
Appreciation (quartiles)					0.98 (0.83,1.15)	0.788
Lowest Appreciation	99	33.9%	77	27.9%	ref	
Low Appreciation	116	39.7%	129	46.7%	0.68 (0.45,1.00)	0.052
High Appreciation	26	8.9%	35	12.7%	**0.52 (0.29,0.95)**	**0.034**
Highest Appreciation	51	17.5%	35	12.7%	1.08 (0.64,1.84)	0.772
Promotion (quartiles)					**1.32 (1.10,1.59)**	**0.004**
Lowest Promotion	69	23.7%	85	31.0%	ref	
Low Promotion	121	41.6%	122	44.5%	1.16 (0.77,1.75)	0.481
High Promotion	67	23.0%	48	17.5%	**1.87 (1.14,3.08)**	**0.013**
Highest Promotion	34	11.7%	19	6.9%	**2.06 (1.07,3.96)**	**0.031**
Security (quartiles)					0.88 (0.75,1.05)	0.15
Lowest Security	127	43.8%	104	37.8%	ref	
Low Security	85	29.3%	96	34.9%	0.72 (0.49,1.08)	0.111
High Security	47	16.2%	40	14.5%	0.89 (0.54,1.47)	0.648
Highest Security	31	10.7%	35	12.7%	0.64 (0.37,1.12)	0.121

*Final column shows associations between characteristics and retirement status after logistic
regression adjusted for age (matching factor).

Figure 7-3   Graphical representation of job-roles of women in the HEAF FIRST cohort: distribution of SOC 2010 major groups by ERI in quartiles.

7.1.6   Women: workplace decline and workplace community

Table 7-5 describes responses to questions about workplace decline, in women, in the HEAF FIRST cohort, stratified by case-control status. A perception of declining standards was strongly associated with an increased risk of being retired when adjusted for age (OR 1.69, 95% CI 1.21-2.37) as was a perception of disconnection with higher level colleagues (OR 1.59, 95% CI 1.13-2.24). Retirees were also more likely to report a sense of loyalty to people in the workplace. Responses to the questions about sense of community at work and shared goals with the organisation were not different between cases and controls.

Table 7-5   Descriptive results: workplace decline and community exposures in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
Exposure	**N**	**%**	**N**	**%**	**OR, 95% CI**	**p**
Declining standards						
No decline	125	42.4%	150	54.2%	ref	
Decline	170	57.6%	127	45.8%	**1.69 (1.21,2.37)**	**0.002**
Shared goals						
Shared goals	233	79.3%	221	80.1%	ref	.
No shared goals	61	20.7%	55	19.9%	1.07 (0.71,1.62)	0.742
Isolation						
No Isolation	249	84.4%	242	87.7%	ref	
Isolation	46	15.6%	34	12.3%	1.37 (0.85,2.23)	0.197
Loyalty						
Loyalty	274	93.2%	243	88.4%	ref	.
No loyalty	20	6.8%	32	11.6%	**0.48 (0.26,0.87)**	**0.016**
Us VS Them						
No Disconnection	149	50.9%	168	61.1%	ref	
Disconnection	144	49.1%	107	38.9%	**1.59 (1.13,2.24)**	**0.007**
part of community at work						
Part of community	239	81.0%	221	80.1%	ref	.
Not Part of community	56	19.0%	55	19.9%	1.00 (0.66,1.52)	0.998

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

7.1.7 Women: demand-control support model

Table 7-6 describes the results from the DCSQ exposures amongst women in the HEAF FIRST cohort. Amongst the DCSQ job types, active roles had the strongest association with retirement when adjusted for age (OR 2.16, 95% CI 1.28-3.64). In the subscales, increased demands were associated with increased risk of being retired. Low levels of control as measured by the decision latitude scale was more often reported by workers, as was limited skill discretion (a derivative of decision latitude).

Table 7-6   Descriptive results: DCSQ exposures in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
DCSQ type						
Low Demand/high control	74	25.2%	76	27.4%	ref	
Active Job	69	23.5%	37	13.4%	**2.16 (1.28,3.64)**	**0.004**
Passive Job	72	24.5%	95	34.3%	0.74 (0.47,1.16)	0.183
High Demand/low control	79	26.9%	69	24.9%	1.22 (0.77,1.94)	0.396
Psychosocial Demands						
Low	146	49.7%	171	61.7%	ref	
High	148	50.3%	106	38.3%	**1.80 (1.28,2.54)**	**0.001**
Control (decision Latitude)						
High	143	48.5%	113	40.8%	ref	
Low	152	51.5%	164	59.2%	**0.69 (0.49,0.97)**	**0.033**
Social support						
High	136	46.3%	147	46.7%	ref	
Low	158	53.7%	129	53.3%	1.06 (0.76,1.48)	0.735
Skill Discretion (sub cat of DL)						
High	120	40.7%	88	31.8%	ref	
Low	175	59.3%	189	68.2%	**0.61 (0.43,0.87)**	**0.006**
Decision authority (Sub cat of DL)						
High	84	28.5%	76	27.5%	ref	.
Low	211	71.5%	200	72.5%	0.94 (0.65,1.37)	0.758

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

Figure 7-4 shows the distribution of jobs (coded to SOC 2010[112] major groups) within the DCSQ job types, in women, in the HEAF FIRST cohort. Low demand/high control and active jobs were generally reported by those in the higher grouped jobs (managers, professionals and associate professionals accounted for 61% and 70% respectively). Similar to the results for the whole cohort (see Figure 6-6) active jobs had a large proportion of professional occupations. In contrast, passive jobs and high demand/low control jobs included jobs at the lower grouped jobs (elementary, process and sales).
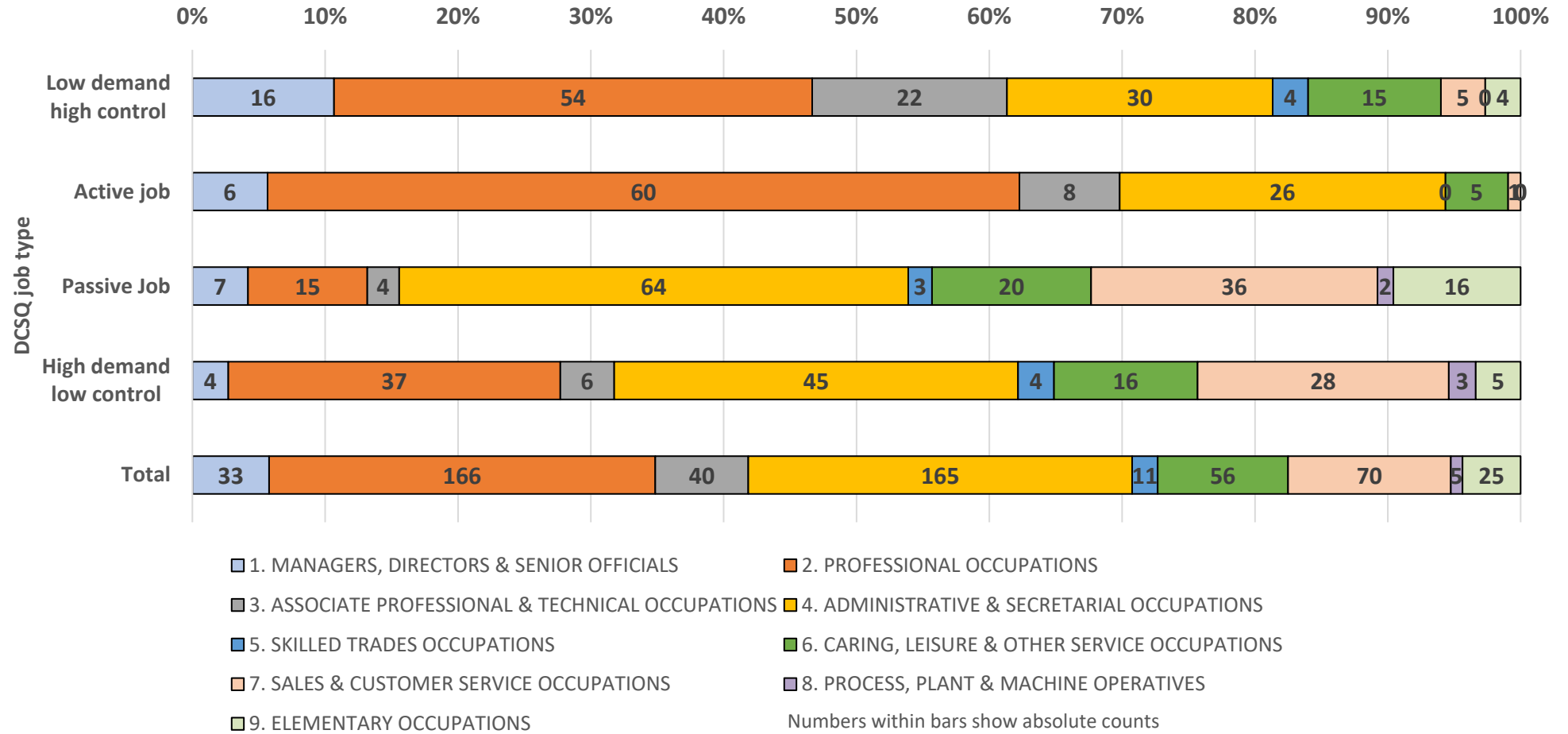
Figure 7-4   Graphical representation of job-roles of women in the HEAF FIRST cohort: The distribution of SOC 2010 major groups by DCSQ job type.

7.1.8   Women: age discrimination and later working culture

Table 7-7 describes responses to questions about age discrimination and later working culture in women, in the HEAF FIRST cohort, by case-control status. Retirees reported more age discrimination on the NADS scale although the result did not reach statistical significance when adjusted for age. Being in a workplace that did not encourage work beyond the SPA had a strong association with increased risk of having retired (OR 2.15, 95% CI 1.48-3.12).

Table 7-7   Descriptive results: age discrimination and later working culture in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
Age discrimination						
Low	162	55.5%	160	58.0%	ref	
High	130	44.5%	116	42.0%	1.24 (0.85,1.80)	0.257
workplace encourages work post-SPA						
encouraged	124	42.6%	154	55.8%	ref	
not encouraged	167	57.4%	122	44.2%	**2.15 (1.48,3.12)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

7.1.9   Women: physical work exposures

Table 7-8 describes the results from physical work exposures amongst women, in the HEAF FIRST cohort, stratified by case-control status. A clear pattern of physical work exposures was not discernible with retirees reporting higher levels of kneeling/squatting (OR 1.52), stair climbing, lifting weights ≥10 kg and sitting, whilst workers reported higher levels of climbing ladders, digging, standing/walking and hard work. However, workers did report higher levels of the physical work scale and lower levels of coping with physical work, although neither result reached statistical significance when adjusted for age.

Table 7-8   Descriptive results: physical work exposures in respondents to the HEAF FIRST

questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
Physical exposures						
kneeling/squatting	45	15.3%	29	10.5%	1.52 (0.92,2.52)	0.105
climbing ladder	25	8.5%	27	9.7%	0.81 (0.45,1.44)	0.464
30+ flights stairs	29	9.8%	26	9.4%	1.09 (0.62,1.93)	0.755
digging	1	0.3%	2	0.7%	0.59 (0.05,6.69)	0.672
lifting weights ≥10 kg	41	13.9%	32	11.6%	1.17 (0.71,1.93)	0.542
Standing/walking day	107	36.3%	119	43.0%	**0.70 (0.50,0.99)**	**0.042**
standing/walking 3hrs+	75	25.4%	108	39.0%	**0.49 (0.34,0.70)**	**<0.001**
hard work	32	10.8%	37	13.4%	0.78 (0.47,1.30)	0.343
sitting	173	58.6%	140	50.5%	**1.50 (1.07,2.11)**	**0.018**
Physical Work Scale						
Low	180	61.0%	152	54.9%	ref	
High	115	39.0%	125	45.1%	0.72 (0.51,1.01)	0.059
Physical coping						
easily	208	70.5%	177	63.9%	ref	.
not easily	87	29.5%	100	36.1%	0.73 (0.51,1.04)	0.079

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).
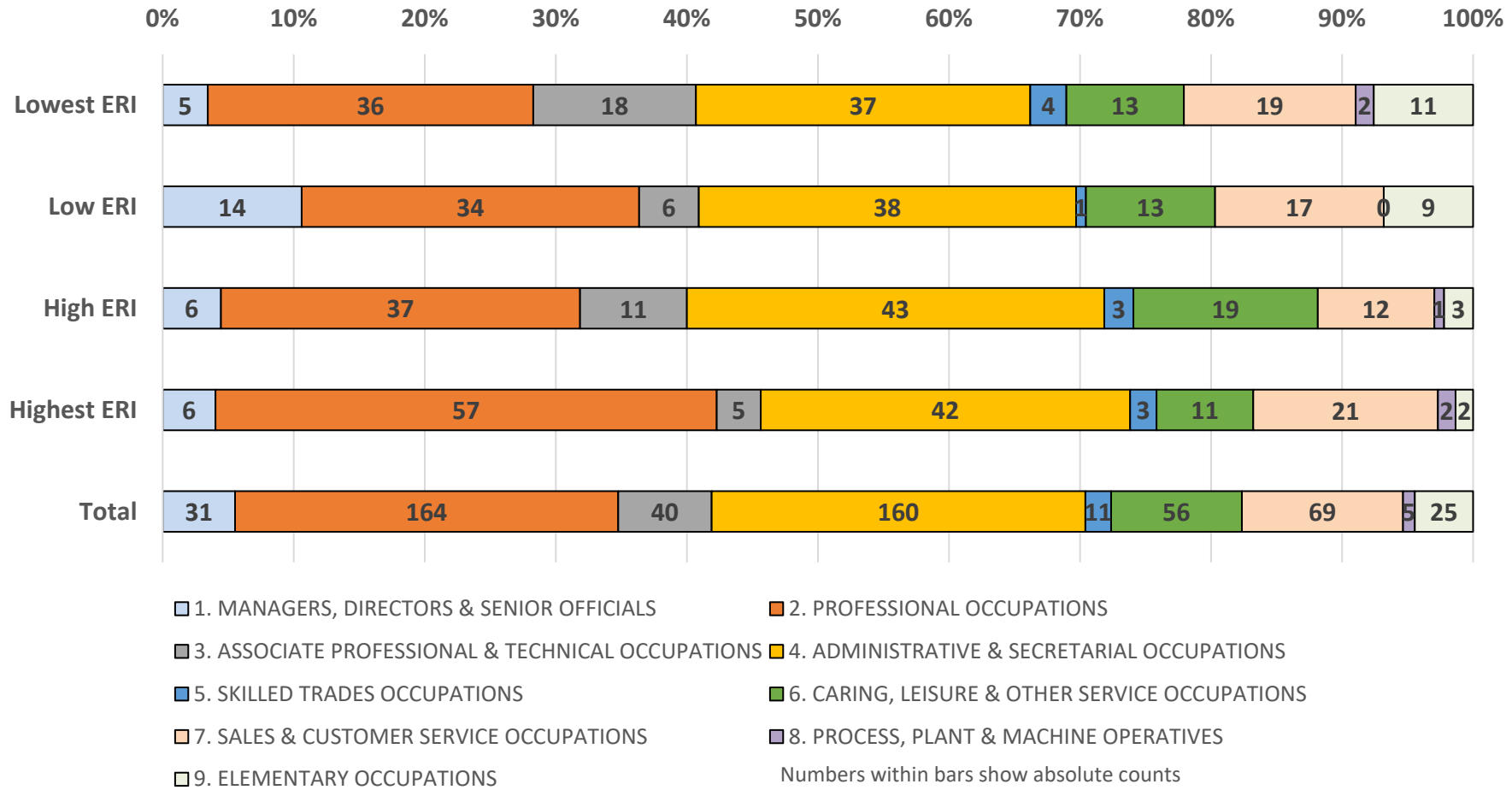
7.1.10   Women: commuting and overnight stays

Table 7-9 describes responses to questions about commuting and overnight stays in women, in the HEAF FIRST cohort, stratified by case-control status.

Retirees were more likely to report commutes above 30 mins and increased trouble coping with their commutes, although the latter result did not reach statistical significance. Retirees were also more than twice as likely to have jobs that required overnight stays and this had a strong association with being retired (OR 2.63, 95% CI 1.68-4.10).

Table 7-9   Descriptive results: commuting and overnight stay exposures in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
Commute time						
<30m	108	37.0%	120	43.5%	ref	.
≥30m	184	63.0%	156	56.5%	**1.42 (1.00,2.00)**	**0.047**
Commute coping						
easily	228	77.8%	220	80.0%	ref	.
not easily	65	22.2%	55	20.0%	1.22 (0.81,1.85)	0.336
Overnight stays						
No overnight	214	73.3%	239	86.9%	ref	
some overnight	78	26.7%	36	13.1%	**2.63 (1.68,4.10)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

7.1.11   Women: flexibility, constant availability, and work-life conflict

Table 7-10 describes the response to questions on flexibility, constant availability and work-life conflict, amongst women, in the HEAF FIRST cohort. Scores on the flexibility scale were similar between retirees and workers. However, being constantly available or perceiving work-life conflict (per quartile) were significantly associated with a higher risk of being retired.

Table 7-10   Descriptive results: flexibility, constant availability and work-life conflict scales, in respondents to the HEAF FIRST questionnaire (women only, by case-control status)

Exposure	Cases(Retirees) N=296		Controls(Workers) N=277		Regression*	
	N	%	N	%	OR, 95% CI	p
Flexibility Scale Quartiles (trend)					1.04 (0.89,1.21)	0.639
Highest flex	56	19.2%	47	17.0%	ref	
High flex	55	18.8%	59	21.4%	0.81 (0.47,1.39)	0.449
Low flex	87	29.8%	93	33.7%	0.78 (0.48,1.27)	0.319
Lowest flex	94	32.2%	77	27.9%	1.09 (0.66,1.80)	0.733
Constant availability quartiles (trend)					**1.46 (1.25,1.70)**	**<0.001**
Lowest constav	81	27.6%	119	43.0%	**ref**	.
Low constav	86	29.3%	80	28.9%	**1.75 (1.14,2.68)**	**0.01**
High constav	47	16.0%	35	12.6%	**2.17 (1.27,3.69)**	**0.004**
Highest constav	80	27.2%	43	15.5%	**3.21 (1.98,5.20)**	**<0.001**
Worklife Quartiles (trend)					**1.35 (1.16,1.58)**	**<0.001**
Lowest conflict	69	23.5%	87	31.4%	ref	.
Low conflict	75	25.5%	82	29.6%	1.31 (0.83,2.06)	0.253
High conflict	72	24.5%	56	20.2%	**2.00 (1.23,3.27)**	**0.006**
Highest conflict	78	26.5%	52	18.8%	**2.36 (1.44,3.86)**	**0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

7.1.12   Adjustment for non-work factors

Table 7-11 describes the associations between work exposures and having retired in three logistic regression models. The models followed the pattern established for the logistic regressions in the whole cohort (see para 6.2.13), with the exception that sex was no longer applicable as an adjustment factor. Therefore, model one adjusted for the matching factor (age), model two additionally adjusted for socio-economic position (NS-SEC[113] and managing financially) and model three additionally adjusted for marital status.

7.1.13 Women: logistic regression models adjusted for non-work factors

Table 7-11 Results of logistic regressions showing the association between work-related exposures and retirement status, adjusted for non-work factors, in respondents to the HEAF FIRST questionnaire (women only)

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
Dissatisfaction	**1.98 (1.08,3.61)**	**0.027**	**2.51 (1.30,4.83)**	**0.006**	**2.60 (1.34,5.06)**	**0.005**
Hours – irregular	1.29 (0.82,2.04)	0.273	1.14 (0.70,1.85)	0.589	1.12 (0.68,1.82)	0.663
Hours - unhappy	**1.93 (1.19,3.12)**	**0.008**	**2.55 (1.50,4.36)**	**0.001**	**2.77 (1.60,4.78)**	**<0.001**
ERI (low-high)	**1.31 (1.13,1.53)**	**<0.001**	**1.38 (1.17,1.62)**	**<0.001**	**1.41 (1.20,1.67)**	**<0.001**
ERI – Efforts	**1.43 (1.23,1.66)**	**<0.001**	**1.38 (1.18,1.61)**	**<0.001**	**1.41 (1.20,1.66)**	**<0.001**
ERI - Rewards	1.00 (0.86,1.15)	0.987	0.86 (0.74,1.01)	0.064	**0.84 (0.71,0.98)**	**0.031**
ERI - Appreciation	0.98 (0.83,1.15)	0.788	0.86 (0.72,1.03)	0.106	0.84 (0.70,1.01)	0.065
ERI -Promotion	**1.32 (1.10,1.59)**	**0.004**	1.10 (0.90,1.34)	0.366	1.08 (0.88,1.33)	0.456
ERI – Security	0.88 (0.75,1.05)	0.15	**0.80 (0.67,0.95)**	**0.012**	**0.79 (0.66,0.95)**	**0.01**
Declining standards	**1.69 (1.21,2.37)**	**0.002**	**1.98 (1.38,2.84)**	**<0.001**	**2.06 (1.43,2.97)**	**<0.001**
Shared goals	1.07 (0.71,1.62)	0.742	1.10 (0.71,1.70)	0.661	1.09 (0.70,1.69)	0.712
Isolation	1.37 (0.85,2.23)	0.197	1.57 (0.93,2.64)	0.091	**1.91 (1.11,3.28)**	**0.02**
Loyalty	**0.48 (0.26,0.87)**	**0.016**	0.63 (0.34,1.19)	0.157	0.65 (0.34,1.23)	0.183
Us VS Them	**1.59 (1.13,2.24)**	**0.007**	**1.81 (1.26,2.60)**	**0.001**	**1.82 (1.26,2.63)**	**0.002**
community at work	1.00 (0.66,1.52)	0.998	1.20 (0.76,1.89)	0.426	1.20 (0.76,1.90)	0.441

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
DCSQ type						
Low Demand/high control	ref		ref		ref	
Active Job	**2.16 (1.28,3.64)**	**0.004**	**1.96 (1.14,3.36)**	**0.015**	**2.01 (1.16,3.49)**	**0.013**
Passive Job	0.74 (0.47,1.16)	0.183	1.13 (0.68,1.88)	0.626	1.18 (0.71,1.98)	0.522
High Demand/low control	1.22 (0.77,1.94)	0.396	**1.80 (1.08,3.00)**	**0.024**	**2.10 (1.23,3.56)**	**0.006**
DCSQ- Psychosocial demands (high)	**1.80 (1.28,2.54)**	**0.001**	**1.75 (1.22,2.51)**	**0.002**	**1.89 (1.30,2.74)**	**0.001**
DCSQ – decision latitude (low)	**0.69 (0.49,0.97)**	**0.033**	1.10 (0.75,1.63)	0.626	1.18 (0.79,1.76)	0.407
DCSQ - Social support (low)	1.06 (0.76,1.48)	0.735	1.17 (0.82,1.67)	0.381	1.25 (0.87,1.80)	0.228
DCSQ- skill discretion (low)	**0.61 (0.43,0.87)**	**0.006**	0.92 (0.61,1.38)	0.682	0.97 (0.64,1.48)	0.905
DCSQ – decision authority (low)	0.94 (0.65,1.37)	0.758	1.31 (0.88,1.96)	0.189	1.38 (0.92,2.09)	0.123
Age discrimination	1.02 (0.73,1.44)	0.892	1.26 (0.87,1.81)	0.219	1.24 (0.85,1.80)	0.257
Not encouraged post-SPA	**1.97 (1.39,2.78)**	**<0.001**	**2.09 (1.45,3.01)**	**<0.001**	**2.15 (1.48,3.12)**	**<0.001**
Kneeling/squatting	1.52 (0.92,2.52)	0.105	**2.04 (1.17,3.57)**	**0.012**	**1.98 (1.13,3.48)**	**0.017**
Climbing ladder	0.81 (0.45,1.44)	0.464	1.05 (0.56,1.97)	0.89	1.06 (0.56,2.00)	0.869
30+ flights stairs	1.09 (0.62,1.93)	0.755	1.39 (0.75,2.57)	0.301	1.62 (0.85,3.11)	0.145
digging	0.59 (0.05,6.69)	0.672	0.98 (0.08,11.45)	0.989	1.44 (0.12,16.80)	0.772
lifting weights ≥10 kg	1.17 (0.71,1.93)	0.542	1.32 (0.78,2.25)	0.306	1.35 (0.78,2.31)	0.281
standing	**0.70 (0.50,0.99)**	**0.042**	**0.86 (0.59,1.24)**	**0.42**	0.81 (0.56,1.18)	0.281
standing/walking 3hrs+	**0.49 (0.34,0.70)**	**<0.001**	**0.63 (0.43,0.93)**	**0.022**	**0.63 (0.42,0.93)**	**0.021**
hard work	0.78 (0.47,1.30)	0.343	1.22 (0.69,2.16)	0.5	1.20 (0.67,2.14)	0.539
sitting	**1.50 (1.07,2.11)**	**0.018**	1.24 (0.87,1.79)	0.235	1.31 (0.90,1.89)	0.155

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
Physical work scale	0.72 (0.51,1.01)	0.059	0.98 (0.67,1.41)	0.899	0.94 (0.64,1.37)	0.737
Physical coping	0.73 (0.51,1.04)	0.079	1.05 (0.71,1.54)	0.821	1.10 (0.74,1.64)	0.63
Commute ≥30mins	**1.42 (1.00,2.00)**	**0.047**	1.29 (0.90,1.87)	0.171	1.35 (0.93,1.96)	0.118
Commute cope	1.22 (0.81,1.85)	0.336	1.31 (0.84,2.03)	0.229	1.48 (0.94,2.32)	0.089
Overnight stays	**2.63 (1.68,4.10)**	**<0.001**	**2.10 (1.30,3.37)**	**0.002**	**2.16 (1.34,3.50)**	**0.002**
Flexibility (high-low)	1.04 (0.89,1.21)	0.639	1.16 (0.98,1.37)	0.079	1.18 (1.00,1.40)	0.052
Constant availability (low-high)	**1.46 (1.25,1.70)**	**<0.001**	**1.32 (1.12,1.57)**	**0.001**	**1.33 (1.12,1.58)**	**0.001**
Work-life conflict (low-high)	**1.35 (1.16,1.58)**	**<0.001**	**1.43 (1.21,1.70)**	**<0.001**	**1.47 (1.23,1.75)**	**<0.001**

Model 1: adjusted for age, Model 2: adjusted for age, managing financially and NS-SEC, Model 3: adjusted for age, managing financially, NS-SEC and marital status.

7.2 Women: work-related exposures that have a statistically significant association with retirement status

Table 7-12 describes the work-related exposures that had a statistically significant association with retirement after adjustment for age, managing financially, NS-SEC[113] and marital status, amongst women in the HEAF FIRST cohort. Job dissatisfaction, when adjusted for non-work factors, associated strongly with increased risk of having retired. Increasing levels of ERI consistently associated with higher risk of being retired, as did a perception of declining standards, isolation and 'Us vs Them.'

The DCSQ job type categories of active jobs and high demand/low control associated with an increased risk of being retired when compared with low demand/high control jobs. Irregular hours did not seem to associate with risk of being retired among women but being unhappy with work hour schedules associated with an increased risk of being retired with a large effect size (OR 2.77, 95% CI 1.60-4.78). Being in a workplace that did not encourage work post-SPA also significantly associated with an increased risk of having retired.

Kneeling/squatting at work associated with increased risk of being retired, however standing/walking for more than three hours at a time associated with a reduced risk. Both longer commute times and not coping with commutes were positively associated with an increased risk of being retired but failed to reach statistical significance in model three. However overnight stays consistently associated significantly with increased risk of being retired.

Perceived lower levels of flexibility were associated with increased risk of having retired, however this result did not reach statistical significance when adjusted. Stronger effects were seen in the constant availability and work-life conflict scales, higher scores for both of which consistently associated with an increased risk of being retired.

Table 7-12   Work-related exposures with statistically significant (p<0.05) associations with being retired, after adjustment for non-work factors, in respondents to the HEAF FIRST questionnaire (women only)

Characteristic	Regression*	
	OR, 95% CI	p
Dissatisfaction	2.60 (1.34,5.06)	0.005
Hours - unhappy	2.77 (1.60,4.78)	<0.001
ERI (low-high)	1.41 (1.20,1.67)	<0.001
Declining standards	2.06 (1.43,2.97)	<0.001
Isolation	1.91 (1.11,3.28)	0.02
Us Vs Them	1.82 (1.26,2.63)	0.002
DCSQ type		
Low Demand/high control	ref	
Active Job	2.01 (1.16,3.49)	0.013
Passive Job	1.18 (0.71,1.98)	0.522
High Demand/low control	2.10 (1.23,3.56)	0.006
Not encouraged post-SPA	2.15 (1.48,3.12)	<0.001
Kneeling/squatting	1.98 (1.13,3.48)	0.017
standing/walking 3hrs+	0.63 (0.42,0.93)	0.021
Overnight stays	2.16 (1.34,3.50)	0.002
Constant availability (low-high)	1.33 (1.12,1.58)	0.001
Work-life conflict (low-high)	1.47 (1.23,1.75)	<0.001

*All factors adjusted for age, managing financially, NS-SEC, and marital status

7.3   Women: mutually adjusted model

Following a similar method to that used in producing the mutually adjusted model for the whole cohort (see para 6.4), I then produced a logistic regression model that mutually adjusted all factors. The base model adjusted for age, managing financially, NS-SEC[113] and marital status.

Work-related factors were added to the to the base model one at a time, having regard to the magnitude of odds ratio and statistical significance whilst discarding those that de-stabilised the overall model when added. Table 7-13 describes the results from the mutually adjusted model in women in the HEAF FIRST cohort. Increased work-life conflict associated with increased risk of having retired and was robust to mutual adjustment. Overnight stays were significantly associated with the risk of being retired with a large effect size (OR 2.28, 95% CI 1.36-3.81), as was a perception of declining standards (OR 1.97) and being in a workplace that did not encourage work

beyond SPA (OR 1.91). Two physical work exposures were included in the final model and had contrasting effects on risk of being retired with kneeling/squatting increasing risk and standing/walking for more than three hours decreasing risk of being retired.

Table 7-13   Mutually adjusted logistic regression model, showing the associations between work-related exposures and retirement status, in respondents to the HEAF FIRST questionnaire (women only)

Characteristic	Regression	
	OR, 95% CI	p
Older age	1.20 (1.13,1.28)	<0.001
NS-SEC (high-low)	0.77 (0.59,1.00)	0.05
Managing financially (doing worse)	0.37 (0.22,0.60)	<0.001
Marital status (single/widowed /divorced)	0.51 (0.33,0.77)	0.002
Work-life conflict (low to high)	1.29 (1.06,1.57)	0.01
Not encouraged post-SPA	1.91 (1.29,2.84)	0.001
Overnight stays	2.28 (1.36,3.81)	0.002
Declining standards	1.97 (1.32,2.96)	0.001
Standing/walking 3hrs+	0.44 (0.28,0.69)	<0.001
Kneeling/squatting	2.45 (1.29,4.64)	0.006

*All factors mutually adjusted

7.4   Summary

In this chapter I have presented results from the women in the HEAF FIRST case-control study. In the next chapter I will present the results from the men only.

Chapter 8   Phase three: case-control study results (men only)

8.1   Men only

8.1.1   Men: demographic characteristics

Table 8-1 describes the demographic characteristics of the men in the HEAF FIRST cohort stratified by case-control status. Retirees were older than workers and a higher proportion of them were married. The workers worked for 38 hours per week on average and 11% of the retirees did some paid work. The retirees were more likely to be carrying out caring and voluntary work, a pattern repeated in the whole cohort and in the women only analysis.

Table 8-1   Demographic characteristics of respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Characteristic	Cases(Retirees) N=192				Controls(Workers) N=171				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, 95% CI	p
Age	192		65.92	3.73	171		64.86	3.19	**1.09 (1.03,1.16)**	**0.005**
Age median			64.85							
Marital status (BL)										
married/civil part	152	79.2%			126	73.7%			ref	
single/widowed/ divorced	40	20.8%			45	26.3%			0.77 (0.47,1.27)	0.306
Ethnicity (BL)										
White	189	99.0%			167	99.0%				
Black	0	0.0%			1	0.6%				
Indian	0	0.0%			1	0.6%				
Chinese	0	0.0%			1	0.6%				
Other	2	1.0%			1	0.6%				
Employment status (HF)										
Employed	0	0.0%			166	97.1%				
Employed off sick	0	0.0%			5	2.9%				
Retired, no paid work	171	89.1%			0	0.0%				
Retired, some paid work	21	10.9%			0	0.0%				
Paid Job (hours) (HF)	192		1.26	4.78	171		38.37	10.50		
No work hours	170	88.5%			0	0.0%				
Low work hours	21	10.9%			24	14.0%				
High work hours	1	1.0%			147	86.0%				
Personal care (hours) (HF)	192		1.85	7.51	171		1.47	7.43		
No caring	161	83.9%			152	88.9%				
Some caring	31	16.1%			19	11.1%				
Volunteering (hours) (HF)	192		1.84	4.40	171		0.67	2.60		
No volunteering	145	75.5%			153	89.5%				
Some volunteering	27	24.5%			18	10.5%				

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor). Result for age is not adjusted

8.1.2 **Men: health and socio-economic position**

Table 8-2 describes the health and socio-economic characteristics of the men in the HEAF FIRST cohort. Workers were more likely to report doing worse financially and were less likely to be in the higher managerial category of NS-SEC[113] (see Figure 8-1). Self-rated health was similar between groups.

Table 8-2   Health and socio-economic characteristics of respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Characteristic	Cases(Retirees) N=192				Controls(Workers) N=171				Regression*	
	N	%	Mean	SD	N	%	Mean	SD	OR, 95% CI	p
Managing financially (BL)										
Doing better	170	89.0%			114	67.5%			ref	
Doing Worse	21	11.0%			55	32.5%			**0.25 (0.14,0.43)**	**<0.001**
Social class (HF)										
Routine and Manual	44	22.9%			65	38.0%			ref	
Intermediate	46	24.0%			40	23.4%			1.71 (0.96,3.05)	0.069
Higher Managerial	102	53.1%			66	38.6%			**2.39 (1.45,3.94)**	**0.001**
Self-rated health (BL)										
at least good	161	83.9%			143	84.1%			ref	
fair/poor	31	16.1%			27	15.9%			1.00 (0.57,1.77)	0.997

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).
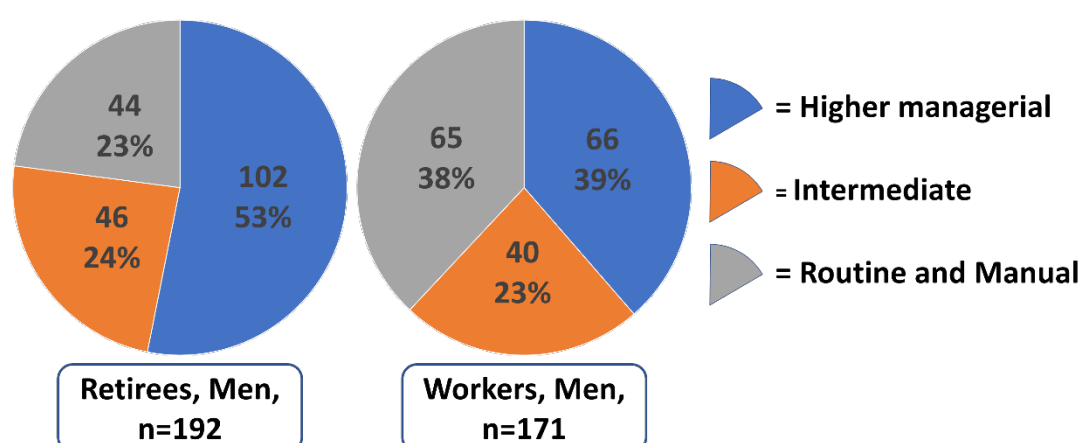
Figure 8-1   Pie chart of NS-SEC status of men in the HEAF FIRST cohort, stratified by retirement status

8.1.3   Men: SOC 2010 major job groups

Figure 8-2 shows the SOC 2010[112] major jobs groups of the men in HEAF FIRST, stratified by case-control status. Retirees tended to have higher jobs in the SOC 2010 (major groups 1-3, 56%) compared with workers (39%).
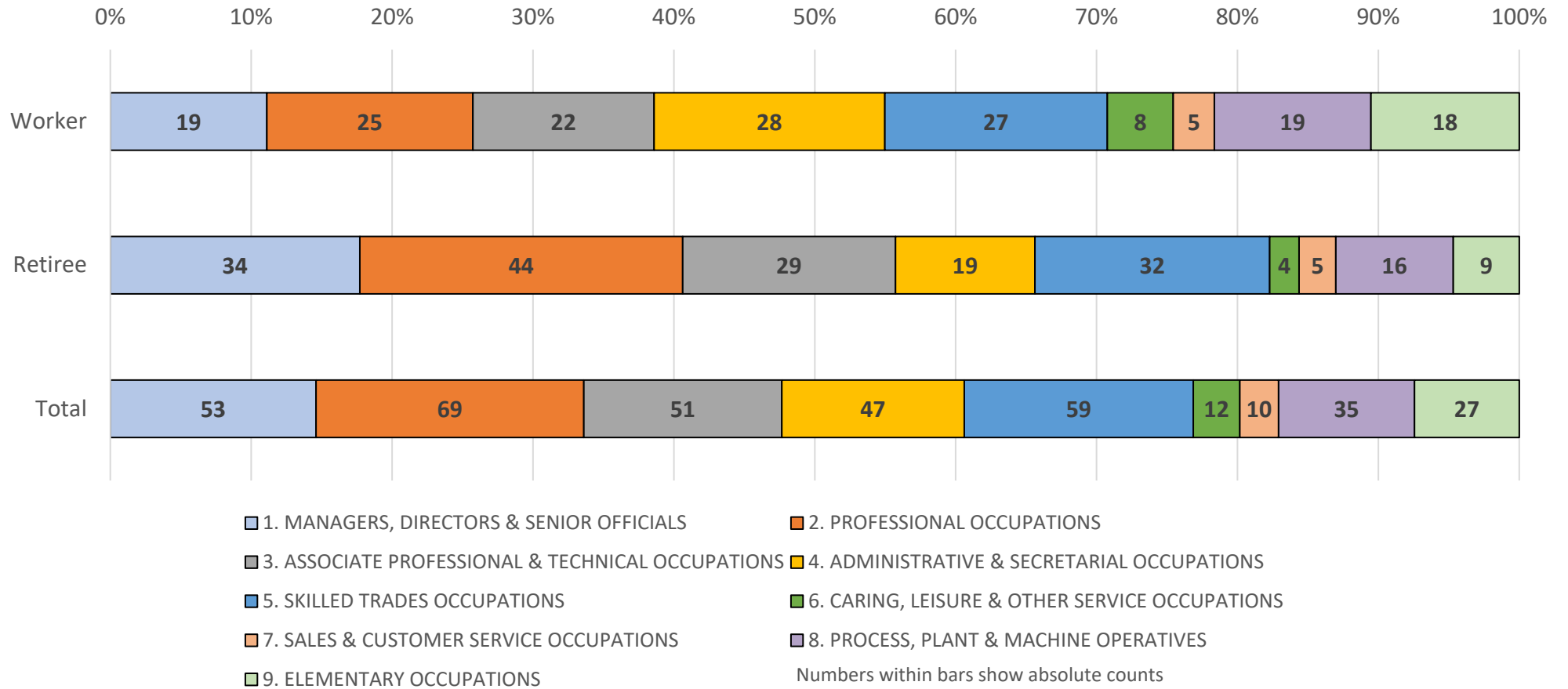
Figure 8-2   Graphical representation of job-roles of men in the HEAF FIRST cohort: distribution of SOC 2010 major groups by case-control status.

8.1.4   Men: job satisfaction and working hours

Table 8-3 describes responses to questions about job satisfaction and working hours in men in the HEAF FIRST cohort, stratified by case-control status. Job satisfaction was similar in workers and retirees, a finding which contrasts with the results for women. Working irregular hours strongly associated with an increased risk of being retired (OR 3.01, 95% CI 1.70-5.31) whilst being unhappy with working schedules did not have a significant association, a result which again contrasts with women for whom the opposite was found.

Table 6-11 describes the SOC 2010[112] major job groups of the men who worked irregular hours. Of the men who reported working irregular hours, 20% worked in the process, plant and machine operatives major group.

Table 8-3   Descriptive results: job satisfaction and working hours exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
Exposure	N	%	N	%	OR, 95% CI	p
Satisfaction						
satisfied	178	92.7%	158	92.4%	ref	
dissatisfied	14	7.3%	13	7.6%	1.00 (0.45,2.20)	0.998
Hours - irregular						
Regular hours	138	72.3%	150	87.7%	ref	.
Irregular hours	53	27.7%	21	12.3%	**3.01 (1.70,5.31)**	**<0.001**
Hours - unhappy						
Happy	169	88.0%	146	85.4%	ref	
Not happy	23	12.0%	25	14.6%	0.95 (0.51,1.78)	0.868

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.5   Men: effort-reward imbalance and subscales

Table 8-4 describes the ERI exposure results in men, in the HEAF FIRST cohort, stratified by case-control status. Increased ERI associated with higher risk of having retired when adjusted for age. In the subscales, retirees were more likely to report that their job required a lot of effort and had better promotion opportunities, whilst workers reported better job security. The overall rewards scale did not significantly differ between retired and working men.

Table 8-4   Descriptive results: effort-reward imbalance exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
ERI (quartiles)					**1.26 (1.04,1.53)**	**0.02**
Lowest ERI	46	24.0%	58	34.1%	ref	
Low ERI	53	27.6%	46	27.1%	1.52 (0.87,2.68)	0.143
High ERI	51	26.6%	32	18.8%	**2.44 (1.32,4.48)**	**0.004**
Highest ERI	42	21.9%	34	20.0%	1.77 (0.96,3.26)	0.067
Efforts (quartiles)					**1.40 (1.16,1.68)**	**<0.001**
Lowest Efforts	64	33.3%	85	49.7%	ref	
Low Efforts	40	20.8%	33	19.3%	1.64 (0.92,2.91)	0.091
High Efforts	42	21.9%	21	12.3%	**3.00 (1.59,5.65)**	**0.001**
Highest Efforts	46	24.0%	32	18.7%	**2.36 (1.32,4.23)**	**0.004**
Rewards (quartiles)					0.93 (0.78,1.12)	0.467
Lowest Rewards	57	29.7%	52	30.6%	ref	
Low Rewards	37	19.3%	28	16.5%	1.24 (0.66,2.32)	0.508
High Rewards	56	29.2%	44	25.9%	1.21 (0.70,2.11)	0.497
Highest Rewards	42	21.9%	46	27.1%	0.76 (0.43,1.35)	0.348
Appreciation (quartiles)					1.06 (0.85,1.31)	0.615
Lowest Appreciation	57	29.7%	50	29.6%	ref	
Low Appreciation	82	42.7%	74	43.8%	1.02 (0.62,1.69)	0.929
High Appreciation	22	11.5%	27	16.0%	0.71 (0.36,1.42)	0.338
Highest Appreciation	31	16.1%	18	10.7%	1.46 (0.72,2.94)	0.291
Promotion (quartiles)					**1.38 (1.09,1.75)**	**0.006**
Lowest Promotion	41	21.4%	48	28.2%	ref	
Low Promotion	75	39.1%	82	48.2%	1.08 (0.64,1.84)	0.767
High Promotion	52	27.1%	25	14.7%	**2.60 (1.36,4.94)**	**0.004**
Highest Promotion	24	12.5%	15	8.8%	1.83 (0.84,3.98)	0.128
Security (quartiles)					**0.67 (0.55,0.83)**	**<0.001**
Lowest Security	85	44.3%	51	29.8%	ref	
Low Security	60	31.3%	58	33.9%	**0.58 (0.35,0.96)**	**0.036**
High Security	28	14.6%	28	16.4%	0.52 (0.28,1.00)	0.05
Highest Security	19	9.9%	34	19.9%	**0.28 (0.14,0.55)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

Figure 8-3 describes the distribution of jobs, coded to the SOC 2010[112] major job groups, in the quartiles of the ERI exposure. The distribution of jobs within the quartiles is largely consistent.
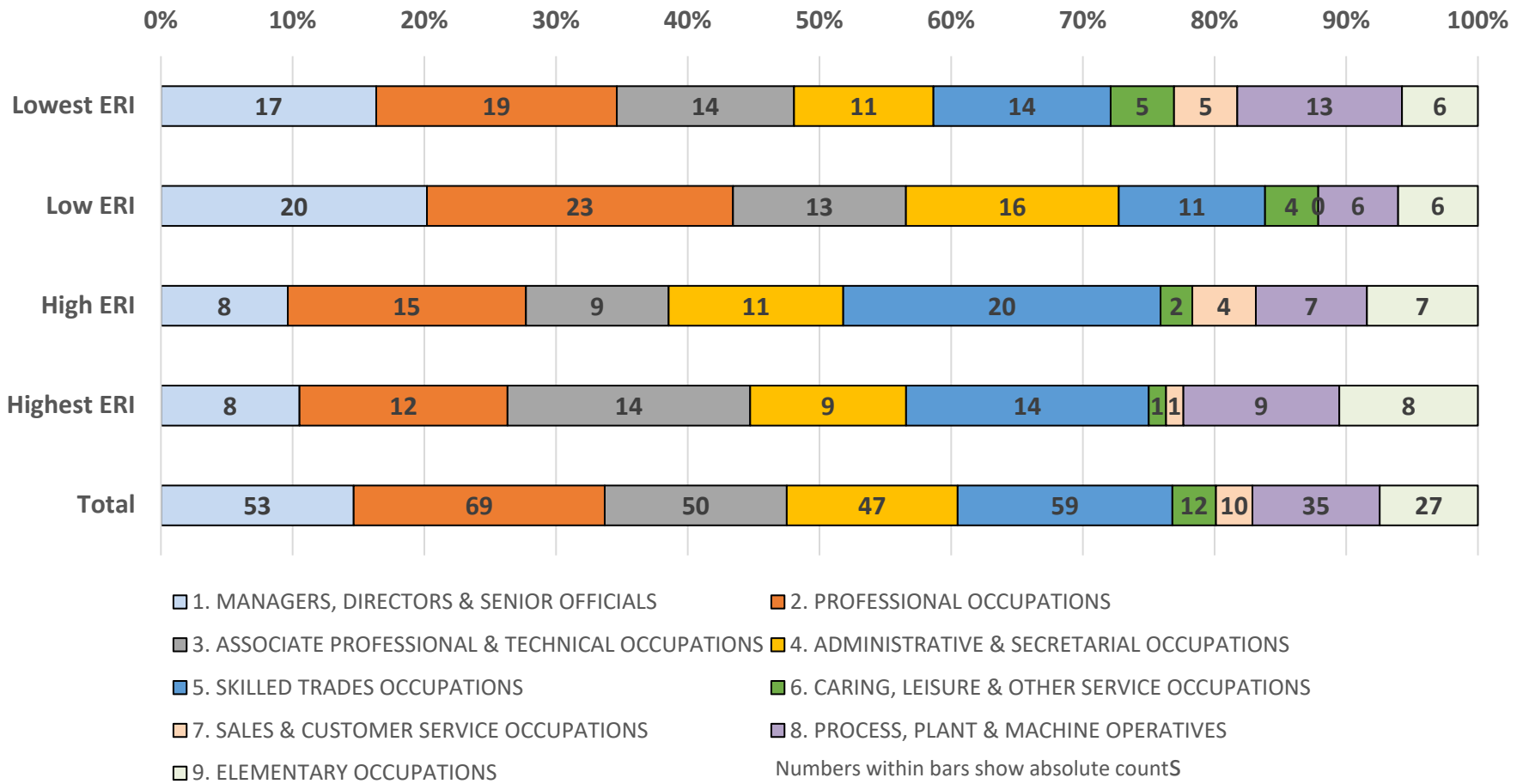
Figure 8-3   Graphical representation of job-roles of men in the HEAF FIRST cohort: distribution of SOC 2010 major groups by ERI in quartiles.

8.1.6   Men: workplace decline and workplace community

Table 8-5 describes responses to questions about perceived declining standards and community at work in men, in the HEAF FIRST cohort, stratified by case-control status. Retirees were more likely to report a decline in standards over the past two years and a feeling of isolation, when compared with workers, but neither result reached statistical significance. Workers were more likely to report less loyalty and less sense of community at work, but again neither result reached statistical significance when adjusted for age.

Table 8-5   Descriptive results: workplace decline and community exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
Declining standards						
No decline	105	54.7%	106	62.0%	ref	
Decline	87	45.3%	65	38.0%	1.40 (0.92,2.15)	0.118
Shared goals						
Shared goals	159	82.8%	133	77.8%	ref	.
No shared goals	33	17.2%	38	22.2%	0.73 (0.43,1.24)	0.242
Isolation						
No Isolation	163	84.9%	149	87.1%	ref	
Isolation	29	15.1%	22	12.9%	1.21 (0.66,2.21)	0.536
Loyalty						
Loyalty	169	88.0%	144	84.2%	ref	.
No loyalty	23	12.0%	27	15.8%	0.71 (0.39,1.30)	0.265
Us VS Them						
No Disconnection	113	58.9%	97	57.1%	ref	
Disconnection	79	41.1%	73	42.9%	0.92 (0.60,1.41)	0.713
part of community at work						
Part of community	162	84.4%	136	79.5%	ref	.
Not Part of community	30	15.6%	35	20.5%	0.68 (0.39,1.17)	0.161

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.7   Men: demand-control support model

The results from DCSQ exposures for men in the HEAF FIRST cohort, are described in Table 8-6. Those with active jobs were more likely to be retired (OR 2.94, 95% CI 1.53-0.01) when compared with low demand/high control jobs. Scores in the psychosocial demands scale were higher for retirees and workers reported slightly lower levels of job control. However, contrasting results exist in the two constituents of the overall control scale, workers reported less skill discretion but more decision authority. Better levels of social support at work were reported by workers but the result did not reach statistical significance.

Table 8-6   Descriptive results: DCSQ exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
DCSQ type						
Low Demand/high control	73	38.4%	74	43.3%	ref	
Active Job	45	23.7%	18	10.5%	**2.94 (1.53,5.66)**	**0.001**
Passive Job	42	22.1%	53	31.0%	0.79 (0.47,1.34)	0.385
High Demand/low control	30	15.8%	26	15.2%	1.30 (0.69,2.44)	0.417
Psychosocial Demands						
Low	115	60.2%	127	74.3%	ref	
High	76	39.8%	44	25.7%	**2.17 (1.36,3.46)**	**0.001**
Control (decision Latitude)						
High	118	62.1%	92	53.8%	ref	
Low	72	37.9%	79	46.2%	0.70 (0.46,1.08)	0.104
Social support						
High	90	47.4%	70	40.9%	ref	
Low	100	52.6%	101	59.1%	0.78 (0.51,1.19)	0.247
Skill Discretion (sub cat of DL)						
High	95	49.7%	58	33.9%	ref	
Low	96	50.3%	113	66.1%	**0.50 (0.33,0.77)**	**0.002**
Decision authority (Sub cat of DL)						
High	68	35.8%	76	44.4%	ref	.
Low	122	64.2%	95	55.6%	1.44 (0.94,2.21)	0.093

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

Figure 8-4 shows the distribution of SOC 2010[112] major job groups in the DCSQ job types for men. Low demand/high control and active job types included a higher proportion of jobs in the higher SOC 2010 groups (managers, professionals, associate professionals), whilst high demand/low control and passive jobs types included more roles from the lower groups (elementary, process and sales). This pattern can also be seen in results for the whole cohort (Figure 6-6) and for women (Figure 7-4).
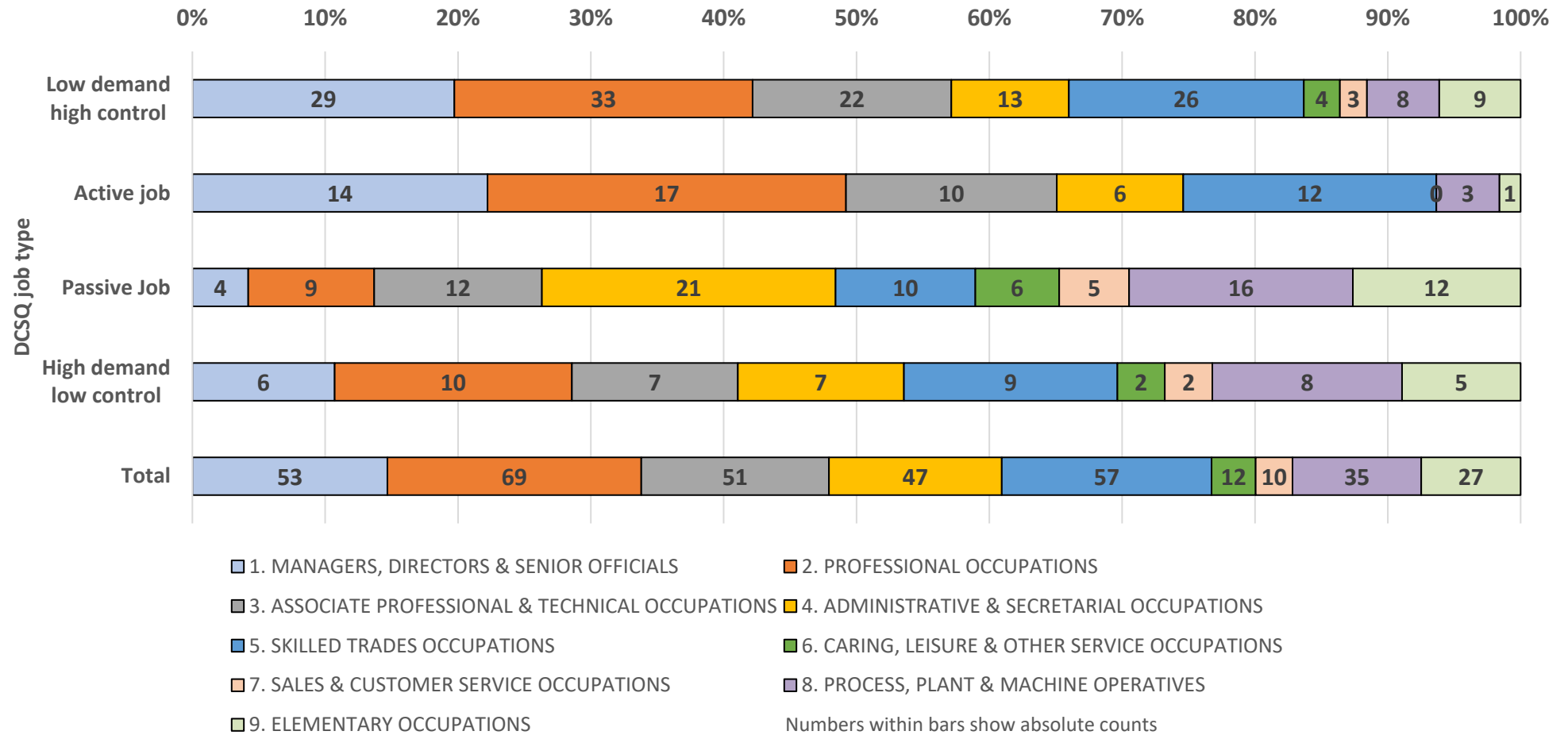
Figure 8-4   Graphical representation of job-roles of men in the HEAF FIRST cohort: the distribution of SOC 2010 major groups by DCSQ job type.

8.1.8   Men: age discrimination and later working culture

Table 8-7 describes responses to questions about age discrimination and workplace encouragement post-SPA in men, in the HEAF FIRST cohort, stratified by case-control status. Workers reported more perceived age discrimination, a result that had a large effect size (OR 0.58, 95% CI 0.38-0.89), when adjusted for age. Being in a workplace that encouraged work beyond the SPA was also significantly more common in workers.

Table 8-7   Descriptive results: age discrimination and later working culture in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
Age discrimination						
Low	102	53.7%	68	39.8%	ref	.
High	88	46.3%	103	60.2%	**0.58 (0.38,0.89)**	**0.012**
workplace encourages work post-SPA						
encouraged	76	40.2%	87	50.9%	ref	
not encouraged	113	59.8%	84	49.1%	**1.80 (1.16,2.78)**	**0.009**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.9   Men: physical work exposures

The physical work exposures for men in the HEAF FIRST cohort are described in Table 8-8. There was no clear pattern of prevalence of physical exposures between workers and retirees. Workers were more likely to report climbing ladders, lifting weights ≥10 kg, hard physical work and troubles coping with physical work, whilst retirees were more likely to report kneeling/squatting and standing/walking for more than three hours. None of the effects reached statistical significance.

Table 8-8   Descriptive results: physical work exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
Physical exposures						
kneeling/squatting	41	21.4%	35	20.5%	1.12 (0.67,1.87)	0.677
climbing ladder	44	22.9%	41	24.0%	0.94 (0.57,1.53)	0.796
30+ flights stairs	38	19.8%	34	19.9%	0.95 (0.56,1.60)	0.834
digging	13	6.8%	11	6.4%	1.03 (0.45,2.38)	0.945
lifting weights ≥10 kg	66	34.4%	72	42.1%	0.71 (0.46,1.09)	0.115
standing/walking day	80	41.7%	72	42.1%	0.97 (0.64,1.49)	0.901
standing/walking 3hrs+	70	36.5%	55	32.2%	1.23 (0.79,1.92)	0.35
hard work	42	21.9%	43	25.1%	0.87 (0.53,1.43)	0.588
sitting	112	58.3%	84	49.1%	1.46 (0.96,2.22)	0.078
Physical Work Scale						
low	91	47.4%	74	43.3%		
high	101	52.6%	97	56.7%	0.82 (0.54,1.24)	0.348
Physical coping						
easily	149	77.6%	120	70.6%	ref	.
not easily	43	22.4%	50	29.4%	0.71 (0.44,1.14)	0.155

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.10   Men: commuting and overnight stays

Table 8-9 describes responses to questions about commuting and overnight stays in men, in the HEAF FIRST cohort, stratified by case-control status. Commutes above 30 mins were more likely to be reported by retirees but the result did not reach statistical significance when adjusted for age. Overnight stays were significantly associated with an increased risk of being retired, with a relatively large effect size (OR 2.55, 95% CI 1.65-3.95).

Table 8-9   Descriptive results: commuting and overnight stay exposures in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
Commute time						
<30m	58	30.9%	66	39.1%	ref	.
≥30m	130	69.1%	103	60.9%	1.47 (0.94,2.29)	0.091
Commute coping						
easily	156	81.7%	132	78.1%	ref	.
not easily	35	18.3%	37	21.9%	0.82 (0.49,1.39)	0.459
Overnight stays						
no overnight	89	46.4%	115	67.3%		
some overnight	103	53.6%	56	32.7%	**2.55 (1.65,3.95)**	**<0.001**

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.11   Men: flexibility, constant availability, and work-life conflict

Participant responses to questions about flexibility, constant availability and work-life conflict, for men, in the HEAF FIRST cohort are described in Table 8-10. Retirees were more likely to report being constantly available and work-life conflict but less flexibility at work. Being constantly available was the only result that was significantly associated with an increased risk of being retired(OR 1.42, 95% CI 1.17-1.73).

Table 8-10 Descriptive results: flexibility, constant availability and work-life conflict scales, in respondents to the HEAF FIRST questionnaire (men only, by case-control status)

Exposure	Cases(Retirees) N=192		Controls(Workers) N=171		Regression*	
	N	%	N	%	OR, 95% CI	p
Flexibility Scale Quartiles (trend)					1.18 (0.98,1.42)	0.078
Highest flex	44	22.9%	46	26.9%	ref	
High flex	36	18.8%	37	21.6%	1.09 (0.58,2.03)	0.797
Low flex	53	27.6%	46	26.9%	1.34 (0.75,2.39)	0.33
Lowest flex	59	30.7%	42	24.6%	1.63 (0.91,2.93)	0.1
Constant availability quartiles (trend)					**1.42 (1.17,1.73)**	**<0.001**
Lowest constav	34	17.8%	57	33.3%	ref	.
Low constav	64	33.5%	50	29.2%	**2.12 (1.20,3.75)**	**0.01**
High constav	36	18.8%	33	19.3%	1.88 (0.99,3.58)	0.055
Highest constav	57	29.8%	31	18.1%	**3.38 (1.81,6.31)**	**<0.001**
Worklife Quartiles (trend)					1.13 (0.93,1.39)	0.225
Lowest conflict	40	20.8%	47	27.5%	ref	.
Low conflict	69	35.9%	57	33.3%	1.50 (0.86,2.61)	0.155
High conflict	49	25.5%	31	18.1%	**2.14 (1.14,4.02)**	**0.018**
Highest conflict	34	17.7%	36	21.1%	1.31 (0.69,2.50)	0.414

*Final column shows associations between characteristics and retirement status after logistic regression adjusted for age (matching factor).

8.1.12 Adjustment for non-work factors

The associations between work-related exposures and risk of having retired in three different logistic regression models, adjusted for non-work factors, are described in Table 8-11. The adjustment method was the same as for women described at 7.1.12. Model one is adjusted for age, model two is additionally adjusted for managing financially and NS-SEC[113] and model three is additionally adjusted for marital status.

8.1.13   Men: logistic regression models adjusted for non-work factors

Table 8-11   Results of logistic regressions showing the association between work-related exposures and retirement status, adjusted for non-work factors, in respondents to the HEAF FIRST questionnaire (men only)

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
Dissatisfaction	1.00 (0.45,2.20)	0.998	2.25 (0.89,5.67)	0.085	2.24 (0.89,5.65)	0.088
Hours – irregular	**3.01 (1.70,5.31)**	**<0.001**	**2.70 (1.50,4.86)**	**0.001**	**2.70 (1.50,4.86)**	**0.001**
Hours - unhappy	0.95 (0.51,1.78)	0.868	1.17 (0.60,2.30)	0.638	1.17 (0.60,2.29)	0.648
ERI (low-high)	**1.26 (1.04,1.53)**	**0.02**	**1.50 (1.21,1.87)**	**<0.001**	**1.50 (1.20,1.86)**	**<0.001**
ERI – Efforts	**1.40 (1.16,1.68)**	**<0.001**	**1.46 (1.19,1.78)**	**<0.001**	**1.46 (1.19,1.78)**	**<0.001**
ERI - Rewards	0.93 (0.78,1.12)	0.467	**0.75 (0.61,0.92)**	**0.006**	**0.74 (0.60,0.92)**	**0.005**
ERI - Appreciation	1.06 (0.85,1.31)	0.615	0.86 (0.68,1.09)	0.205	0.86 (0.68,1.08)	0.195
ERI -Promotion	**1.38 (1.09,1.75)**	**0.006**	1.15 (0.90,1.48)	0.268	1.15 (0.90,1.47)	0.271
ERI – Security	**0.67 (0.55,0.83)**	**<0.001**	**0.55 (0.43,0.69)**	**<0.001**	**0.54 (0.43,0.69)**	**<0.001**
Declining standards	1.40 (0.92,2.15)	0.118	**2.03 (1.26,3.27)**	**0.004**	**2.04 (1.26,3.29)**	**0.004**
Shared goals	0.73 (0.43,1.24)	0.242	1.09 (0.61,1.94)	0.77	1.10 (0.61,1.97)	0.748
Isolation	1.21 (0.66,2.21)	0.536	1.90 (0.97,3.73)	0.062	1.89 (0.96,3.73)	0.064
Loyalty	0.71 (0.39,1.30)	0.265	1.00 (0.52,1.92)	0.992	1.00 (0.52,1.94)	0.992
Us VS Them	0.92 (0.60,1.41)	0.713	1.14 (0.72,1.78)	0.577	1.13 (0.72,1.78)	0.582
community at work	0.68 (0.39,1.17)	0.161	0.77 (0.43,1.36)	0.368	0.77 (0.43,1.36)	0.363

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
DCSQ type						
Low Demand/high control	ref		ref		ref	
Active Job	**2.94 (1.53,5.66)**	**0.001**	**3.17 (1.60,6.29)**	**0.001**	**3.16 (1.59,6.28)**	**0.001**
Passive Job	0.79 (0.47,1.34)	0.385	1.02 (0.58,1.81)	0.937	1.03 (0.58,1.82)	0.918
High Demand/low control	1.30 (0.69,2.44)	0.417	1.93 (0.97,3.85)	0.063	1.94 (0.97,3.87)	0.061
DCSQ- Psychosocial demands (high)	**2.17 (1.36,3.46)**	**0.001**	**2.53 (1.53,4.19)**	**<0.001**	**2.53 (1.53,4.19)**	**<0.001**
DCSQ – decision latitude (low)	0.70 (0.46,1.08)	0.104	0.94 (0.59,1.49)	0.786	0.95 (0.59,1.51)	0.817
DCSQ - Social support (low)	0.78 (0.51,1.19)	0.247	0.98 (0.63,1.54)	0.934	0.98 (0.62,1.53)	0.921
DCSQ- skill discretion (low)	**0.50 (0.33,0.77)**	**0.002**	0.69 (0.43,1.10)	0.116	0.69 (0.43,1.10)	0.121
DCSQ – decision authority (low)	1.44 (0.94,2.21)	0.093	**1.68 (1.07,2.65)**	**0.026**	**1.70 (1.07,2.68)**	**0.023**
Age discrimination	**0.58 (0.38,0.89)**	**0.012**	0.70 (0.45,1.09)	0.116	0.70 (0.45,1.10)	0.119
Not encouraged post-SPA	**1.80 (1.16,2.78)**	**0.009**	**1.74 (1.11,2.75)**	**0.017**	**1.75 (1.11,2.77)**	**0.016**
Kneeling/squatting	1.12 (0.67,1.87)	0.677	1.38 (0.79,2.42)	0.26	1.38 (0.79,2.43)	0.257
Climbing ladder	0.94 (0.57,1.53)	0.796	1.20 (0.71,2.04)	0.499	1.20 (0.71,2.04)	0.5
30+ flights stairs	0.95 (0.56,1.60)	0.834	1.10 (0.63,1.91)	0.745	1.10 (0.63,1.92)	0.744
digging	1.03 (0.45,2.38)	0.945	1.40 (0.57,3.43)	0.466	1.41 (0.57,3.46)	0.458
lifting weights ≥10 kg	0.71 (0.46,1.09)	0.115	1.01 (0.62,1.64)	0.97	1.01 (0.62,1.65)	0.953
standing	0.97 (0.64,1.49)	0.901	1.41 (0.87,2.28)	0.164	1.43 (0.88,2.32)	0.151
standing/walking 3hrs+	1.23 (0.79,1.92)	0.35	**1.71 (1.05,2.80)**	**0.031**	**1.72 (1.05,2.81)**	**0.031**
hard work	0.87 (0.53,1.43)	0.588	1.26 (0.72,2.21)	0.418	1.26 (0.72,2.21)	0.415
sitting	1.46 (0.96,2.22)	0.078	1.06 (0.66,1.68)	0.816	1.05 (0.66,1.67)	0.832

Exposure	Model 1		Model 2		Model 3	
	OR, 95% CI	p	OR, 95% CI	p	OR, 95% CI	p
Physical work scale	0.82 (0.54,1.24)	0.348	1.23 (0.76,1.99)	0.398	1.23 (0.76,2.00)	0.39
Physical coping	0.71 (0.44,1.14)	0.155	0.90 (0.54,1.50)	0.678	0.90 (0.54,1.50)	0.684
Commute ≥30mins	1.47 (0.94,2.29)	0.091	1.40 (0.88,2.23)	0.161	1.39 (0.87,2.23)	0.163
Commute cope	0.82 (0.49,1.39)	0.459	0.79 (0.45,1.38)	0.406	0.78 (0.45,1.37)	0.396
Overnight stays	**2.55 (1.65,3.95)**	**<0.001**	**1.83 (1.13,2.97)**	**0.014**	**1.84 (1.13,2.99)**	**0.015**
Flexibility (high-low)	1.18 (0.98,1.42)	0.078	**1.34 (1.10,1.64)**	**0.004**	**1.34 (1.10,1.65)**	**0.004**
Constant availability (low-high)	**1.42 (1.17,1.73)**	**<0.001**	**1.27 (1.03,1.57)**	**0.028**	**1.27 (1.02,1.57)**	**0.029**
Work-life conflict (low-high)	1.13 (0.93,1.39)	0.225	1.21 (0.97,1.50)	0.087	1.21 (0.97,1.50)	0.089

Model 1: adjusted for age, Model 2: adjusted for age, managing financially and NS-SEC, Model 3: adjusted for age, managing financially, NS-SEC and marital status.

8.2   Men: work-related exposures that have a statistically significant association with retirement

Table 8-12 describes the work-related exposures that were significantly associated with risk of being retired, in men, in the HEAF FIRST cohort, when adjusted for non-work confounders. After adjustment for age, managing financially, NS-SEC[113] and marital status, higher levels of ERI were associated with an increased risk of having retired (OR 1.50, 95% CI 1.20-1.86). Being in a workplace that did not encourage work post-SPA was also associated with an increased risk of being retired, as was reporting a perception of declining standards.

In the DCSQ job types, having an active job was associated with an increased risk of being retired with a large effect size (OR 3.16, 95% CI 1.59-6.28) when compared with low demand/high control jobs. Having a high demand/low control job (notionally the type with highest job strain) also had a positive association with being retired but did this not reach statistical significance.

Physical work exposures did not generally significantly associate with being retired in men. The exception was standing/walking for more than three hours which associated with an increased risk of being retired. Work-related overnight stays were also significantly associated with an increased risk of being retired. Although commuting for more than 30 mins was positively associated with being retired, the result did not reach statistical significance.

In contrast to results from women, working irregular hours was significantly associated with an increased risk of being retired (OR 2.70, 95% CI 1.50-4.86), however, being unhappy with work hours schedule was not. Being constantly available and perceiving less flexibility was associated with an increased risk of having retired. More perceived work-life conflict was also associated with being retired but the result failed to reach statistical significance.

Table 8-12   Work-related exposures with statistically significant (p<0.05) associations with being retired, after adjustment for non-work factors, in respondents to the HEAF FIRST questionnaire (men only)

Characteristic	*Regression	
	OR, 95% CI	p
Hours – irregular	**2.70 (1.50,4.86)**	**0.001**
ERI (low to high)	**1.50 (1.20,1.86)**	**<0.001**
Declining standards	**2.04 (1.26,3.29)**	**0.004**
DCSQ type		
Low Demand/high control	**ref**	
Active Job	**3.16 (1.59,6.28)**	**0.001**
Passive Job	1.03 (0.58,1.82)	0.918
High Demand/low control	1.94 (0.97,3.87)	0.061
Not encouraged post-SPA	**1.75 (1.11,2.77)**	**0.016**
standing/walking 3hrs+	**1.72 (1.05,2.81)**	**0.031**
Overnight stays	**1.84 (1.13,2.99)**	**0.015**
Flexibility (high-low)	**1.34 (1.10,1.65)**	**0.004**
Constant availability (low-high)	**1.27 (1.02,1.57)**	**0.029**

*All factors adjusted for sex, age, managing financially, NS-SEC, and marital status

8.3   Men: mutually adjusted model

After adjusting for non-work factors, I then produced a mutually adjusted model following the same steps described at 6.4. The results from the mutually adjusted model are described in Table 8-13. Higher levels of ERI was associated with an increased risk of being retired in the mutually adjusted model (and all prior models). Working irregular hours (OR 2.48, 95% CI 1.34-4.61) was also consistently associated with an increased risk of having retired, robust to mutual adjustment. Having an active job associated with increased risk of being retired, although this effect became attenuated in the final stage of the model (p=0.052).

Being in a workplace perceived not to encourage working post-SPA also had a consistent effect in all models and was associated with an increased risk of being retired when mutually adjusted. Finally, standing/walking for more than three hours was associated with increased risk of being retired; this was the only physical work exposure that had a significant association in men.

Table 8-13   Mutually adjusted logistic regression model, showing the associations between work-related exposures and retirement status, in respondents to the HEAF FIRST questionnaire (men only)

Characteristic	Regression	
	OR, 95% CI	p
Older age	**1.16 (1.08,1.25)**	**<0.001**
NS-SEC (high to low)	**0.70 (0.52,0.95)**	**0.022**
Managing financially (doing worse)	**0.21 (0.11,0.41)**	**<0.001**
Marital status (single/widowed /divorced)	0.96 (0.55,1.68)	0.882
ERI (low to high)	**1.38 (1.06,1.81)**	**0.018**
Hours - irregular	**2.48 (1.34,4.61)**	**0.004**
DCSQ type		
Low Demand/high control	ref	
Active Job	2.16 (0.99,4.68)	0.052
Passive Job	0.93 (0.50,1.72)	0.809
High Demand/low control	1.04 (0.45,2.40)	0.918
Not encouraged post-SPA	**1.80 (1.11,2.92)**	**0.017**
Stand/walk 3hrs+	**1.73 (1.02,2.95)**	**0.043**

*All factors mutually adjusted

8.4   Summary

In this chapter I have presented result from the men in the HEAF FIRST case-control study. In the next chapter I will present a discussion of the results from the previous three chapters.

Chapter 9   Phase three: case-control study: summary of results, discussion and conclusion

9.1   Summary of results

In this phase, I conducted a case-control study of retirees and workers in the HEAF cohort in order to explore the relationship between work-related factors and retirement decisions. The results from the phase one telephone interviews and phase two systematic review guided selection of appropriate work-related factors for inclusion in the postal questionnaire. Questions that address the following work-related factors were included in the study: job satisfaction, working hours, effort-reward imbalance, workplace decline, workplace community, demand-control-support model, age discrimination, later working culture, physical work, commuting, overnight stays, flexibility, constant availability and work-life conflict.

Associations between the work-related factors and retirement were explored using unconditional logistic regression, for the whole cohort of respondents and then stratified by sex. Preliminary exploration of the data showed that, as expected, some non-work factors were importantly associated with being retired and therefore logistic regression models were built that adjusted for non-work factors: age, sex, NS-SEC[113], self-reported managing financially and marital status (see Figure 9-1 for a schematic that summarises). In the resultant models adjusted for these non-work factors, the following work-related factors were significantly associated (p<0.05) with an increased risk of being retired in the whole cohort: job dissatisfaction, irregular hours, being unhappy with hours schedule, effort-reward imbalance, declining standards, isolation, 'us vs them,' having an 'active' job, having a high demand/low control job, being in a workplace that did not encourage work beyond SPA, kneeling/squatting, commuting more than 30 minutes, overnight stays, low flexibility, constant availability and work-life conflict (see Table 6-20). Subsequently, I further explored the work factors in a mutually adjusted logistic regression model and this suggested that: effort reward imbalance; overnight stays; being in a workplace that did not encourage working beyond SPA; declining standards; and constant availability were those factors most robustly associated with the risk of being retired (see Table 6-21).

Subsequently, the analyses were carried out stratified by sex. To achieve this, another set of logistic regression models were built for women and then for men and adjusted for age, NS-SEC[113], managing financially and marital status. Amongst women, the following work-related factors were associated significantly (p<0.05) with an increased risk of being retired after

adjustment for non-work factors: job dissatisfaction, being unhappy with hours schedule, ERI, declining standards, isolation, 'Us vs them,' active jobs, high demand/low control jobs, being in a workplace that does not encourage work beyond the SPA, kneeling/squatting, overnight stays, constant availability and work-life conflicts. Standing/walking for more than three hours was associated with a decreased risk of being retired (see Table 7-12). After mutual adjustment, work-life conflict, not being in a workplace that encouraged work beyond the SPA, overnight stays, declining standards and kneeling/squatting were significantly associated with an increased risk of being retired whilst standing/walking for more than three hours remained significantly associated with a decreased risk of being retired (see Table 7-13).

Amongst men, after adjustment for non-work factors, the following work-related factors were significantly associated with the risk of being retired: irregular hours, ERI, declining standards, active jobs, being in a workplace that did not encourage work beyond the SPA, standing/walking for more than three hours, overnight stays, flexibility, and constant availability (see Table 8-12). After mutual adjustment, the following work-related exposures were robustly associated with the risk of being retired in men: ERI, irregular hours, being in a workplace that did not encourage work post-SPA and standing/walking for more than three hours. In the final mutually adjusted model, 'active jobs' were also associated with the risk of being retired, but the association was attenuated (p=0.052), see Table 8-13.
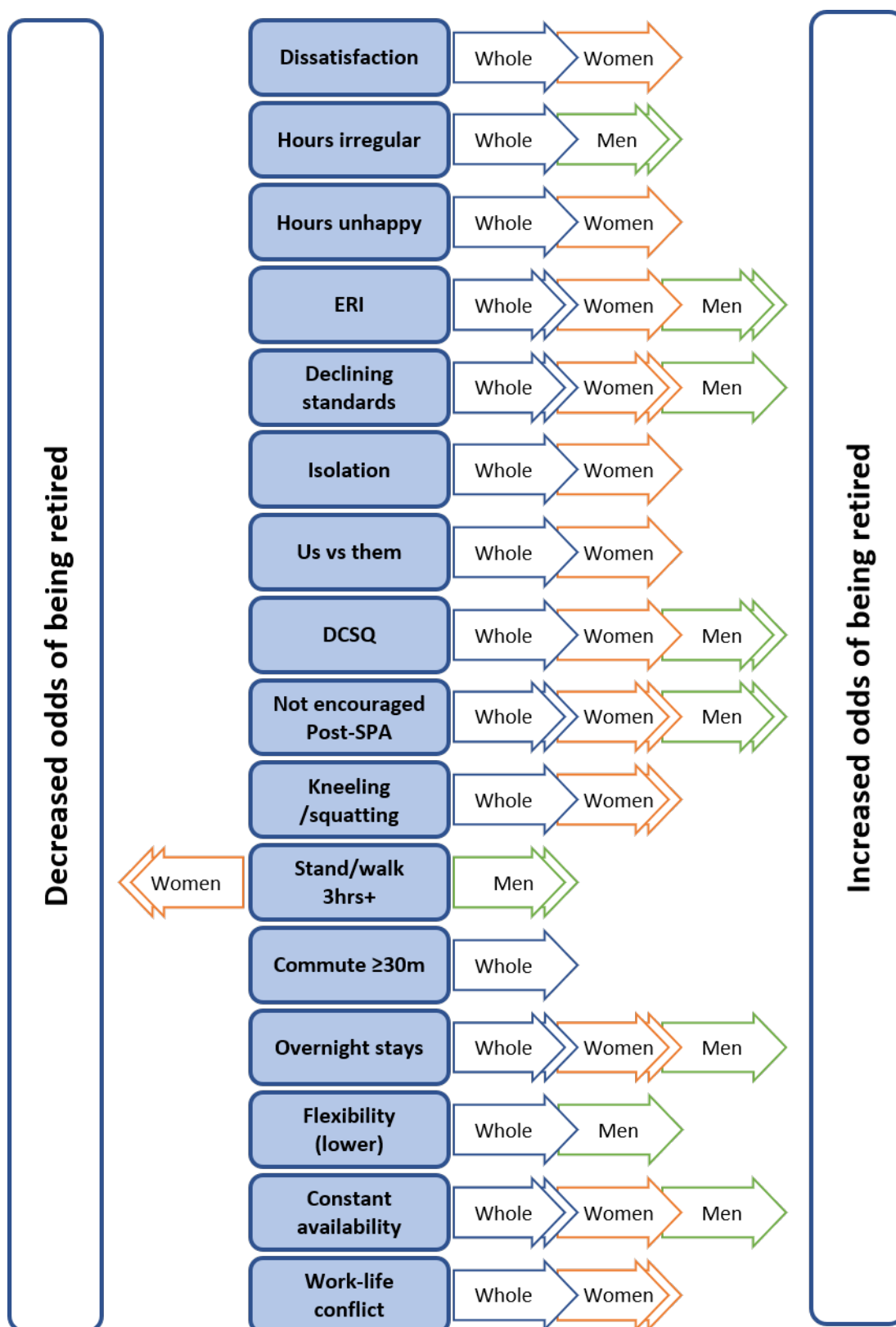
Arrow = statistically significant (p<0.05) association with risk of being retired. Whole cohort adjusted for: age; sex; managing financially; NS-SEC and marital status. Women/men adjusted for: age; managing financially; NS-SEC and marital status. Double arrow = robust to mutual adjustment of work factors. DCSQ included if any job type significantly associates with being retired, men: active job p=0.052 in mutual model

Figure 9-1   Schematic summarising HEAF FIRST case-control work-related exposures and their direction of relationship with being retired for the whole cohort and women and men separately

9.2   Discussion

In this case-control study including 936 participants from the contemporary HEAF cohort study, I investigated the role of work factors in current employment status (retired since baseline vs. remains working). In total, 488 retirees and 448 current workers provided useable questionnaire responses. Retirees were generally older and were socio-economically better off than those who remained working. Using the data available I found that the 'non-work' influences (socio-economic and personal) were best explained statistically by NS-SEC[113], reported coping financially and marital status. Therefore, in investigating work-related factors, all analyses were adjusted for age and sex (matching factors) and these other non-work factors. Several work-related factors were found to have a clear association in current retirement status, including: job dissatisfaction; irregular hours; being unhappy with hourly schedule; effort reward imbalance; perception of declining standards; isolation; 'us vs them'; demand control support model: active jobs and high demand/low control jobs; being in a workplace that did not encourage work post-SPA; kneeling/squatting; standing walking for more than three hours (increased risk of being retired in men and decreased risk of being retired in women); commuting more than 30 mins; overnight stays; lower flexibility; constant availability; and work-life conflict.

Amongst the 488 retirees in the study, only 10.7% reported that they had retired within six months before or after the SPA. This may suggest that the SPA is becoming less of a determinative factor in contemporary retirement decisions. In the period under study the SPA was being increased within the range of 65-67 years of age for men and 60-67 years of age for women. The rolling increases applied to the SPA in this period may account for the reduced emphasis on the SPA date for retirement decisions.

The results suggested that job dissatisfaction was an important factor associated with being retired. This was found for the whole cohort and amongst women in whom it was robust to adjustment for non-work factors. However, although the associations were in the same direction in men, they were less robust. These findings are not perhaps surprising and are consistent with the results of a meta-analysis by Topa et al.[168] Interestingly however, I could not find such a consistent relationship from the systematic review of the literature performed earlier in this thesis (see para 4.4.9). Job satisfaction is a wide measure and will likely encompass many different work-related aspects. However, the findings add to evidence obtained by others that suggest that dissatisfied employees are more likely to stop working.

The results suggested that working irregular hours and being unhappy with hours schedules were both important in having retired amongst HEAF FIRST respondents in the whole cohort. However, these results were less consistent after stratification for sex such that working 'irregular hours'

was important among men and being 'unhappy with working hours' was important amongst women. Of course, this may represent a genuine contrast in retirement decision-making for men and women. However, this may also be related to the types of jobs held by the men and women in the cohort (see Table 6-11). A high proportion of women who worked irregular hours (45%) were in SOC 2010[112] group two 'professional' roles (typically nursing), compared with men (23%). Men who worked irregular hours were more likely to work in 'process, plant and machine operative' roles (1% of women who worked irregular hours were in SOC 2010 group eight compared with 20% of men). Overall, however, it seems that working hours/schedules are a determinant of retirement for older workers.

The HEAF FIRST results suggested that perceived effort reward imbalance was importantly and consistently associated with an increased risk of being retired in the whole cohort and men and women. Moreover, when considered alongside other work factors in the mutually adjusted models, ERI was robust in the whole cohort and in men. Overall, these findings reinforce those of the qualitative phase in which appreciation and negative job changes were reported by retirees to be relevant to retirement decisions (see paras 3.3.4.1.1 and 3.3.4.2). Moreover, in the papers reviewed systematically earlier in the thesis (see para 4.4.4) there was limited evidence that ERI may be associated with the risk of retirement. Further in a large study (n=17,625) in the Europe-wide SHARE cohort of people aged 65-80, Wahrendorf et al[191] found that an abbreviated measure of ERI (7 items) reduced the likelihood of working at older ages. Hintsa et al,[192] also found that an abbreviated measure of ERI predicted labour market exit at age ≤61 in the ELSA cohort. This study supports those findings and is evidence that ERI, measured with the ERI short-form questionnaire,[139] may increase the risk of being retired. Importantly however, ERI encapsulates a complex psychosocial evaluation of an individual's perceptions of their job and working environment. Many researchers either do not include the whole validated tool,[11, 24] or ask questions that relate to aspects within the tool. Overall, it is becoming clear that the tool, or some aspects measured by it, do play importantly into retirement decision-making.

In this study there was generally no association between workplace social support and retirement status. Social support was measured by the DCSQ social support subscale, an item on loyalty and an item from COPSOQ regarding community at work. In these analyses, none of these factors were found significantly associated with the risk of being retired, once adjusted for non-work factors, in the whole cohort, nor for men or women. This finding appears to contradict those of the qualitative phase theme 'But work pulled me back' (see 3.3.4.2) in which it appeared that recent retirees indicated that they perceived that their colleagues were a community that 'pulled' the worker towards remaining in their work. Other qualitative work in the Netherlands by Sewdas et al[95] suggested that people working past SPA valued maintaining contact with clients and

colleagues. On the other hand, this finding falls more into line with the evidence found from the papers included in the systematic review in which there was no conclusive evidence for a role of workplace social support in retirement decision-making (see para 4.4.16). One possible explanation for the apparent opposing findings is that the questions in the HEAF FIRST questionnaire and indeed those in other published retirement studies, are failing to capture the subtle nature of the workplace community described by respondents in the qualitative phase. Alternatively, this factor may play a role only in a small proportion of retirement decisions that HEAF FIRST may be under-powered to observe.

In the qualitative phase, a number of participants commented on declining standards at work prior to retirement (para 3.3.4.1.1), feelings of isolation (see para 3.3.4.1.3) and/or 'us vs them' (disconnection with higher level colleagues in the workplace, see para 3.3.4.1.2), which, in each case, played into their decision to retire. In the case-control study the same factors were associated with an increased risk of being retired (a) in the whole cohort and (b) in women. Amongst men, declining standards was also found associated with an increased risk of being retired, and there was a trend for isolation and 'us vs them' to be associated, but these latter findings did not attain statistical significance. As such, I found further evidence that perceptions about these important constructs may be relevant in retirement decision making. I could find very little comparable evidence from other studies and the results suggest that these perceptions justify further investigation.

The DCSQ model compared high demand/low control, active jobs and passive jobs with a reference category of low demand/high control jobs. In HEAF FIRST, people who reported that they were working in a high demand/low control job were more likely to now be retired, after adjustment for non-work factors, in the whole cohort and in women. The same trend was seen amongst men ($p=0.061$). This may suggest that working in a job with higher levels of strain may increase the risk of being retired amongst older workers, something that was also suggested from included papers in the systematic review in which poorer job control was found consistently associated with an increased risk of retirement (see para 4.4.7), and the qualitative phase which suggested that increased control may discourage retirement decisions (see para 3.3.4.2). However, the analyses also suggested a larger and more consistent effect between active jobs (high demand/high control) and the risk of being retired. This may indicate that the psychosocial demands measured in the DCSQ model also influence retirement.

One potential determinant of working to older ages is perceived fairness in the workplace and I investigated this possibility using age discrimination, as measured using the NADS[180] tool. However, I did not find any association between this and current retirement status, either in the

whole cohort or the analyses using single sex stratifications. However, other investigators have detected such an effect, as I reported in the systematic review (see para 4.4.1). This paradox might be explained by a type of survivor bias in which workers who remain in the workplace to older ages have an extended period during which they can perceive and report age discrimination. Alternatively, it may be that that the NADS tool was insufficiently sensitive to detect more subtle forms of age discrimination.

Not working in a workplace that encouraged work beyond the state pension age consistently associated with increased risk of being retired in the whole cohort and women and men separately and was also robust to mutual adjustment with other work-related factors. This result is consistent with the results of the systematic review (see para 4.4.13), in particular De wind et al[152] and Van Solinge et al,[114] both of which found an association between supporting/encouraging work up to SPA (age 65) and decreased risk of retirement. The exposure in HEAF FIRST was slightly different, in that it asked whether the workplace encouraged work beyond the SPA. Overall, HEAF FIRST is further evidence that being in a workplace that supports and/or encourages work beyond SPA may encourage later retirement.

Of the physical workplace exposures, the most consistent effect was seen for reported kneeling/squatting at work, which was found associated with an increased risk of being retired in the whole cohort, especially in the women. Standing/walking for more than three hours during a working day seemed to be associated with an increased risk of being retired in men, but a decreased risk in women. However, the other physical exposures, including a cumulative score using six measures, were not found associated. I found similar apparently conflicting results in the systematic review (see para 4.4.14). The conflicting results are similar to several studies which investigated reasons for working later or beyond SPA: Andersen et al[167] (Denmark) and Virtanen et al[193] (Finland) suggested a link between higher physical demands and decreased likelihood of later working, contrasting with three studies based in the Netherlands STREAM cohort, De wind et al,[194] Scharn et al[195] and Van Der Zwaan et al[96] who did not find associations between physical loads and later working. However, the results from quantitative studies contrast with those from qualitative studies by Van den Berg et al[94] and Reeuwijk et al[106] which suggest physical strains at work may generally encourage retirement. The HEAF FIRST qualitative study indicated that physical efforts may push towards retirement (see para 3.3.4.1.2). However, the qualitative findings suggest a more nuanced relationship in which perceived physical demands were judged alongside the respondent's perceived current physical function/status. To try to better understand this, I included a question on perceived coping with physical work demands. However, in the current study, this self-assessed coping measure was not found associated with being retired. It may be that the questionnaire items included in HEAF FIRST are not measuring a

conflict between physical abilities and physical declines. Certainly, a recent study by Sonnega et al[196] (published too late for the systematic review) found no association between a measure of physical effort at work and risk of retirement but when this exposure was dichotomised with a measure of the participant's physical mobility to create a measure of notional physical mismatch between demands and ability, this new variable was found positively associated with the risk of retirement. It is also possible that a type of survivor bias may be influencing results, explained further in limitations below (see para 9.3).

Amongst HEAF FIRST respondents, a commute time of over 30 minutes was found to be associated with an increased risk of being retired in the whole cohort. Likewise, holding a job that required overnight stays was found consistently associated with an increased risk of being retired in the whole cohort, men and women, with associations robust to mutual adjustment for other work factors in the whole cohort and women. These findings reinforce results from the qualitative phase which suggested that commuting and overnight stays may be factors in retirement decisions (see para 3.3.4.1.3). Neither commuting nor overnight stays were explored in the papers in the systematic review, however Cebulla et al[172] found that workers post-SPA were commuting shorter distances than younger colleagues. Taken together, it appears that commuting and overnight stays are factors which are important amongst older workers and can act as a 'push' out of work.

Evidence for the role of flexibility in retention of older workers was provided by responses to questions about flexibility at work. Less perceived flexibility was associated with an increased risk of being retired in the whole cohort and men, with a similar trend amongst women (p=0.052). Perceived flexibility can encompass availability of a wide range of job adaptations that may enable working to older ages and do not need to be constrained to working hours (see para 4.4.5 in systematic review where flexible hours had a mixed association with retirement) or homeworking.[64] These findings, suggest a key role for a wide battery of flexibility arrangements (ability to reduce hours, time off for an emergency, ability to swap to a lighter role, manager allowing flexible work and support for phased retirement) to enable retention of older workers. The results are in slight contrast to Ghent et al[197] which reported that the presence of phased retirement schemes encouraged earlier retirement. However, that result must be viewed in the very specific context of tenured staff in a single US college retiring before 2000.

Perceived conflict between work and home demands was associated with an increased risk of being retired amongst HEAF FIRST respondents, both in the whole cohort and in women. Similar findings were reported by Kubicek et al[145] using a 3-item measure of work-life conflict. Using a different tool: the 5-item COPSOQ work-life dimension, I found similar results and this suggests

that perhaps workers find such conflicts more difficult to cope with at older ages or become less tolerant of them. Based upon findings from the qualitative phase (see para 3.3.4.1.3), I investigated the role of the perception being constantly available for work, particularly in the era of emerging technology, smart phones etc. In HEAF FIRST, higher scores on the constant availability scale were associated with an increased risk of being retired in the whole cohort (robust to mutual adjustment), as well as in men and women. These results are consistent with the qualitative phase where constant availability seemed to act as a push towards retirement. These results may indicate a reducing acceptance of work intrusion and a growing perception of conflict between home and work demands at older ages. Such influences (being contacted outside working hours, completing work tasks at home outside of working hours and answering work enquiries/e-mails out of hours), may be a factor that pushes people towards retirement.

9.3   Limitations

HEAF FIRST was sampled from the HEAF cohort study. The HEAF questionnaires were sent from general practitioner practices (in order to maintain the confidentiality of patient names and addresses from the study team) and it is worth noting that the initial response rate was relatively low (20.7%)[111]. The questionnaire was sent out to all registered patients aged 50-64 years barring some that were excluded that the GPs themselves thought would be insensitive to contact (e.g. those with life-limiting illness or severe cognitive impairment). The questionnaires were sent out relatively 'blindly' but did include a letter from the GP recommending patient's participation in the study. This is a relatively modest response rate but compares favourably to studies such as the UK Biobank that has a response rate of 5.5%.[198] A comparison of demographic characteristics of HEAF participants with the general population of 50-64 years olds in England shows that they have a somewhat higher level of education and wealth and are somewhat older.[111] It is important therefore to bear in mind that HEAF FIRST respondents were sampled from a cohort which was not entirely representative of the general population.

Moreover, the HEAF FIRST cohort themselves were generally of higher socio-economic position when compared to the population of workers in England. According to data from the 2011 census,[199] 37% of English workers were higher managerial, 26% intermediate and 37% routine and manual when using the NS-SEC[113] three tiered system, but In HEAF FIRST the equivalent proportions were 44%, 29% and 27% respectively. Of course, HEAF FIRST participants were sampled based on (a) working at baseline and (b) retired since baseline or still working. This may have led to a bias in the NS-SEC categories amongst participants or it may mean that the HEAF FIRST cohort had 'better' jobs, potentially with greater flexibility, control or appreciation. Assuming that this could be the case, then the study may not fully explain retirement decisions for

those in lower socio-economic positions. However, the study did include a sizeable proportion of retirees and workers from the lower 'routine and manual' NS-SEC tier (20% and 35% respectively). Moreover, I attempted to account for at least some of these effects by adjusting the analyses for both NS-SEC and self-rated financial position in order to try to account for some of the potential bias. Importantly, HEAF and HEAF FIRST are limited in terms of diversity with only a 1% of non-white ethnicity. This bias means that the current results may not adequately explain variation in retirement status amongst people from other ethnic groups.

Importantly, I limited the sampling of the current retirees to those who confirmed that a health problem was not the main reason for leaving their jobs. This was a pre-defined decision as health-related job loss may well be explained by an even wider set of determinants which were not the focus of the current enquiry. However, the unintended consequence may be that those retirees who struggled the most with some work-related exposures (especially perhaps physically demanding exposures) may have been excluded from the study. This could have had the effect of obscuring true associations of retirement with effects of physical work exposures.

Selection bias may also have been introduced by the healthy worker effect. All participants in the case-control study were employed at HEAF baseline (2013-2014). It is possible that those who were pushed towards retirement by work-related factors may have already left the workplace before HEAF baseline. Health does not have a straightforward relationship with retirement (see para 1.8.1), and whilst poor health can push towards retirement, good health can also encourage retirement in those with the financial means to retire. Therefore, it is also possible that healthier members of the cohort left work at earlier stages leaving the less healthy (who could not afford to retire) in work. In initial results workers were more likely to report struggling to cope with physical exposures (33.6%) when compared with retires (26.5%), see Table 6-16. The workers who, in effect, cannot leave work despite struggling with work demands may artificially obscure true associations, or at least push the results towards the null hypothesis.

Another important point is that the measurement of exposures in this study may be subject to differential misclassification bias.[200] In HEAF FIRST the cases were asked to report their perceptions about work factors from their previous job, whereas the controls were asked to report their perceptions about work factors in their current employment. It is possible therefore that responses from the cases (retirees) may well be subject to recall bias or even be tempered by subsequent retirement (in a positive or negative way). Likewise, the measurement of exposures in current workers may be subject to a type of survivor bias, whereby those still in the workplace could be subject to increasing levels of the exposure. For example, workers who remained in the workplace to older ages may have remained long enough to experience some, or more, age

discrimination (workers, especially men, reported more by way of age discrimination measured on the NADS scale). Those who left work previously did so younger and may have experienced less age discrimination and this effect may obscure a true association between perceived levels of age discrimination and retirement status. Similarly, as the workers remained working but aged, it will have become more likely that they had developed some decline in physical function/performance which could lead to a greater perceived mismatch between the demands of their work and their capacity to meet those demands, whilst the retirees may have left the workplace before this became a problem. Again, this could act to reduce the likelihood of detecting true associations.

The power calculations (para 6.2.1), appear to suggest that the study may be slightly under-powered to detect some true associations, although a number of important associations were found (Table 6-20, whole cohort, model adjusted for non-work factors, OR range 1.25–2.36). Effects of power become heightened when considering the sex stratified results, which reduce the number of participants in each regression model. Moreover, the logistic regression models that were mutually adjusted for other work-related exposures (6.4, 7.3 and 8.3) could have been limited by collinearity, a limitation also acknowledged in another retirement study by Thorsen et al,[160] particularly as it is likely that the work-related factors in HEAF FIRST are inter-related. For example, a participant with a lower quality job may experience less job control, less flexibility and more effort reward imbalance simultaneously. These correlations may exist due to causative relationships, i.e. less flexibility may lead to poorer perceptions of control. However, the correlations may also be reflective of general job quality, where intangible staff benefits are less in all respects in some jobs as compared with others. Consequently, it is likely that the mutually adjusted models understate some of the associations between work-related exposures and retirement in this cohort. The mutually adjusted models may well point to those factors which had the strongest associations with retirement, but factors which dropped out of these analyses are not necessarily unimportant to retirement decisions.

In this study the odds ratios for work-related factors that significantly associated with being retired were relatively low (range for whole cohort adjusted for non-work factors OR 1.25-2.32). However, given the large size of the target population, namely workers who consider retirement when reaching older ages, it is likely that small effect sizes could lead to noteworthy increases in retirement age, provided of course that such results would be similar in the wider population. In some of the analyses, particularly those stratified by gender, sample sizes were sometimes quite small and this has led to wider confidence intervals around the estimated risks (for example declining standards OR 2.01, 95% CI (1.51,2.68) in whole cohort, OR 2.04, 95% CI (1.26,3.29) in men. In the future, larger studies will be needed to yield more precise estimates of effect sizes.

Although retirement in the UK is ostensibly a choice there are many factors that could, externally impose pressures on retirement behaviour (see qualitative phase one theme 'I had my reasons at para 3.3.4.4). It is possible that retirement may have been encouraged by other factors, notably redundancy or voluntary severance schemes. These could act as an inducement or an incentive to enter retirement (Wang and Shultz[25] discuss this point in relation to early retirement). Therefore, it is possible that work-related factors played less of a role in decision making in people who were incentivised to retire earlier, something that would again act to attenuate the measured effects of some work-related exposures and retirement.

9.4   Strengths

HEAF FIRST was specifically designed to explore retirement in a cohort of older workers. As such the questionnaire encompassed a wide range of possible work-related factors that could be associated with retirement. The questionnaire design process was informed by the results from the qualitative and systematic review phases. This enabled inclusion of questions that were, in some cases novel such as 'us vs them,' perceptions of workplace decline and commuting. In the absence of validated tools to measure these effects, these questions were reviewed and approved by a PPI group.

The study included a range of participants from a range of different socio-economic backgrounds and jobs. The study also included retirees who retired before, at, and after the SPA as well as workers who were working before, at, and after the SPA. Therefore, the study encompasses a wide range of retirement decisions and workplace experiences.

The adoption of a wide definition of retirement based upon that of Feldman[8] allowed a wide range of contemporary retirement circumstances to be included in the study. For example, 52 of the retirees (10.7%) still carried out some paid work. Any definition of outcome based on stopping paid work completely may have excluded these participants and therefore restricted the range of retirement circumstances explored in the study. The date of retirement was reported contemporaneously on a yearly basis, in the HEAF data, reducing the possibility of recall error in the year of retirement which Korbmacher suggests could be as high as 36.5% in SHARE data from Germany.[166] Therefore, potential participants could be categorised as cases or controls, based on retirement status with increased levels of certainty.

It was an a priori decision that the HEAF FIRST analyses would be carried out for all and then stratified by sex enabling comparison between men and women. This was felt important as men and women tend to be employed in different sectors and because of the structural differences in

retirement processes for men and women. As demonstrated in the systematic review (see Table 4-26), the majority of retirement studies do not undertake separate analysis by sex.

The data gathered on exposures was relatively contemporary with the participant's retirement decisions. The data on workers was current, whilst retirees completed the questions referring to their prior job. This enabled retirees to assess their jobs at the point at which they chose to retire. In this respect, HEAF FIRST was stronger than many other studies, in which work exposures are reported years or even decades before retirement, which would not account for any changes in those exposures. This may be particularly important for factors that may change as the participant ages e.g. perceptions of physical work factors.

In HEAF FIRST I endeavoured to use validated tools to explore the relationship between work-related factors and retirement. The questionnaire measured workplace exposures using three complete tools: NADS (age discrimination); ERI (effort-reward imbalance) and DCSQ (demand-control job types). I also included the work-life conflict dimension from the COPSOQ. The systematic review highlighted a wide diversity both in exposures that researchers consider and which tools they use to assess these exposures. If comparable data are to be collected within and between countries, more agreement is required as to the best exposures to measure and how to assess these most reliably.

9.5   Conclusion

In the HEAF FIRST case-control study a range of work-related factors were found to be associated with the risk of being retired, after adjustment for relevant non-work factors. The study suggests that several unique factors such as perceptions of declining standards, isolation at work, and being constantly available for work may push people towards retirement. It also demonstrated that validated tools such as ERI and DCSQ may be associated with retirement status.

These results are broadly consistent with those obtained from the phase one qualitative interviews and the phase two systematic review. Overall, these suggest that work-related factors play an important role in retirement decisions. Many of these factors are readily modifiable in the workplace and suggest that employers may be able to take measures that could encourage workers to work to older ages.

The final discussion will follow in chapter 10 which will explore the results from all three phases along with recommendations for future research.

Chapter 10   Discussion

10.1   Summary of results

In this thesis I have sought to explore the relationship between work-related factors and the decision to retire in contemporary settings. I did this in three phases:

1. Qualitative telephone interviews with retirees from the HEAF cohort based in England, which explored their reasons for retirement. Research question:

    'In the opinion of HEAF participants what are the work-related factors that influenced the decision to retire?'

2. A systematic review of published studies, which explored the relationship between work-related factors and the decision to retire. Research question:

    'Amongst people aged 50 and over, which work-related factors affect the decision to retire?'

3. A case-control study, of retirees and workers from the HEAF cohort based in England, which explored the relationship between work-related factors and the decision to retire. Research question:

    'After adjustment for appropriate confounders, which work-related factors affect the decision to retire (negatively and positively) in 2013-2018 amongst a cohort of UK retirees and workers?'

In phase one, I conducted 17 qualitative telephone interviews with retired participants from the HEAF cohort. Participants had retired between 2012 and 2014, aged between 55 and 67, and had reported that they had not left work for a health reason. Interviews were recorded, transcribed and the data was analysed thematically.

I grouped the data into five themes:

<u>'Work was pushing me'</u> contained comments about work-factors that encouraged retirees towards retirement. This was broken down into four sub-themes:

'You've changed,' collected data related to changes in the workplace that were perceived negatively. This included feelings that workplace standards had declined, that workplaces were factionalised (us vs them) or that changes had meant the worker had lost autonomy/control.

'Grinding me down,' contained data that related to draining and unpleasant work that pushed towards retirement. This included perceptions of isolation, being under-appreciated and unpleasant commuting experiences.

'I've got no time,' collected data that reported work being a time burden. In this sub-theme work was taking up too much of the participants time, reducing time available for other activities. This included being constantly available for work, especially through mobile technology.

'This hurts,' contained comments regarding physically-demanding activities at work. Physical workloads could push participants toward retirement when they were also experiencing a corresponding decline in physical ability. In addition, the physical work environment could also push towards retirement.

'But work also pulled me back,' collected comments on work-related factors that seemed to discourage retirement. These were positive factors in the workplace that seemed to counteract the negative push factors. These included a sense of community amongst colleagues, autonomy or job control in the workplace and positive appreciation.

'It's not you it's me,' contained data on internal feelings or values that seemed to push towards retirement. These included the sense that there was a 'normal' retirement age or that the participant had experienced a long working life and/or needed a break from work.

'I had my reasons,' contained factors that pushed towards retirement but were perceived to be external and acted upon the participant and/or were outside of their control. These included health, finances and caring/family commitments.

The qualitative phase one seemed to indicate that a wide variety of factors influence retirement decisions and that work-factors can play an important role in that decision making. The data provided a range of possible work factors for further exploration in phase three and included several factors that, to my knowledge, had not been investigated in other retirement studies. The qualitative phase also indicated that work-factors can push towards retirement in a complex or nuanced way. For example, physical exposures may push towards retirement when coupled with a self-perceived physical decline, or workplace change can push toward retirement if that change was perceived negatively.

In phase 2, I conducted a systematic review of the evidence about work-related factors from published studies on retirement. Studies were included if:

- they explored the relationship between work-related exposures and retirement (excluding intended retirement)
- the retirement events under investigation took place after 50 years of age
- at least some of the retirement events in the study took place after 01 January 2020

Searches were conducted on six bibliographic databases. Results were screened by reading their title/abstract and then full text, by two researchers, blinded to each other's decisions. A data extraction sheet was devised and completed by two researchers, blinded to each other's responses. A risk of bias checklist was devised and again, was completed by two researchers, blinded to each other's decisions.

Thirty studies met the inclusion criteria, reporting on the association between 169 work-related exposures and retirement. The questionnaire items used to measure these 169 exposures were categorised in order to classify the exposures into 19 pragmatic categories, to enable synthesis of results. Results were analysed within categories to establish trends of associations with retirement. The results were analysed at group-level and then stratified for sex (women/men/mixed cohorts), and retirement type (early retirement studies and non-early retirement studies).

The included studies were heterogeneous, with different definitions of retirement, inconsistent measurement of exposures and different approaches to data analysis. Studies were from relatively limited geographical areas. Moreover, a number of studies explored retirement within the same cohort of participants. Results were also limited by collinearity in statistical analysis.

However, despite these limitations, the review identified consistent associations between lower levels of job control and increased risk of retirement and feeling under-appreciated and increased risk of retirement. There was some, but more limited, evidence for: workplace culture supporting working until SPA; perceived age discrimination; flexible working hours; and job prospects also having an effect on the risk of retirement.

In phase three, I conducted a case-control study of retirees and workers within the HEAF cohort. The questionnaire was designed to include work-related factors that may be relevant to retirement decisions, which were informed by the results from the phase one interviews and the phase two systematic review. Where possible I selected validated tools that addressed topics raised in earlier phases. These included the effort reward imbalance short-form questionnaire,[139] the Swedish demand control support model[176] and the Nordic age discrimination scale.[180] The questionnaire also included several novel exposures devised to explore factors which seemed

important in the qualitative phase, such as the job requiring constant availability and perception of declining standards.

The case-control study was nested within the HEAF cohort. Cases were retirees who were previously employed and had retired between HEAF FU1 (2014-15) and FU4 (2017-2018). People who retired mainly for a health reason were excluded. Cases and controls were matched on a one-to-one basis. Differences between cases and controls were explored using non-conditional logistic regression, stratified by sex.

The final cohort included 488 retirees and 448 workers from a variety of NS-SEC[113] social classes (Routine and manual 27.2%, intermediate 29.2%, higher managerial 43.6%) and a variety of SOC 2010[112] job classes (see Figure 6-3). Descriptive statistics were compiled and differences between groups were investigated using logistic regression adjusted for age and sex (matching factors).

Several non-work factors were considered as possible adjustment factors. After cross-tabulation and analysis of collinearity, all subsequent logistic regression models were adjusted for age and sex (matching factors), along with NS-SEC,[113] managing financially and marital status.

The following work-related factors seemed to have an important association with an increased risk of being retired, in either the whole cohort, men or women, after adjustment:

- job dissatisfaction
- working irregular hours
- being unhappy with hourly schedule
- perceived effort reward imbalance
- perception of declining standards
- isolation at work
- perception of 'us vs them'
- demand control support model: active jobs and high demand/low control jobs
- being in a workplace that was not perceived to encourage work post-SPA
- jobs involving kneeling/squatting
- jobs involving standing or walking for more than three hours (decreased risk of being retired amongst women)
- commuting more than 30mins
- jobs requiring overnight stays
- less flexibility
- perception of constant availability
- perceived work-life conflict

Stratification by sex, suggested that there were some differences between men and women, in the associations between work-related factors and retirement. For example, amongst women, being unhappy with their hours schedule was found associated with an increased risk of being retired, whilst among men, working irregular hours was associated with an increased risk of being retired. Further, perceived work-life conflict seemed to have a greater and more consistent association with the risk of being retired in women. Therefore, the results provide some evidence that the role of work-related factors in retirement decision-making may be different amongst men and women.

Additionally, logistic regression models were built which mutually adjusted all work-related factors and the non-work factors. In the whole cohort: effort reward imbalance, perception of declining standards, not being in a workplace that encouraged work post-SPA, requirement for overnight stays and being constantly available for work were consistently associated with an increased risk of being retired when adjusted for non-work factors and mutually adjusted for other work-related factors.

10.2   Discussion

With demographic changes, there are longer life expectancies and relatively fewer births, leading to greater numbers of pensioners in relation to workers. One strategy to re-balance the OAWAR has been to increase the age of entitlement to state pension (SPA). However, it seems that raising the SPA in isolation is unlikely to be a panacea. There is evidence that retirement ages are slightly increasing in the UK, but it is important that working to older ages does not become restricted to those who are forced to stay in the workforce due to financial pressures. Should this happen, there is a risk that this will widen inequalities, as suggested by the EXTEND project,[32] or Boot et al[84] and Oude Hengel et al.[83] Increasing the SPA is, in effect, reducing eligibility to claim a state welfare benefit and whilst it may increase retirement ages it may also decrease the financial well-being of older people. In addition, it is possible that increasing SPA may lead to a corresponding increase in unemployment claims,[84] (in the UK this is called employment and support allowance) which in effect, would be replacing one state benefit with another. It is also possible that 'compelling' people to continue working by increasing the SPA may cause resentment, if this contrasts with long-held retirement plans. In a contemporary Swedish cohort Sousa-Ribeiro et al[201] identified a preference for early retirement which contrasts with the policy movement towards later working and the qualitative phase confirmed that participants in HEAF FIRST often held a belief in a fixed retirement age. Therefore, it's possible that any changes to SPAs may be received negatively, for example the WASPI[77] campaign in the UK, or the strikes (including clashes with police) in France in late 2019, motivated by increases to the state pension ages.[202] Instead of

compelling people to work at older ages, creating working environments where workers choose to continue to work, may encourage later working without the possible drawbacks of blunt tools such as increasing the SPA.

For some, retirement at older ages may be a relatively unrestricted decision, where work-related factors are considered alongside finances, health and lifestyle. However, this 'ideal' may not be achievable for all as some may be subject to more restrictive circumstances, for example where people cannot continue to work due to declining health or perceived obsolescence. Where different 'types' of retirement, such as retirement based on a choice and retirement based on ill-health are included together in a single outcome, a feature of most retirement studies, then associations between work-related factors and retirement may become obscured or revert to the null. However, although work environments in these different 'types' of retirement will be different, factors in the workplace may be universal enough to influence retirement generally. For example, a lack of flexibility may push a financially secure person into taking early retirement whilst simultaneously push someone who is struggling with health issues into the same decision.

However, it is likely that the different 'types' of retirement need to be considered when designing any intervention to encourage working at later ages. It is unlikely that a single retirement pathway will suit everyone. So, the thrust behind the policy making should perhaps move away from a message that universal working to older ages is now necessary, as this may not be appropriate for all, for example those with chronic poor health. Nor can people generally continue to retire at ages they may have done at earlier timepoints, in the face of increasing life expectancies. As such, improving the workplace to the extent that it actively accommodates older workers, at the very least ensuring it does not 'force' them to leave, would seem a reasonable solution. These aims are not altogether incompatible with the views of the retirees from phase one who generally maintained a 'busy' life in retirement, albeit one that no longer included paid work. In addition, estimates in 2014 indicate there were over one million jobless people over the age of 50 who would be willing to work but could not find a suitable opportunity.[42, 85] Therefore there is likely to be a clear group of older people who can, and indeed might want, to work. The findings from this project, which indicate that work-related factors influence retirement decisions, suggest that changes could be made to the workplace to accommodate these older workers. Thus, changes to the workplace could be made that provide appropriate roles to suit people who would otherwise leave the workforce and/or encourage jobless people back into work.

Further, the HEAF FIRST study results suggest there are some differences between work factors that affect retirement decisions in men and women, particularly in work hours and work-life conflict. This may be due to the systemic differences in the UK retirement SPAs, individual

preferences and/or other social expectations and norms that contrast between sexes. Again, this suggests that many different 'types' of retirement decision exist and that interventions to encourage working at older ages may need to be tailored to the individual.

Retirement is now a choice in the UK and in this study, the SPA did not seem to be determinative of the actual retirement date of many HEAF participants. In the case-control study only 11% of the retirees retired within six months either side of their SPA. Given that the SPA for this cohort increased on a rolling basis, perhaps causing uncertainty over the precise date, this is perhaps unsurprising. However, the qualitative study suggested that there was an existing belief amongst some participants that there was a 'normal' age to retire, often based upon either the former SPAs for men (age 65) and women (age 60). Therefore, although SPAs are being changed, it appears that an expectation that retirement is 'normal' at a fixed age may create a barrier to working to older ages.

It is unclear whether objective or subjective methods of measuring retirement as a study outcome are preferable. However, Korbmacher[166] identified a wide gap between the two when comparing German registry based pension data with the SHARE interview results (year of retirement differed between the two datasets in 36.5% of participants). Retirement can be considered as both a work status and a social concept, and any rigid definition has the potential to exclude one of these aspects. Self-reported retirement has value as it represents the perspective of the participant themselves, and can be said to distinguish the retired from unemployed or work-disabled people.[61] Alternatively, objective measures give clarity for the purposes of comparison. From a practical perspective it is clear that the concept of retirement must be operationalised in a manner that allows comparisons to be made, however there does not seem to be a standardised method of doing this. Therefore, studies that utilised self-reported or objective definitions of retirement were both included in the systematic review. However, this disparity in case definition of retirement has further potential to obscure the results of research studies. Further, assuming that either self-reports or more objective registry data represents 'retirement' in both a social and administrative context simultaneously, is perhaps incorrect.

Taking the results from all the research in this thesis would suggest that there is an opportunity to better understand how work-related exposures are being perceived by individuals at a personal level. The findings suggest that, where work factors such as control or appreciation or working hours are being perceived negatively, modifications to these might enable working to older ages. Also, the HEAF FIRST results have shown that having a job which makes physical demands on a daily basis is not of itself necessarily associated with the risk of retirement. However, I also found evidence that physical workload was important in retirement decisions when it became

incompatible with physical capabilities. This suggests that asking a battery of questions that includes how the respondent is experiencing or coping with physical exposures may be more beneficial. Similarly, asking about patterns of working hours may be too simplistic and it may be more important to find out if an older worker is currently satisfied with their hourly schedule. It seems therefore, that the presence or magnitude of a work-related exposure may be only part of the decision-making process: how a worker experiences or feels about that work-related factor may be more determinative when making retirement decisions. It is possible that individual perspectives may determine what is ultimately an individual decision.

As the workforce ages, employers may want to adapt the work environment to ensure the comfort and safety of older workers. The types of measures will need to, at a minimum, meet legal obligations, such as protection from age-based discrimination but is likely to be more successful if it goes further and involves creating strategies that specifically benefit older workers. However, importantly, such strategies can have unintended consequences: Hennekam et al[135] in qualitative work in the Netherlands with participants aged 50-59, found that HR practices favouring older workers could be perceived as devaluing older workers as a group. However, even in the same study the workers wanted organisations to accommodate their age-related needs. Seen through the lens of social identity theory, the study emphasised that creating an inclusive culture where workers are valued and recognised will assist an organisation in retaining older workers. One might argue that providing safe, comfortable and flexible work environments would be good for all workers and need not single out one age group but could benefit the health and wellbeing, as well as productivity, of employing organisations.

Caution may also need to be taken from an ethical and legal perspective[169] in focussing policies or working conditions only on older workers. In order to encourage working to older ages, an employer may wish to modify the work-related factors highlighted in this thesis. These could broadly be described as 'improvements' to the workplace. However, if these improvements were solely targeted at older workers, then it is possible that this may be inequitable in relation to other categories of workers who may also benefit from modifications.

The findings from the HEAF FIRST project suggest that work-related factors have an influence on retirement decisions. In turn, this suggests that employers could make modifications in the workplace that may encourage workers to work to older ages. The HEAF FIRST project has identified several areas for further investigations and/or development of interventions to encourage working to older ages which are summarised below in para 10.5.

10.3   Limitations

This study was nested in the HEAF cohort which had slightly higher levels of wealth and education than the general population and an initial response rate to questionnaires of 20.7%.[111] In HEAF FIRST this limitation is mitigated to some extent as the studies made internal comparisons and the qualitative phase purposively selected participants based on their NS-SEC[113] category. Importantly, the case-control study included 255 (27.2%) participants in the lowest (routine and manual) NS-SEC class, so that the whole range of socio-economic groups were included.

The nature of retirement itself is constantly changing. As explained in para 1.2.2, social understanding of retirement has shifted, from an earlier perception that retirement was a period of post-work, age-related deterioration, to the perception that retirement is a more active period of life which can be enjoyed.[4] In addition, numerous policy measures which affect retirement have changed rapidly and indeed seem in a state of flux after a relatively long period of stability (see para 1.6). The changing definition of retirement was mitigated in the HEAF FIRST study by exploring retirement that occurred relatively recently (the systematic review focused on retirement post-2000 and the case-control study explored retirement within the range of 2013-2018). However, it is likely that the meaning of retirement will change further in the future, and the results and conclusions of this thesis may become less applicable.

In this thesis, I generally defined retirement using the adapted Feldman definition explained at para 2.2.1. This definition varied slightly in the systematic to review to concentrate on people who had left paid work. However, the systematic review reported on results from 30 studies representing wide categories of retirement. Although a possibility remains that the slightly divergent definition of retirement in the review affects the synthesis of results with the other phases, any effects are likely to be minimal.

The qualitative study excluded people who had left work mainly or partly for health reasons, whilst the quantitative study excluded those who had left work mainly for health reasons. This allowed the studies to focus on retirement effects of work-related factors. However, these exclusions would also have excluded those with poorer health, meaning that the data presented here for the HEAF FIRST cohort may represent findings from a generally healthier cohort than that of all older adults in the general population. In addition, the same exclusion may have removed those with the highest conflict between health and work-related factors, particularly those struggling with physical exposures, from the potential participants. Moreover, in effect, to be eligible for HEAF FIRST, every participant needed to have 'survived' to be in work at baseline of HEAF (then aged 50-64 years) so that this potential bias must be considered in interpreting our results.

Information about the role of work-factors in retirement was obtained retrospectively from retirees both in the qualitative interviews and the case-control study. This could of course have meant that they could be subject to recall bias. However, it is not clear whether this bias would result in recollections of prior working conditions being more or less favourable. A retired participant may well recall a prior job in a better or worse way, dependent on their current enjoyment of life in retirement, and their current perception of the contrast between the two states. Social identity theory would suggest that people would be more likely to enter retirement if they had positive perceptions of retirees as a group.[132, 135] Further, participants' perceptions about retirement may influence their timing of entering retirement. This perceived contrast between former employment and current life in retirement may have affected responses from retirees in HEAF FIRST but would not have been a factor in their retirement decision. However, a current worker may well compare their employment to a perception of how life in retirement might be, when considering retirement. Parry et al[131] in an English qualitative study, found that people approach retirement from different positions, with their hopes and expectations of retirement shaping their attitudes towards working longer, a factor that especially differed between people from different socio-economic groups. In the HEAF FIRST qualitative study, it was clear that the participants generally enjoyed their retirement. However, the same retirees were also, generally, very positive about their former jobs, albeit whilst recalling work factors that had pushed them towards retirement. Therefore, it is possible that the elapsed time between the retirement and the interviews/questionnaire, may have improved perceptions of former work, as frustrations are forgotten or come to appear relatively less important. In contrast, the elapsed time may also have worsened perceptions of former work, if work now appeared an inferior state to that of retirement.

The measurement of exposures in this study was cross-sectional. As such it is not possible to establish causation between the work-related exposures and the retirement outcome. However, longitudinal measurement of exposures can also cause difficulties. The qualitative phase highlighted that changes in perception about work-related factors can occur very shortly before the retirement decision. This stood in contrast to the systematic review where longitudinal studies often assessed work-related factors several years before actual retirement. Therefore longitudinal data collection may fail to pick up subsequent actual work changes or changes to perceptions about work, which may have occurred very close in time to the retirement decision. For example, an employee may regard their work hours as acceptable when assessed at a relatively early time-point. However after a change in domestic caring responsibilities, the employee may find that their working hours have now become an obstacle to work. Likewise, the qualitative phase found some evidence that it may not simply be the actual physical demands of

an individual's work that matter but the mismatch in that demand in relation to their changing physical capacity to meet those demands. This could be missed if data collection occurs before the mismatch becomes a problem.

10.4   Strengths

The HEAF FIRST study is a mixed methods study which includes data on retirement from both a qualitative and a quantitative study, as well as other published studies. Therefore, the scope of data collection was wide and this enabled a wide range of exposures and retirement decisions to be explored.

Nesting the study within the HEAF cohort allowed me to sample participants for the HEAF FIRST study with specific characteristics. In the qualitative phase, I sampled participants based on sex and NS-SEC[113] class. Without this sampling, there is a chance that experiences (especially those from people in lower socio-economic positions), would have been excluded. In the case-control study, I sampled retirees who had previously been employed, and had retired relatively recently, and matched them with workers of the same sex and similar age, enabling consideration of the widest possible range of contemporary retirement decisions

For both the HEAF FIRST qualitative interviews and case-control study, I chose to use a self-reported definition of retirement. This allowed a wider range of retirement experiences to be included. In particular, I found that some individuals describe themselves as being 'retired' whilst still undertaking some paid work. Notably, previous studies who have used 'no paid work' as their definition would have excluded some of these participants. In the absence of any consensus as to what should constitute retirement, I believe that researchers should consider taking the same approach to generate the widest possible evidence base.

The mixed-methods approach of this research enabled the investigation of several relatively under-investigated or unique, work-related factors in the case-control study. The qualitative phase highlighted novel work-related aspects that participants reported had affected their retirement, including: commuting, requirement for overnight stays, perception of 'us vs them,' and perception of declining standards. I was able to investigate these constructs further in the case-control study and found that they were indeed associated with increased odds of being retired.

10.5   Recommendations for future studies

It is important that future retirement studies carefully consider the definition of retirement being applied. The concept of retirement can be subjective and changes over time. Therefore, although the definition of retirement may not be consistent across contexts (for example retirement in different countries is likely to be operationalised in different ways according to social security structures and SPAs), it is important to consider what type of retirement is being explored. In particular it is important to distinguish retirement from ceasing to participate in all paid work, as they may not be synonymous. Further, concepts such as 'early' and 'late' retirement may be of reduced utility in future studies where SPAs are less important to decision making and/or are subject to increases.

The potential differences between determinants of retirement decisions in women and men seems to be under-explored in prior retirement studies. A priori, there may be many factors which affect women and men differently in making retirement decisions, from types of work undertaken, to wider social expectations and norms. It is becoming clear that different 'types' of retirement pathways exist and any research and/or interventions that could be tailored more specifically towards different groups may be more effective in encouraging working to later ages. Therefore, I would recommend stratifying results between women and men in future studies to fully explore these differences.

There appears to be an ongoing need for studies which explore and focus upon retirement decisions. There are a limited number of cohorts set-up to study retirement transitions (for example STREAM, SHARE and HRS). Outside of these studies, retirement is more difficult to explore as wider studies of health and ageing may not collect data on the variety of personal and work-related factors necessary to fully investigate retirement transitions. HEAF FIRST benefitted from a separate questionnaire dedicated to studying the retirement transition, which allowed exploration of several work-related factors simultaneously. I would recommend more specialised studies into retirement transitions.

The decision to retire is multi-factorial[117] and analysis of any single work-related factor in retirement may be oversimplifying a complex decision-making process (as illustrated by the conflicting results found for the role of physically-demanding work exposures). Therefore, a balance of both positive and negative work factors may provide a more complete predictor of the risk of retirement. In this study, validated versions of the ERI model and DCSQ model, both of which calculate a ratio or balance of positive and negative work factors, were found consistently associated with the risk of being retired. Future research could usefully explore which psychosocial elements captured by the tools are most important and how to best measure these

routinely among older workers in order to perhaps identify aspects of the job that could be enhanced to reduce the risk of older workers leaving. Therefore, I recommend further exploration of both the ERI short-form questionnaire[139] and Swedish DCSQ[176] questionnaire in retirement studies. In addition, the tools may prove useful to employers in identifying those likely to be at risk of retiring. In addition, analysis of the ERI and DCSQ subscales could indicate specific areas of for action for employers, such as giving their employees a greater sense of appreciation and/or giving them a greater feeling of control over how and when they perform their job in order to facilitate their remaining in work to older ages.

The construct of 'job satisfaction' is also an overall summary measure likely to be reflecting an individual's perception of both positive and negative work factors. The results of the case-control study suggested that this might be a useful predictor of risk of retirement but, interestingly, in the systematic review the associations with retirement were conflicting. Some insight came from the qualitative interviews, in which the term job 'satisfaction' was used many times, but often did not appear to be directly related to the decision as to when to retire. Where job satisfaction was mentioned, the phrase was more of an umbrella term which summarised, but often masked, the underlying reasons for wanting to retire. Consequently, it may be that simply measuring 'job satisfaction' might only have limited application for employers if they would like to make changes to encourage later working, as those who are less satisfied are not necessarily providing any insight as to which aspects of the work could be improved. However, perhaps simply considering employees' assessment of their job satisfaction regularly could act as a barometer for an employer as to how well they might do in retaining their older workers.

The hours worked by participants in this study were an important factor in retirement decisions, as emphasised in the qualitative theme 'I've got no time'. Needing to work irregular hours (especially in men) seemed to be an important factor in having retired in the case control study. In some employment sectors where these types of irregular hours are most commonplace, employers could consider finding ways to adapt working hours for older workers, perhaps by offering more choice. Being unhappy with hours schedule (especially in women) was also important in having retired in the case control study. Although work hours are important in retirement decisions, it may that employers will be unable to discern if a particular type of schedule would push generally towards retirement. Therefore, a possible intervention would be to pro-actively initiate communication with members of staff, perhaps as part of an annual appraisal process, to establish whether they are content with their current schedule and asking whether there are any other hourly patterns that they may prefer.

Commuting times over 30 minutes and work that involved overnight stays were also important in having retired in the case-control study and featured prominently in several of the themes in the qualitative work. Whilst commute distance/duration would usually be beyond the control of an employer, provision of flexible working hours or availability of home working could mitigate some of these effects. Likewise, as discussed in relation to work schedules and irregular hours above, it could be that employers could consider offering alternatives to night stays or could explore reducing the requirement for these amongst their older workers in order to retain them. Similarly, utilisation of home working could also alleviate the need to undertake overnight stays. Clearly this is more realistic an objective in some types of employment than others.

Conflicts between work and home life seemed to push towards retirement in HEAF FIRST, especially among women. Family responsibilities are generally outside the remit of the employer however, when these are conflicting with work demands, the effect may push towards retirement. Here again, it would suggest that individual discussions with employees in order to understand whether work is conflicting with family life and what, if any, changes could be made to alleviate this.

In the case-control study 52% of participants reported not being in a workplace that encouraged work beyond the SPA. This suggests that many employers are not currently encouraging work to older ages. Being in a workplace that was perceived to encourage work beyond the state pension age was consistently associated with the risk of being retired in the case-control study. This result in particular suggested that work-related factors influence retirement decisions. The single item question may assist employers to identify those 'at risk of retiring.' This result also suggests that employers could influence people to work to older ages by fostering a work environment that is actively encouraging and supportive of older workers.

Perceptions of isolation, declining standards and 'us vs them' are perhaps harder to resolve when compared with some of the more specific work-related factors. However, both the HEAF FIRST qualitative and quantitative results suggest that these perceptions importantly influence retirement decisions. Further studies, and employers, could explore these aspects further by identifying workers utilising the questionnaire items (all single items). Once identified, individual discussions with the workers may reveal why these perceptions are held and what could be done to change them. The concept of isolation at work may also interact with the wider constructs of loneliness and/or social isolation. Working at older ages may be seen as a solution to loneliness at older ages, ensuring that workers remain part of a community at work. Therefore work that may cause feelings of isolation and push towards retirement, which may compound social isolation or even loneliness would be an important area of research.

In the current study, kneeling/squatting at work was associated with an increased risk of being retired. However, the overall associations between physical exposures and retirement decisions in the case-control study were inconsistent, just as they were in the systematic review. Despite this, employers should not disregard the effects of physically-demanding work exposures, particularly in their older workers. The qualitative phase, and indeed other qualitative studies,[94, 106] have suggested that physical work can influence retirement decisions. It may be the case that the method of the study produced divergence in the results, in that people may be more likely to discuss physical strains in an interview compared with acknowledging them on a paper questionnaire. Therefore, further investigation of this link, especially the conflict between physical abilities and demands and the effect on retirement, is warranted.

In HEAF FIRST perceiving less work flexibility was associated with an increased risk of having retired. However, it is possible that the concept of flexibility is often too narrowly defined as either availability of home-working[64] or availability of flexible working hours. It may be that a wider variety of flexibility measures (in this study: reduction of working hours; allowed time off for emergencies; being allowed to change to lighter roles; manager allowing flexible working; and availability of phased retirement) could be considered by employers in order to encourage working to older ages.

Perceiving that work expected or required constant availability (particularly with mobile technology) was a factor that influenced retirement decisions in the qualitative phase. This was reinforced in the quantitative phase where being constantly available for work was found associated with the risk of being retired. To my knowledge this factor is under-explored in previous retirement studies and these findings suggest that it should be investigated further. I suggest that employers who wish to encourage working at older ages may wish to consider reducing or halting any out of hours enquiries.

An appropriate tool for employers to modify the work-related factors discussed above may be available in idiosyncratic/individually negotiated deals (I-deals, see Fisher,[6] Loretto,[20] Bal[203] and Foster[5]). I-deals are work arrangements that can be individually negotiated between the employer and employee and could be used to modify many of the relevant work-related factors, especially in relation to flexible work arrangements. In addition an I-deal itself may increase the attachment between an employee and employer(see Bal[203]) which may potentially encourage working to older ages, as the employee offered such an arrangement is more likely to perceive that the employer values them as an individual.

An aspect which would prove crucial in any employer-led interventions would be the perspective of the employers themselves. The results from HEAF FIRST study suggest that being in a workplace

that employees perceive encourages work beyond the SPA can discourage retirement. Therefore, it is clear that the work environment fostered by the employer can affect retirement decisions. If the employer is reluctant to encourage workers to work at later ages, for example by echoing the belief that retirement at a fixed age is 'normal,' then working to older ages is perhaps unlikely. Therefore, the next stage to this research could be to explore employer attitudes to working beyond the state pension age. This could be done by conducting qualitative focus groups to explore employers' attitudes towards older workers generally, their attitudes towards the prospect of their current staff working to older ages and any interventions to promote working at older ages that they feel may be implementable. Similar topics could also be explored by qualitative focus groups with mixed groups of employers and employees to explore how ideas about working at older ages compare and contrast between the groups. Further, 54% of participants in the case-control study reported not being in a workplace that encouraged work beyond the SPA, suggesting that many employers are currently not encouraging workers to work for longer. This may be indicative of a training need on the part of employers regarding the value of older workers.

A further investigation could be undertaken through a randomised controlled trial to explore whether modifying work factors could increase retirement ages, a research requirement also identified in a review of intervention studies by Cloostermans.[169] This could, for example, be conducted on two similar sized organisations, within the same industry, to act as control and intervention groups. As an intervention I would recommend a battery of changes to work-related aspects highlighted by this thesis, which should be designed in consultation with the organisations in order to ensure that any changes are both practical and achievable.

Foremost amongst the interventions, I would recommend the relatively simple step of encouraging staff to work beyond the SPA. From a practical perspective this would require engagement from the organisation as a whole and individual line managers, so may require individual training for leaders within the organisation. The next element of the intervention would be asking employees age 50+ to complete the 10 item ERI short form questionnaire,[139] with the addition of the HEAF FIRST questions on workplace encouraging work beyond the SPA, perception of declining standards and the three constant availability questions. This 15 item tick box questionnaire would allow employers to potentially identify people at a higher risk of retirement, as well as provide data on overall ERI scores for individuals, plus subscale scores, of efforts, appreciation, promotion opportunities and job security.

As many of the work-related factors that are important in retirement decisions seem subjective in nature, it is important to understand the perspectives that individuals hold. Therefore, I would

also recommend individual discussions with each employee nearing retirement age to discuss: the results of their questionnaire; their current role; whether there is any aspect of their role that they currently perceive as a negative and finally how any negatives could be remedied. In particular this conversation could focus on hours and possible flexible work options. I would also recommend regularly conducting these data gathering exercises with the 15 item questionnaire and a subsequent discussion every six months in order to encompass any changes in the workers' personal situations or perceptions of work. Retirement rates, age at retirement and the age of people remaining at work could be compared between the intervention organisation and the controls in order to assess the efficacy of the intervention. Follow up time would ideally be for several years, I'd recommend at least three, in order to fully assess the impacts of the intervention.

10.6   Conclusions

In the HEAF FIRST project I explored the relationship between work-related factors and retirement. Based on the results of this project I conclude that:

Work-related factors have an influence upon retirement decisions. In turn, this suggests that employers and/or policy makers could seek to modify work-related factors in order to encourage working to older ages.

In particular job dissatisfaction, working hours, effort reward imbalance, perception of declining standards, isolation at work, 'us vs them', the demand control support model, being in a workplace that did not encourage work post-SPA, kneeling/squatting, commuting more than 30mins, requirement for overnight stays, less flexibility, constant availability and work-life conflict seem to increase the likelihood of being retired.

The current retirement literature is heterogeneous with different definitions of retirement and approaches to measuring work-related exposures. Consistency, especially in relation to the use of validated tools to measure exposures, may enable better comparison between studies.

Work-strain models that compare positive work aspects with negative aspects, such as effort-reward imbalance and the demand control support model may prove useful in identifying individuals 'at risk' of retiring.

Some work-related exposures that influence retirement such as perception of declining standards, isolation and 'us vs them' seem to be highly subjective in nature. This suggests that individual communication between employees and employers may be best placed to identify and resolve conflicts.

Chapter 10

Appendix A   Phase one: topic guide

A.1   Topic guide overview

Appendix A

A.2   Topic guide sample questions

Retirement overview

- Would you describe yourself as retired? What does being retired mean to you?
- What age were you when you retired?

Retirement Decision

- What was the main reason for your retirement?
- What other reasons led to your retirement?
- What made the decision to retire more difficult?

Former Employment

- What job did you do prior to retirement?
- Prompt for industry or further description i.e. solicitors' firm, secondary school etc.
- How large was that organisation?
  - o   Prompt for number of staff if not given
- How many hours were you working before you retired? (casual work or fixed contract of employment)
- What were your main duties in that role? (Prompt for manual or non-manual if not given)
- Is this the type of work you did for the majority of your working life?
- What did you like about your job?
- What did you dislike about your job?
- As you approached retirement age, how did these feelings change?

Work aspects

We're investigating whether any aspect of the workplace could have an effect on retirement

decisions. So, I'd like to turn to some questions on:

Workload/Effort

- How hard was your job physically?
- How hard was your job mentally?
- How important was your workload in your decision to retire?

Control

- How much choice did you have in how you did your work?
  - •   Prompt: could you decide when to take a break, could you decide what hours to keep, could you decide the best way in which to perform your role
- How much did you value that choice at work?
- How did the amount of control influence your decision to retire?

Job Satisfaction

- How much did you enjoy your job?
- How important was job satisfaction in your decision to retire?

Reward

- How well were you rewarded at your last job ?
- What effect did the rewards have in your decision to retire?

Work environment

- How much did your work change as you got nearer retirement?
  - o Prompt restructures, technology, ways of working
- How much did work changes affect your decision to retire?
- How much say did you have in these changes?

Training/skills

- How much training was available to you in your work?
- How much were your skills valued in your workplace?

Community

- How was your relationship with your line manager?
- How important were your colleagues in dealing with work challenges?
- Did you retire earlier or later or at the same age as others at your workplace?
      If Discrepancy – Was there a reason for the difference?
- How did your relationship with your colleagues affect your decision to retire?

Employment Interventions

- What could your organisation have done to encourage you to work for longer than you did?

Wrap-up

• What else would you like to add about your retirement decision that we haven't already covered?

Appendix B   Phase one coding frame extract

1. Appreciation at Work - negative	Description: Feelings of under-appreciation at work. Could be from colleagues, customers, supervisors or the organisation as a whole
Example: *I don't think I was valued actually at all very much no, no and I think a lot of us felt like that unfortunately (interview 11)*	
2. Appreciation at Work - positive	Description: Feelings of appreciation at work. Could be from colleagues, customers, supervisors or the organisation as a whole
Example*: The job satisfaction when I got flowers, thank you cards we saw photographs of the couple, of the clients walking down the aisle or mother of the bride standing proudly by her daughter or son or whatever that sent goose bumps every time and you suddenly think yeah it's worthwhile, all the stress all the aggro and it has been worthwhile (Interview 13)*	
3. Autonomy in role	Description: the freedom a worker has, to perform their role, including freedom over breaks, execution of work etc.
Example: *that's one of the kinds of roles that I would look for things where I had the opportunity to shape things (Interview 15)*	
4. Bridge employment	Description: participants taking a different job as part of the retirement process -, often a 'lesser' job than their careers
Example: *I did it in two steps I left a fully employed job when I was 56 and I became self-employed which I then finished, I might've actually I think I was 53 and then when I was 59 I stopped being self-employed and didn't work for money at all.* (interview 15)	
5. Busy life post retirement	Description: Descriptions of life being full, active or busy after retirement
Example: *Busy, active, all my time is taken up with something (Interview 18)*	

Appendix C   Phase one thematic map

C.1   Complete draft of phase one thematic map

Retirement

Now I'm Free....

- Lifestyle change = Retirement
- Busy life post retirement
- Freedom of retirement
- Interests (non-work, include travelling)
- Volunteering in retirement

- Redundancy as pathway to retirement
- Bridge employment as pathway to retirement

It's not you it's me
- Normal retirement age, planned retirement
- More to offer
- Change of attitude
- Long working life
- Needing a break

I had my reasons
- Finances as retirement factor
- Caring as motivator for retirement
- Family Interactions
- Volunteering in retirement
- Health as retirement factor

Work was pushing me

You've changed
- Declining standards at work
- Obstacle to change
- Us vs them
- Loss of control at work
- moving on without me
- Value mismatch
- Rewards (reduction in)
- Workload Mental
- Appreciation at Work - negative
- Pride & Status
- Training

Grinding me down
- Draining descriptions of work
- competitive descriptions of work
- Commutes & travelling are unpleasant
- Communication is lacking
- I'm isolated
- Appreciation at Work - negative
- Workload Mental
- Us vs them

I've got no time
- Mobile tech = constant availability
- Workload time
- Work is restricting
- Commutes & travelling are unpleasant

This Hurts
- Physical Work Environment unpleasant
- Workload Physical
- Health as retirement factor
- Commutes & travelling are unpleasant

- Finances as retirement factor
- Pride and Status
- Work as a 'break' from normal life
- Autonomy in role
- Flexible hours
- Loyalty made decision harder
- I loved my job (but)
- Colleagues = Community
- Appreciation at Work - positive

But Work also pulled me back

Work

C.2 Early draft of phase one thematic map, July 2018
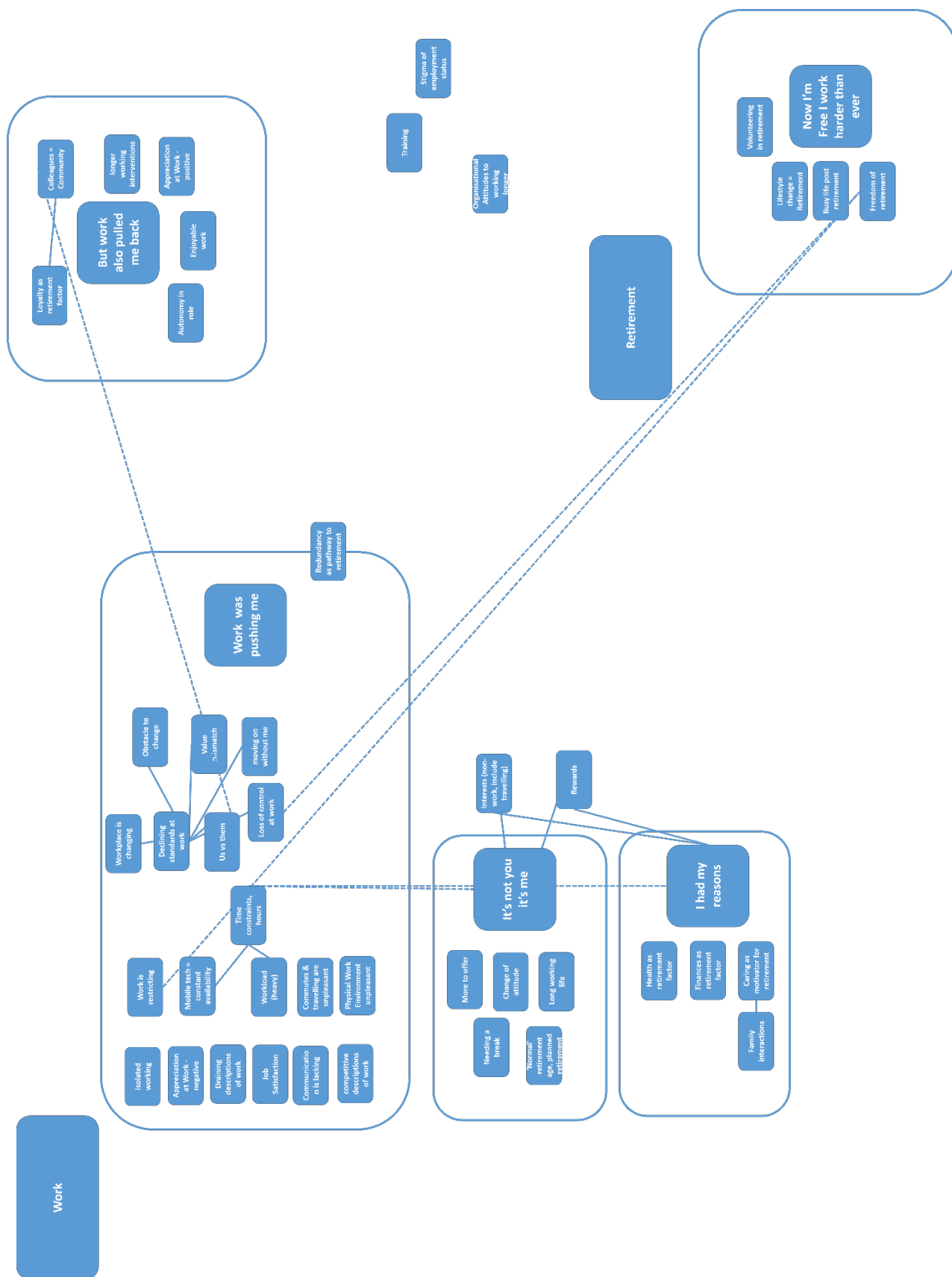
Appendix D   Phase one: case studies

Interview 7. Leo, man, formerly employed, routine and manual NS-SEC retired at SPA

Leo was formerly employed as a mechanic, repairing and maintaining vehicles for 35 years having previously worked in the military. Leo felt his work was physically heavy but as a result had kept him physically fit.

The work was prescriptive in that Leo was told directly what to do, however he enjoyed a degree of autonomy in that, how he performed the maintenance was up to him. No managers routinely checked up on Leo's work, in fact he felt that the managers only got directly involved in the work if something had gone wrong. Thus, not hearing from a manager was perceived as a positive. The exception to this was health and safety compliance, a source of frustration for Leo who felt that management were much less flexible in their approach and would not respond to feedback on the subject.

Leo enjoyed his work and had a good working relationship with his colleagues who would assist if problems arose. However, most of the work was carried out on an individual basis with separate jobs being allocated to separate staff members. Leo felt valued for his work and received training when necessary in order to keep up to date with new mechanical systems on the vehicles. Leo chose to work nights and felt that this hourly pattern suited him. He found it allowed him to do other things during the daytime and felt in the winter that he probably saw more daylight than those performing day-shift jobs.

As Leo neared retirement age, he felt the job was beginning to wear him down. The physical strains which he felt had previously felt kept him fit were becoming increasingly difficult to perform and therefore Leo perceived these strains as detrimental to his health. In addition, Leo was increasingly concerned over his exposure to environmental contaminants from the vehicles, particularly airborne particles. Although the employer provided personal protective equipment (PPE) Leo felt the exposures were inescapable as it was impractical to wear the PPE all day or when someone else in the workplace was performing dusty work. Leo had a longstanding respiratory problem which he felt was connected to his work, along with a musculoskeletal issue which he felt was exacerbated by his work

Leo retired at the SPA (65) and was one of the first to retire from his peer-group, whilst another employee of a similar age carried on for several years longer.

Appendix D

Interview 8, Elena, woman, formerly employed, intermediate SES, retired before SPA

Elena was employed in an educational setting. However, her role had changed with increased workload, paperwork and role expectations. Elena had reduced from full-time to a part time role on a reduced rate of pay. Notionally the reduced rate of pay was to reflect reduced responsibility, however Elena felt she was still being utilised by her employer in a role similar to her former employment, despite the pay reduction. In addition, although she was only paid for part time hours, Elena had to do a lot of work at home in order to discharge her duties, effectively creating a time burden for which she was not compensated. Elena also found it difficult to switch off from her role in the evenings out of concern for her students who were often from deprived backgrounds. She cared about her students who she felt were being let down and did not have suitable prospects in life. Her employer planned to further reduce her hourly rate due to a notional reduction in responsibilities. Elena retired before this change came into effect.

Elena's job satisfaction had reduced over a period of time and she didn't perceive any upcoming improvement in this situation. Retirement represented an escape from the 'treadmill' of increasing workloads and paperwork.

Elena felt under-appreciated at work but perceived a distinct hierarchical distinction in how appreciation was expressed. She felt her direct colleagues were generally supportive, but that those higher up in managerial structures were not supportive or appreciative at all. This led to a camaraderie with her direct colleagues and even her direct line manager. However, this was at the expense of negative feelings towards colleagues who were higher-up in managerial structures who were perceived as administrators rather than educational professionals.

Elena had significant caring responsibilities for her parents. Caring was a significant time constraint which did not allow time for other things, thus Elena reduced hours at her employer. Having reduced her hours, she sometimes perceived work as a welcome escape or break from the caring role. Therefore, declining satisfaction with work rather than the caring responsibilities precipitated the final decision to retire.

Elena described herself as a WASPI (Women Against State Pension Inequality) woman who had experienced a legislative extension to her SPA. She felt that she had no notification of this and was expected to work for several years longer than she had hoped.

Elena retired before her SPA. Although this caused a financial strain, Elena perceived that the strain of working outweighed this, encouraging her decision to retire.

Interview 15, Alice, woman, formerly self-employed, higher and administrative SES, retired before SPA.

Alice was employed in the finance department of a large employer. She left this role in order to become a self-employed consultant in the same sector before eventually retiring approximately three years after the transition to self-employment. Alice felt her retirement was a two-stage process, leaving the employment to move to self-employment, then leaving self-employment to final retirement.

Whilst employed, Alice grew increasingly frustrated with the long hours, long commutes and travelling involved in the role. The structure of the organisation had changed, and Alice was enjoying her role less and less. She felt the opportunities on offer had reduced and the projects assigned to her were less interesting. This reduced job satisfaction and motivated her to find a different way of working

In the self-employed role Alice felt there was a downturn of work due to the financial crisis. However, by the time demand had risen again Alice had decided to retire to obtain a better quality of life. Alice had recently married, and her partner had retired. Her role regularly required staying away from home for weeks at a time and Alice felt this wasn't the right way to start a new marriage. At first Alice had found travelling for work exciting but over time these feelings lessened, and she found travelling for work tiring and unenjoyable. As she neared retirement, she purposely selected more projects that did not require travel.

Retirement was not an easy decision and Alice was particularly concerned with removing her ability to earn money leaving her vulnerable to financial upheavals. She gained self-esteem from her role and was also concerned that retirement would deprive her of this. The possible depletion of self-esteem that retirement may cause was mitigated by taking up other roles in retirement to which she could attach value.

Alice's job was mentally stretching, especially when dealing with people who may not have appreciated her presence as an external consultant, checking on their processes. However, the workload had reduced due to reduced demand for her role in the financial downturn. This demand picked up and Alice accordingly had the opportunity to work more. She decided not to do so, not wanting to increase her workload back to former levels. In hindsight she described this period as being 'semi-retired.'

Alice's colleagues varied as she worked on different projects with little continuity is personnel. However, she had a close working relationship over many years with a specific contact at her

main client. She felt she could not just walk away from this contact and would not exit her job

until a plan had been agreed to train a replacement.

Appendix E   Systematic Review Protocol

Review question

Amongst people aged 50 and over, which work-related factors affect the decision to retire?

Searches

The following databases will be searched for relevant literature:

MEDLINE (Ovid)

EMBASE (Ovid)

PsycINFO (EBSCO)

CINAHL (EBSCO)

Web of Science

IBSS (PROQUEST)

The review will restrict time of publication from 01/01/2000 to the date the searches are performed. This is to enable the review to look at the determinants of contemporary retirement. We speculate that the determinants will have changed significantly between generations rendering studies published before 2000 less relevant to the current question. Studies where all the relevant retirements took place prior to 01/01/2000 will also be excluded

The review will be restricted to publications in English.

The review will only include papers that have been peer reviewed and will be limited to full text reports only (although these requirements will not be used as search terms to avoid excluding mis-categorised papers)

Citation searches will be a carried out by MS on relevant papers to ensure that any further relevant material is included.

Types of study to be included

Any trials, interventions or observational studies reporting primary data will be included. Both longitudinal and cross-sectional studies will be included.

For clarity, cross-sectional studies will be included but where they are concluded prior to the participants' retirement they will be excluded as per the exclusion on retirement intention described below.

Systematic reviews will be excluded but will be discussed in the introduction and/or discussion if relevant.

Qualitative studies will be included if all other inclusions and exclusions are also fulfilled, notably they must have a valid comparator in the study.

Condition or domain being studied

Appendix E

Retirement from employment/self-employment. This will exclude an intention to retire to ensure that the review focuses on actual retirement behavior.

Participants/Population

Inclusion

Individuals over the age of 50 who have been employed or self-employed who have subsequently transitioned into retirement.

Exclusion

Workplace transition involving unemployment

Workplace transition resulting in a disability pension

Retirement that took place before the participant reaches 50 years of age.

Intervention(s), exposure(s)

Work-related factors. These are defined as aspects of day-to-day working environment that the worker would potentially no longer experience if they were to retire.

Examples include but not limited to:

Psychosocial workplace factors - including demand-control model, Effort reward imbalance

Rewards other than pay – less tangible rewards such as leave etc

Contractual arrangements - including shifts, flexible working but excluding work status i.e. full time/part time or self-employed/employed

Job conditions – including training, challenges

Workload – including physical and mental loads

Job support – including management and colleagues

Hierarchical relationships – including with supervisors and other staff

Work-based social interactions - including having friends or conflicts at work

Job satisfaction

Examples of factors not falling into these will be

Health

Financial position including pay

Employer characteristics such as size and sector (although these will be extracted if present in other relevant studies)

Social class

Employment status demographics i.e. employed vs self-employed or Part time vs full time arrangements

Comparator(s)/ control

Those from same initial cohort remaining in employment/self-employment, or who retired earlier or later

Context

The global population is aging. In Western Countries the Baby Boom generation have started to retire which, combined with lower birth rates in subsequent generations has resulted in an imbalance in the working population. This has created a strain on welfare systems which need to provide for increasing numbers of pensioners and for employers who will struggle to replace experienced staff with adequate numbers of younger employees.

In Western Europe to date, policy responses have generally been centred on increasing state pension ages. However, this has yet to provide a comprehensive solution as many people continue to retire early relative to the state pension age.

Therefore, studies published prior to 2000 will be excluded as being unrelated to this current trend. Studies where all the relevant retirements took place prior to 01/01/2000 will also be excluded

Several European Countries provide a disability pension which takes the form of a regular welfare-type payment and is available at a comparatively younger age. Literature related to these pensions will be excluded, as the determinants of such transitions will not necessarily be the same as those which determine more conventional retirements.

Similarly, the transition from unemployment to retirement will be excluded as the review will concentrate on work-related determinants.

We speculate that a high proportion of studies into retirement will report some workplace factors as secondary exposures to health or finances.

Outcome(s)

Retirement from employment/self-employment. Defined as moving from employment/self-employment for remuneration to being out of work with no intention to return. The review will only include data from those who make this transition over the age of 50.

Self-reported retirement or register-based retirement information will both be included.

Where available we will collect data on dates of retirement, retirement age, retirement age relative to state pension age, employment type, gender and socio-economic class and education level.

The outcome excludes any studies which report on an intention to retire. This is to ensure that the review focuses on actual retirement behaviour.

Primary outcome

Retirement from employment/self-employment, either early, late or 'on-time.'

Secondary Outcomes

NA

Data extraction, (selection and coding)

Search results will be collated and duplicates removed. Three reviewers (MS, CH, CL) will independently screen titles and abstracts to determine suitability for inclusion against this protocol. MS will screen all titles and abstracts, whilst CH and CL will split the screening between them ensuring that MS and one other person screens each result. All three reviewers will screen the first 100 results and will meet to discuss results in order to ensure consistency with this protocol.

If necessary, the full text of the paper will be screened to establish whether a paper is suitable for inclusion.

Any disagreements will be discussed and where resolution cannot be achieved, a fourth reviewer (KWB) will provide a final decision.

A bespoke data extraction form will be developed for the research question between the reviewers. This will be completed independently by MS and CH or CL. Any disagreements will be discussed and where resolution cannot be achieved, a fourth reviewer (KWB) will provide a final decision.

Data will be extracted will as follows
- Author, Year, Study type, Country
- Participant age, gender, socio-economic class, education, relationship status
- Employment status, employed, self employed
- Cohort description e.g. general population, civil servants, public sector workers etc.
- Definition of retirement
- Comparator
- Sample size
- Number & percentage retired
- Age at retirement
- Expected age of retirement
- Type of employment prior to retirement
- Work related determinants
- Inclusion and exclusion criteria
- Length of follow up
- Results of analysis including type of statistical test used.

Risk of bias (quality) assessment

Risk of bias will be assessed using a form based on the Scottish Intercollegiate Guidelines Network (SIGN) checklists. This will be modified and piloted to assess risk of bias based to suit the papers returned by the search terms. Separate forms will be created for randomised control trials, case control studies and cohort studies if necessary.

The form will be piloted then completed by two independent reviewers (MS and KWB). Risk of bias will be discussed and reported in the review.

Strategy for data synthesis

A narrative synthesis will be conducted to report the range of determinants as well as any descriptive statistics and statistical significance.

We will consider a meta-analysis if the evidence is suitably homogenous. However, we anticipate that the literature will be too heterogeneous for a meta-analysis to be possible.

Analysis of subgroups or subsets

It is anticipated that the review will include studies with diverse outcomes which will include early retirement, late retirement and 'on time' retirement relative to a state pension age. If practicable we will analyse these subsets differently.

If possible we will conduct a subgroup analysis of self-employed persons as we anticipate that the determinants for retirement of such groups may well be distinct.

Dissemination plans

The systematic review will be submitted to an appropriate journal in the subject area as well as dissemination through presentations at conferences.

Contact details for further information

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Appendix E

Anticipated or actual start date

01/11/2017

Anticipated completion date

01/05/2018

Funding sources/sponsors

Conflicts of interest

None known

Language

English

Country

UK

Keywords

Retirement, Work, Employment, Aging, Workforce

Appendix F   Systematic Review Search strategies

F.1   Medline Search (Ovid)

Medline Final RUN 18/10/17 @ 10:24. 1003 hits

Ovid MEDLINE(R) Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily, Ovid MEDLINE and Versions(R)

	Step	Searches	Results
Outcome 6 Step	1	retir*.ti,ab.	18872
	2	exp Retirement/	9058
	3	exp Pensions/	4403
	4	pension*.ti,ab.	5859
	5	workless*.ti,ab.	30
	6	1 or 2 or 3 or 4 or 5	28239
Work and synonyms 6 Step	7	work*.ti,ab.	1298779
	8	employ*.ti,ab.	514224
	9	job.ti,ab.	46218
	10	career.ti,ab.	29059
	11	occupation*.ti,ab.	143198
	12	7 or 8 or 9 or 10 or 11	1832895
Exposure 11 Step	13	characteristic*.ti,ab.	1216095
	14	demand*.ti,ab.	178989
	15	condition*.ti,ab.	1844180
	16	control*.ti,ab.	3485977
	17	environment*.ti,ab.	843123

	18	satisf*.ti,ab.	293381
	19	determin*.ti,ab.	3245887
	20	restructur*.ti,ab.	10700
	21	factor*.ti,ab.	2995563
	22	histor*.ti,ab.	729625
	23	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	10579358
Other Exposure 3 Step	24	(push and pull).ti,ab.	3728
	25	"effort reward".ti,ab.	789
	26	24 or 25	4517
Search work with 2 words of exposure	27	((work* or employ* or job or career or occupation*) adj2 (characteristic* or demand* or condition* or control* or environment* or satisf* or determin* or restructur* or factor* or histor*)).ti,ab.	88046
Combine Exposure with Outcome	28	27 and 6	1429
Combine others exposures with outcome	29	26 and 6	37
Combine Results	30	28 or 29	1444
De-duplicate	31	remove duplicates from 30	1351
Restrict on year	32	limit 31 to yr="2000 -Current"	1003

F.2   Embase Search (Ovid)

Embase final 18/10/2017 – 10:52 am 1222 hits

Database(s): Embase 1996 to 2017 Week 41

	#	Searches	Results
Outcome 6 Step	1	retir*.ti,ab.	16259
	2	exp Retirement/	8976
	3	exp Pension/	3961
	4	pension*.ti,ab.	4344
	5	workless*.ti,ab.	34
	6	1 or 2 or 3 or 4 or 5	23732
Work and synonyms 6 Step	7	work*.ti,ab.	1284458
	8	employ*.ti,ab.	468016
	9	job.ti,ab.	42704
	10	career.ti,ab.	26593
	11	occupation*.ti,ab.	120581
	12	7 or 8 or 9 or 10 or 11	1751400
Exposure 11 Step	13	characteristic*.ti,ab.	1194861
	14	demand*.ti,ab.	180291
	15	condition*.ti,ab.	1716711
	16	control*.ti,ab.	3427225
	17	environment*.ti,ab.	812568
	18	satisf*.ti,ab.	294316
	19	determin*.ti,ab.	3053528

	20	restructur*.ti,ab.	9352
	21	factor*.ti,ab.	3043058
	22	histor*.ti,ab.	819597
	23	13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22	9958430
Other Exposure 3 Step	24	(push and pull).ti,ab.	2796
	25	"effort reward".ti,ab.	842
	26	24 or 25	3638
Search work with 2 words of exposure	27	((work* or employ* or job or career or occupation*) adj2 (characteristic* or demand* or condition* or control* or environment* or satisf* or determin* or restructur* or factor* or histor*)).ti,ab.	80954
Combine Exposure with Outcome	28	27 and 6	1364
Combine others exposures with outcome	29	26 and 6	35
Combine Results	30	28 or 29	1380
De-duplicate	31	remove duplicates from 30	1314
Restrict on year	32	limit 31 to yr="2000 -Current"	1222

Appendix G   Data Extraction sheet

HEAF FIRST Data extraction sheet

Primary Author:		Year of paper:	
Study Number		Reviewer	
Study Title:			

General Paper Attributes			
Location (Country):		Cohort Description:	
Cohort name:		Study years:	
Cohort Age range:		Response Rate:	
N Included =		N assessed for Eligibility =	
Type of Study (please delete)	Observational/Longitudinal Cross Sectional RCT/Intervention		
Key Inclusions			
Key Exclusions			

Outcome:					
Outcome Description	Describe outcome and give page reference				
Early Retirement	Y/N	On time Retirement	Y/N	Late retirement	Y/N
State Early retirement	Y/N	Retirement Age	Y/N		
Self reported outcome	Y/N	Objective outcome (specify)			

Cohort Demographics Used in analysis				
N=		Males N=		Females N=
Age Please specify Mean, SD or range				
Age of retirement Please specify Mean, SD or range				
Expected age of retirement Please specify Mean, SD or range				
Socio-economic status and numbers				
Work type and numbers				
Education status and numbers				
Relationship status and numbers				
Employed/self employed and numbers				

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Group 1 details (Usually Retirees)	
Description:	
N= Males N=	Females N=
Age Please specify Mean, SD or range	
Age of retirement Please specify Mean, SD or range	
Expected age of retirement Please specify Mean, SD or range	
Socio-economic status and numbers	
Work type and numbers	
Education status and numbers	
Relationship status and numbers	
Employed/self employed and numbers	

Group 2 details	
Description:	
N= Males N=	Females N=
Age Please specify Mean, SD or range	
Age of retirement Please specify Mean, SD or range	
Expected age of retirement Please specify Mean, SD or range	
Socio-economic status and numbers	
Work type and numbers	
Education status and numbers	
Relationship status and numbers	
Employed/self employed and numbers	

Results			
Source of data:			
Description of statistical test used:			
RR	Y/N	HR	Y/N	OR	Y/N	Other	

Work related Exposures (add lines if necessary)								
	Description	Grp1 N =	Grp 2 N =	Effect size	SE	Low CI	Upper CI	P=
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								

Adjustments made in above stats

Any other relevant results

Summary of Significant Results		
Retirement made more likely by:	Retirement made less likely by:	Retirement not affected by:
Any other comments		

Appendix H   Systematic Review Risk of Bias Tool

HEAF FIRST Risk of Bias

Study number _____   **Author** _____   **Reviewer** _____

	Yes	No	Can't say	Does not apply	Notes
Internal Validity					
1. The study addresses an appropriate and clearly focused question					
Participants					
2. The source population of the participants is clearly defined					
3. The study indicates how many of the people asked to take part did so - i.e. response rate					
4. The percentage of individuals or groups who dropped out before the study was completed is given.					
5. Comparison is made between full participants and those lost to follow up, by exposure status					
6. Descriptive statistics of the cohort are given					
7. Inclusion/exclusion criteria clearly stated					

Assessment	Yes	No	Can't say	Does not apply	Notes
8. The Outcome (retirement) is clearly defined					
9. The Outcome (Retirement) is reliably assessed and suitable for the present study					
10. The study design excludes or separates unemployment and disability/ill health retirement from the main outcome					
11. The exposures are clearly defined					
12. The exposures test what they purport to test					
Confounding					
13. The main potential confounders are identified and taken into account in the design and analysis					
Statistical Analysis					
14. Confidence intervals or similar measures have been provided?					

Overall Assessment of the study	Yes	No	Can't say	Does not apply	Notes
15. Taking into account your evaluation of the methodology used, and the statistical power of the study, do you think there is clear evidence of an association between the exposures reported as being significant and retirement?					
16. The results are potentially generalisable to other older workers					

17. How well was the study done to minimise the risk of bias or confounding?	High quality and relevant to immediate study	High quality but not relevant to immediate study	Acceptable	Unacceptable	

18. Notes. Summarise the authors conclusions. Add any comments on your own assessment of the study, and the extent to which it answers your question and mention any areas of uncertainty raised above.	

Appendix I Policy Summary

Policy Summary: Point 1
The population of the UK is ageing with a greater proportion of older (potentially retired) people in relation to people of working age. This is causing strain on pension systems and is financially unsustainable. National policies such as raising the state pension age, whilst seemingly effective, may disproportionately affect those in worse socio-economic positions. Helping workers to work to older ages by modifying workplaces at an employer level may help to alleviate this problem.
Policy Summary: Point 2
The Health and Employment After Fifty, Factors Influencing Retirement Study (HEAF FIRST) sought to explore the effect of work-related factors on the decision to retire. The results (gathered utilising multiple research methodologies) suggest that factors in the workplace can influence the decision to retire. Therefore it may be possible to help workers work to older ages by making changes to the work environment. The project suggests that these changes could be made at an individual employer-level
Policy Summary: Recommendation 1
Understanding the multiple work-related factors that can influence retirement is important. Factors that may help workers to work to older ages can be loosely described as 'improvements' to the workplace. Some of these changes may be relatively simple, for example, encouraging employees to work beyond their state pension age or showing appreciation for staff may enable people to work to older ages. Other factors that seemed to influence retirement status in our study include effort reward balance, a perception of declining standards, overnight stays and constant availability.
Policy Summary: Recommendation 2
A 15-item tick box questionnaire may assist employers with identifying those people 'at risk' of retiring whilst also highlighting potential areas for improvement that may encourage working to older ages. Retirement decisions seem to be individualised and therefore a vehicle for implementing these changes may be available in the form of individually negotiated deals where the employer makes specific arrangements with individual employees to assist with their continued employment.

Publications and presentations from this thesis

Publications

Stevens MJ, Barker M, Dennison E, Harris EC, Linaker C, Weller S, Walker-Bone K. Recent UK Retirees' Views About the Work-Related Factors Which Influenced Their Decision to Retire: A Qualitative Study Within The Health and Employment After Fifty (HEAF) Cohort. PREPRINT - under review. https://www.researchsquare.com/article/rs-537101/v1

Presentations (chronologically, latest first)

Oral presentation: Upcoming, Society for social medicine and population health (SSM). Annual Scientific Virtual Meeting, September 2021

Poster presentation:, Virtual International Congress of Behavioural Medicine, June 2021

Poster presentation: University of Southampton, Faculty of Medicine conference, October 2020

Oral presentation: MRC Southampton seminar series, February 2019

Oral presentation: (cancelled due to Covid 19 pandemic): SOM/FOM Occupational Health 2020 conference, Abstract reported at: Occup Med (Oxf) 2020; 70: 530-547. https://doi.org/10.1093/occmed/kqaa046.

Oral presentation: Institute of Developmental Sciences review day, University of Southampton, November 2018:

Poster presentation: Centre for musculoskeletal health & work, University of Southampton, October 2018

Poster presentation: LSHTM Occupational and Environmental Epidemiology meeting, April 2018

Oral presentation: Centre for musculoskeletal health & work, University of Southampton, February 2018

Oral presentation: Colt Foundation research day reported in *Occupational Health at Work* 2018; February/March 2018 (vol. 14/5): pp38-39, January 2018.

Poster presentation*: International Epidemiology in Occupational Health* (EPICOH) Edinburgh August 2017

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