# Northumbria Research Link

# The Relationship Between Pension Literacy, Retirement Planning and the Propensity to Seek Financial Advice in the Light of the 2015 Pension Freedoms

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# The Relationship Between Pension Literacy, Retirement Planning and the Propensity to Seek Financial Advice in the Light of the 2015 Pension Freedoms

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# Abstract

This study explores the relationship between pension literacy, retirement planning and the propensity to seek financial advice in respect of pension choices. The 2015 Pension Freedoms gave more choice to individuals up to and into retirement (Taxation of Pensions Act, 2014). If individuals lack the pension literacy to understand their options, they may be at risk of making poor decisions and even running out of money in retirement (Hunter, 2017). This is particularly the case for individuals who choose not to seek financial advice (Financial Conduct Authority, 2016a; Thurley, 2015). An on-line test of pension literacy was completed by a large sample of individuals aged over 40 from the North East of England. Their actual and perceived pension literacy were measured, both separately and combined together. Logistic regression was applied to assess the relationship between both pension literacy and demographic factors on the propensity to seek advice and plan for retirement. Results found actual pension literacy to be complementary to both seeking financial advice and retirement planning. However, participants who perceived their pension literacy as good, were less likely to seek advice. Based on principal components analysis, pension literacy was deconstructed into five components and some aspects of pension literacy had a greater association with financial behaviour than others. Results also found pension literacy to be significantly different between demographic subgroups and many participants were not able to assess their own pension knowledge accurately. Of particular concern were overconfident participants who were less likely to seek financial advice compared to other groups.

This study makes a contribution to the financial advice gap (Financial Conduct Authority, 2016a) by identifying individuals who may be at risk of making poor pension choices through lack of planning or reluctance to seek financial advice. In addition, the study offers a methodological contribution having developed, with experts from the financial services industry, a diagnostic test of pension literacy. In this study, after having completed this test, participants were better able to accurately assess their own pension knowledge and for some, were more likely to seek financial advice.

Keywords: Pension literacy, financial literacy, financial advice, retirement planning, pension freedoms, perceived pension literacy.

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# Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others.

Ethical approval for the research presented in this thesis has been granted. Approval was sought and granted by the Faculty Ethics Committee in July 2017.

I declare that the word count of this thesis is 64,852

Julie Dick

SIGNATURE:

DATE:

# List of Abbreviations

DB          Defined Benefit

DB          Defined Contribution

FAMR        Financial Advice Market Review

FCA         Financial Conduct Authority

FSA         Financial Services Authority

GDPR        General Data Protection Regulation

OLS         Ordinary Least Squares

PCA         Principal Components Analysis

# 1 Introduction and Research Context

## 1.1 Introduction to the Study

The 2015 'Pension Freedoms' gave more choice to individuals about how and when to draw their personal pensions, including the option to withdraw cash from defined contribution pension funds from the age of 55 (HM Treasury, 2014). If individuals lack the pension literacy to understand their decummulation options, they could be at risk of making poor choices and even running out of money in retirement (The Personal Finance Research Center, 2017). This is particularly the case for individuals who choose not to seek financial advice (Financial Conduct Authority, 2016a, 2018; Hunter, 2017; Thurley, 2015). This study examined whether retirement planning and the decision to seek financial advice were associated with pension literacy. The findings offer a contribution to narrowing the Financial Advice Gap, described below, as reported by the Financial Conduct Authority (FCA) in their Financial Advice Market Review (Financial Conduct Authority, 2016a).

With the input of experts from the financial services industry, a test of pension literacy was developed and used to measure the actual and perceived pension literacy of individuals aged over 40, living in the North East of England. Using logistic regression modelling, it was found that participants with higher levels of pension literacy were more likely to seek financial advice about their pensions. When pension literacy was deconstructed into five components using principal components analysis (PCA), only the one representing financial literacy was significant in the decision to seek financial advice. This suggests that financial literacy is required in order to appreciate the added value of taking advice. However, participants who perceived their own pension knowledge to be of a higher level were less likely to seek financial advice. This is a concern, as individuals have been found to base financial decisions on what they think they know, rather than what they do know (Allgood & Walstad, 2016). Once participants became aware of any knowledge deficiency by taking the test, some expressed an intention to seek advice where they had not done so previously. This suggests that the uptake of financial advice could be improved by providing individuals with more opportunities to self-assess. Some participants however, did not intend to seek advice, even after having completed the test. This suggests that for these participants, their perceived pension knowledge was not the main determinant of their decision to seek advice.

Retirement planning was positively associated with both actual and perceived pension literacy, suggesting that to engage in retirement planning some pension knowledge is required. The majority of participants were able to assess their own level of pension knowledge fairly accurately. However, a third of them showed either under, or over, confidence, both of which have been shown to be negatively associated with financial behaviour (Gentile, Linciano, & Soccorso, 2016; Porto & Xiao, 2016). Logistic regression was applied to test for associations between these traits and demographic characteristics. In doing so, the aim was to identify individuals most at risk of not seeking advice or of failing to plan for retirement.

This chapter provides the rationale for this study. Section 1.2 elaborates on the background to the study and sets the context for the research, including an introduction to the Financial Advice Gap, an important motivation for the work. Five years after the implementation of the Pension Freedoms, the public have embraced the flexibility of the reforms and early concerns about irresponsible spending of pension savings have not materialised (Smith, 2014). However, other risks, such as pension scamming have emerged (Financial Conduct Authority, 2018). Individuals find pensions difficult and complex, yet despite this, the uptake of financial advice remains low (The Personal Finance Research Center, 2017).

Section 1.3 identifies the gaps in the academic literature this study sought to address. It goes on to clarify the research aim, research objectives and central research question. Section 1.4 gives an overview of the thesis by chapter, in doing so providing justification for the structure of the thesis.

## 1.2 Background and Research Context

### 1.2.1 Introduction

This research examined the impact of the latest major set of pension reforms in the UK, 'Freedom and Choice in Pensions' (HM Treasury, 2014), thereafter referred to as the 'Pension Freedoms'. The section begins by explaining the main types of personal pension, the Pension Freedoms, the Guidance Guarantee, the Financial Advice Market Review (FAMR) and the Financial Advice Gap. The section ends by outlining some of the FCA's current initiatives to improve retirement outcomes. This is the context within which the study was situated.

### 1.2.2 Types of Pension

This study was about personal pensions, which are those not provided by the state. They are classified as either occupational pensions, provided by an employer and managed on a defined benefit (DB) or defined contribution (DC) basis, or private pensions (all DC pensions). Members of personal pension schemes enter into a contract with a pension provider, usually an insurance company that manages the pension on their behalf. Occupational schemes have a board of trustees that govern the scheme under trust law. Private pensions are used by employers to provide a pension for their employees, into which they may or may not contribute. Alternatively, individuals may enrol into a private pension of their own accord. Many employers are choosing this arrangement to fulfil their obligations under auto-enrolment[1]. Pension entitlement is determined differently dependent on whether a pension is a DB or DC scheme (Figure 1). DC pensions require individuals to make choices about how their pension contributions are invested.
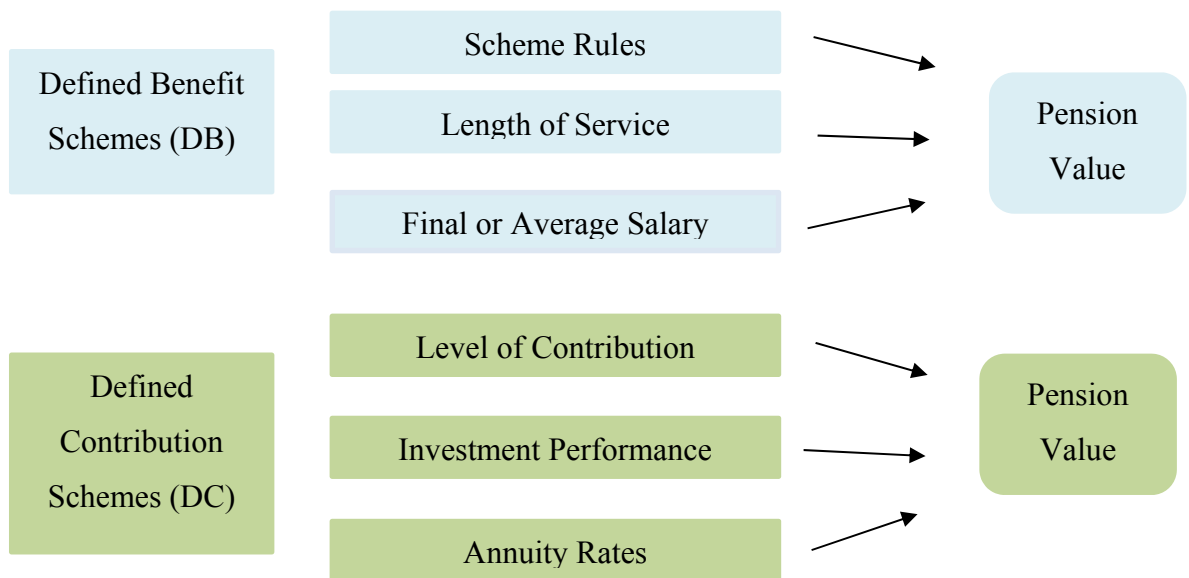


*Figure 1* The Drivers of Pension Value: Defined Contribution and Defined Benefit Schemes (Author's own).

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[1] Auto-enrolment was introduced under the 2008 Pensions Act and was rolled out to workplaces between 2012 and 2016 based on the number of employees. The aim was to ensure a greater number of employees were offered pensions by their employers. At the time of the study in 2019, the minimum contribution was 8% of pay, of which 3% must be paid by the employer. The minimum contributions are low and are unlikely to provide a comfortable income in retirement.

### 1.2.3 The Annuity Market

Before the March 2014 budget, three-quarters of individuals with DC pension savings used them upon retirement to purchase an annuity, a financial product that provides a regular income in retirement, usually until death (HM Treasury, 2014). Once purchased, an annuity bears no investment risk and the income provided depends on the size of the pension fund and the annuity rates offered by providers. These are determined by interest rates and the life expectancy, age and health of the purchaser of the annuity.

Historically, annuities were required only to support individuals for a short period in retirement, but this is no longer the case. More recently, rising life expectancy and other factors[2] have led to a fall in annuity rates, prompting the FCA to carry out a review. It concluded there was little choice for consumers at the point of retirement and the market did not work in their best interests (Financial Conduct Authority, 2014).

It was not compulsory, however, to purchase an annuity prior to 2015 and other products enabled savers to draw their pensions in more flexible ways. However, the rules were complicated and the tax regime penalised individuals who chose to draw money from their pension early[3]. It was argued the system was unfair and made it difficult for people to make the right choices in retirement (HM Treasury, 2014).

### 1.2.4 The Pension Reforms

In March 2014, the Coalition Government announced a change to legislation in relation to DC pension schemes, attempting to simplify the system and give individuals more choice to access their pensions flexibly.

In his Budget Speech to the House of Commons, the then Chancellor of the Exchequer said:

> *'I am announcing today that we will legislate to remove all remaining tax restrictions on how pensioners have access to their pension pots. Pensioners will have complete freedom to draw down as much or as little of their pension pot as they want, anytime they want. No caps. No*

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[2] Mainly the fall in interest and gilt rates.
[3] If individuals chose to withdraw their pensions early they were charged 55% tax and an additional charge of 15% of fund value. This was a strong disincentive.

*drawdown limits. Let me be clear. No-one will have to buy an annuity'(Osborne, 2014).*

Changes to pension tax legislation was passed allowing, from April 2015, DC pension scheme members access to their pension savings from the age of 55, subject to their marginal tax rate (Taxation of Pensions Act, 2014). Individuals would be free to withdraw their entire pension savings and invest, or spend, them as they wished, the elimination of a 55% tax charge effectively removing what had previously been a strong dis-incentive to do so[4]. Initially, the media voiced concerns that individuals would withdraw and spend their pension savings, leaving them with no resources with which to support themselves in retirement. However, so far this does not appear to have been the case (The Personal Finance Research Center, 2017).

The reforms gave DC pension scheme members more options of how to use their retirement savings. Individuals are still able to purchase an annuity, however, they may prefer to keep their money invested and withdraw small amounts as and when they see fit by purchasing a drawdown product[5]. Individuals may decide to stay with their current pension provider or buy a product from an alternative company. To make these decisions, most individuals require financial advice as they are unlikely to be sufficiently pension literate to make them on their own (Financial Conduct Authority, 2015b).

1.2.5   The Guidance Guarantee

The Government acknowledged that individuals would need help to understand the extensive options now available to them. The Chancellor of the Exchequer in his Budget Speech said:

*'…And we're going to introduce a new guarantee, enforced by law, that everyone who retires on these defined contribution pensions will be offered free, impartial, face-to-face advice on how to get the most from the choices they will now have'(Osborne, 2014).*

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[4] The new legislation allows 25% of pension pots to be withdrawn tax free. After this pension income is taxed at marginal rate (it is treated like any other form of income).

[5] A drawdown product is a pension product that allows the saver to withdraw some of their pension savings, whilst leaving the remainder invested. There are different types of product that allow the saver to do this, including flexi-access drawdown and uncrystallised funds pension lump sum. More information on the options since the pension freedoms can be found at https://www.pensionsadvisoryservice.org.uk/about-pensions/pension-reform/freedom-and-choice

The government introduced the 'Guidance Guarantee' to ensure all individuals were offered free and impartial guidance. This was to be high quality, face-to-face and would signpost individuals to the correct course of action, whether this was further advice or purchasing a product (Pensions Schemes Act, 2015). The Citizens Advice Service delivered the face-to-face guidance and the Pensions Advisory Service provided guidance over the phone. The Money Advice Service, together with the Treasury, developed an on-line service. The overall guidance strategy was branded 'Pension Wise'[6]. The offer of guidance was extended to all individuals over age 50 and extensive marketing aimed to raise public awareness (Financial Conduct Authority, 2015b).

## 1.2.6 The Financial Advice Gap

An important distinction exists between free guidance provided by 'Pension Wise' and financial advice that must be paid for. The former provides generic guidance about broad choices, but may not be sufficient to inform complex pension decisions, for which specific personalised financial advice is required (Allam, Echalier, James, & Luheshi, 2016; Financial Conduct Authority, 2016a; Thurley, 2015).

The Financial Advice Market Review (FAMR) was commissioned in 2015 by the FCA and the Treasury and reported its findings in 2016. It confirmed the existence of an 'advice gap' in relation to pensions and other aspects of personal finance. Individuals requiring advice to help them make informed decisions at retirement were not seeking it. Their recommendations focused on the affordability of financial advice, the lack of consumer confidence in their own ability to make financial decisions and a reluctance by advisors to give advice, due to concerns about future liability and redress (Financial Conduct Authority, 2016a).

## 1.2.7 The Pension Landscape since 2015

The first group of retirees affected by the Pension Freedoms are different from those who will follow. DC pensions are not the only source of income for this group, many of whom also have DB pensions or other forms of retirement income (National Employment Savings Trust, 2016). The Pensions Regulator reports DB scheme status

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[6] From 1st January 2019, a single financial guidance body was established (Financial Claims and Guidance Act, 2014). The 'The Money and Pensions Service' brings together the Money Advice Service, the Pension Advisory Service and Pension Wise. This body is now responsible for financial capability in the U.K.

on an annual basis. In 2018[7], they reported only 14% of registered schemes remained open, 83% were closed to new members or future accruals[8] and 3% were winding up (The Pensions Regulator, 2018). The decline in schemes has been attributed to poor investment returns caused by the 2008 financial crisis, rising longevity and many employers having taken contribution holidays when schemes were in surplus (Work and Pensions Committee, 2016). As a consequence, retirees in years to come will have greater dependency on DC pensions, therefore, for this group pension literacy is even more important.

In 2018, the FCA published the 'Retirement Outcomes Review', their assessment of the impact of the Pension Freedoms, focusing specifically on individuals opting not to take financial advice (Financial Conduct Authority, 2018). The review found many individuals had embraced the new flexibilities, especially the option to access tax-free cash. 72% of individuals who had accessed their pension pots had done so before age 65 and just over half of these pots were fully withdrawn[9]. 94% of the individuals had other retirement income. 52% of money withdrawn was not spent, contrary to earlier concerns, but transferred into other savings products. However, a third was invested in cash or cash based products, potentially losing out on investment income, employer contributions and tax efficiencies. Individuals who had spent their savings had done so paying off debt, undertaking home renovations, purchasing cars and helping their children to buy property. A greater number of drawdown products have been sold than annuities since the reforms. Most individuals have remained with their existing provider as opposed to shopping around for more competitive products, potentially, paying higher charges or losing out on investment income. When asked, many individuals did not know how the money in their drawdown product was invested, tending to focus only on the cash withdrawal and not the remainder of their pension fund.

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[7] This was the latest published data at the time of the study.
[8] Closed to future accruals means that members are no longer able to accrue years of service and so increase their pension entitlement.
[9] 88% of these were under £30,000

### 1.2.8 DB to DC Transfers

Under the Pension Freedoms, members of some DB pension schemes may transfer their pension savings to a DC scheme to take advantage of the flexibilities[10]. However, the benefits are often outweighed by the costs[11] (Money Advice Service, 2019). Therefore, it is essential that these individuals seek advice and are required to do so to transfer pension pots over £30,000 in value. The FCA expressed concerns that some advisors may facilitate transfers not in the best interests of individuals, as a consequence measures were introduced to strengthen the rules in relation to them (Financial Conduct Authority, 2019)[12]. Pension scammers have also tried to take advantage of this aspect of the Pension Freedoms[13] (The Pensions Regulator, 2019).

### 1.2.9 Latest Developments

Following a review of the pensions market, the FCA proposed a number of measures[14]. These include a requirement for pension providers to send wake-up packs' to their clients at age 50, to alert them to the start of the decision making process. They also recommend decoupling the decision to withdraw cash, from that of how to invest the remainder of the pension pot, allowing more time for individuals to make considered decisions. Pension providers will also be required to offer 'investment pathways' to help individuals rationalise their retirement objectives and choose suitable investment options (Financial Conduct Authority, 2018). These are intended to prevent individuals passively taking the path of least resistance, which may not be in their best interests. Additionally, more action has been taken to prevent pension scamming.

From 1st January 2019, the new 'Single Financial Guidance Body' was established bringing together the Money Advice Service, Pension Wise and the Pensions Advisory Service (Financial Claims and Guidance Act, 2015). It assumed responsibility for

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[10] Some unfunded DB pension schemes do not permit their members to transfer their pensions. These include the NHS and the Teacher's Pension Schemes.

[11] DB schemes guarantee income in retirement and often have other benefits such as life assurance and widows or widowers pensions. In addition, moving to a DC scheme may incur additional charges.

[12] The FCA advised firms to start from a position that a transfer is not in the interests of the client.

[13] By 2018, pension scammers had stolen £200m with an average scam of £91,000. The activity of pension scammers is not limited to DB to DC transfers. Actions have been taken to address this by the regulator (Financial Conduct Authority, 2018).

[14] These were in the in the process of implementation during this research.

financial capability in the U.K and has recently published a national financial capability strategy that includes measures to improve retirement outcomes.

### 1.2.10 Conclusion

The 2015 Pension Freedoms gave individuals more choices in retirement. This section has briefly reviewed the reasons behind their implementation and their impact, setting the context for the study. For individuals who choose not to seek financial advice, there is a risk of making suboptimal decisions, greater when their financial and pension literacy is poor. The next section identifies the research gap and sets out the research aim and objectives of the study.

## 1.3 Research Gap, Research Aim and Objectives

### 1.3.1 Research Gap

Previous studies in the academic literature have made associations between financial literacy and both seeking advice and planning for retirement. Some of these have combined individuals' actual and perceived financial literacy and explored their joint relationship with these financial behaviours. A comprehensive overview of many of them is contained in the paper by Stolper and Walter (2017). These studies mainly focus on financial rather than pension literacy which are distinct concepts. Although financial literacy is an important element of pension literacy (and arguably the reverse applies), a greater number of skills are required for effective retirement planning than just financial literacy alone. The Personal Finance Research Centre (2017) lists them in their review of financial capability and retirement carried out on behalf of the Money Advice Service. These are discussed in chapter 2. However, there are fewer contributions in the academic literature concerning pension literacy. There was a need therefore, to define the concept and explore its relationship with retirement planning, including the propensity to seek financial advice, since the implementation of the Pension Freedoms in 2015. This is where this study makes its main contribution.

### 1.3.2 Overall Research Aim

'*You can't know what you don't know*' is a quote attributed to Jonathan Raymond, an American Writer. In the light of the Pension Freedoms, the capacity to 'not know what you don't know' is considerable. However, a mismatch between actual and perceived pension literacy could put individuals at risk of poor financial behaviour, such as choosing not to seek financial advice or failing to plan for retirement. Therefore, the

overall aim of this research was to explore the relationship between actual and perceived pension literacy, both separately and combined, and two specific financial behaviours, in order to make a contribution to narrowing the financial advice gap.

To achieve this, four objectives were identified:

1. To define the concept of pension literacy by synthesising academic and policy definitions of financial literacy and financial capability.
2. To develop, with experts, a test of pension knowledge, incorporating it in a survey to measure actual and perceived pension literacy in a sample of individuals living in the U.K.
3. To develop research hypotheses by reviewing the relevant academic literature and test them using appropriate statistical methods, enabling the research questions to be addressed.
4. To contribute to practice by providing information enabling policy makers to increase the uptake of financial advice and guidance, decrease the risk of poor retirement decisions and help narrow the advice gap.

### 1.3.3  Research Question

The main research question was as follows:

*What is the relationship between pension literacy and the propensity to consult an Independent Financial Advisor when planning for retirement in the light of the 2015 Pension Freedoms?*

Five further sub-questions emerged from the review of literature and are identified within the relevant sections of chapter 2.

### 1.4  Overview of the Thesis

This section gives an overview of the thesis by chapter, providing the rationale for the way in which the thesis is structured.

### 1.4.1  Chapter 1 - Introduction and Research Context

This chapter provides the rationale for the study. The background and context for the study are explained and the research aim and objectives are made clear.

### 1.4.2   Chapter 2 - Literature Review

The literature relating to the study was potentially very broad, so the first task was to set the scope of the review. The behavioural finance discipline could have added to the discussion of retirement decision making, however, to review it in its entirety would have precluded more relevant literature concerning the research question. This was also true of the psychology literature concerning 'meta-knowledge', the knowledge of knowledge. The start of this chapter therefore, clarifies the scope of the review and offers justification for the inclusion and exclusion of literature. Based on the research question, three themes of literature were identified, derived from the relationships between the three concepts of financial literacy, financial advice seeking and retirement planning. The literature review is structured around these three themes, following a brief review of the studies relating to the three concepts as stated. The chapter closes by presenting a definition and model of pension literacy, which constitute the study's first contribution.

### 1.4.3   Chapter 3 – Methodology and Methods

This chapter begins by positioning the study into an appropriate philosophical framework. The defence of a realist ontology and a positivist epistemology is presented in the first part of the chapter. The use of a survey method, based around a test of pension knowledge is justified by reference to empirical studies. Prior to the start of the study, the author worked hard to establish a network of experts who would be willing to provide advice in the development of the test of pension literacy. It is thanks to them that the test had good face validity. The test of pension literacy and the process by which it was developed offer the second contribution of the study.

The data sample constituted 581 individuals living in the North East of England, aged over 40. The sampling approach is explained and how problems caused by the introduction of the General Data Protection Regulations (GDPR) were overcome. The chapter describes the ways in which pension literacy was measured. This included the use of principal components analysis (PCA), using the empirical data to separate pension literacy into five components. Logistic regression and one-way analysis of variance (ANOVA) were employed to address the research questions. The approach to this data analysis is set out in the chapter. Finally, the chapter deals with issues concerning replicability, reliability and validity, as well as discussing research limitations and ethical considerations. It also confirms ethical approval for the study.

### 1.4.4 Chapter 4 - Results 1 – The Definition and Measurement of Pension Literacy

There are three results chapters. The first of these is concerned with the definition and measurement of pension literacy, based upon the first theme reviewed in chapter 2. There are two main purposes of the chapter. The first is to present the results in relation to participants' actual and perceived pension literacy and the extent to which they were associated with various demographic factors. The second was to report the findings regarding the degree to which perceived and actual pension literacy were reflective of each other. In doing so, the chapter addresses research questions four, 'How does pension literacy change with age?' and one 'Can individuals assess their own level of pension literacy accurately?' It was decided to separate this theme from the other two because an understanding of the participants' pension literacy was a prerequisite to associating it with their financial behaviour. As such, there is a separate discussion of the findings in relation to this theme at the end of this chapter.

### 1.4.5 Chapter 5 - Results 2 – Pension Literacy and Financial Behaviour –Analysis of Data

Chapters 5 and 6 both concern the other two themes reviewed in chapter 2, pension literacy and financial advice and pension literacy and retirement planning, both aspects of financial behaviour. The purpose of this chapter, after presenting the descriptive statistics from the survey, is to report the results of the stage one and two logistic regressions. The purpose of the stage one regressions was to interpret the odds ratios and $\beta$ coefficients to understand the associations between both pension literacy and demographic factors with the two types of financial behaviour. The stage two regressions were informed from stage one. They culminated in two logistic regression models to predict the likelihood of both seeking financial advice and planning for retirement, given a set of predictor variables. The models were tested for robustness and evaluated by testing, using data external to the sample. Both models were constructed by following the same procedure. Therefore, to avoid repetition it was logical to present these results in one chapter.

### 1.4.6 Chapter 6 – Results 3 - Pension Literacy and Financial Behaviour – Discussion of Findings

The purpose of this chapter is to discuss the results from chapter 5 in the context of the existing academic and public policy research. In relation to pension literacy and seeking financial advice, the chapter addresses research questions two 'What is the

relationship between pension literacy and the propensity to seek financial advice in relation to pensions?' and three 'Are pension literacy and financial advice seeking complements to, or substitutes for, each other? In relation to pension literacy and retirement planning, the chapter addresses research question five 'What is the relationship between pension literacy and retirement planning?

### 1.4.7   Chapter 7 – Conclusion and Contribution

This chapter reflects on the research journey, starting with a review of the aims and objectives of the study and how these were met. It briefly reviews the main stages of the research and how each contributed to the answering of the five research questions. The study offers four contributions. These are discussed and then the implications for practice, highlighting the importance of the main findings, are suggested and recommendations made. The limitations of the study are reflected upon and possible areas for future research are suggested. Finally, the author offers some personal reflections to bring the thesis to a close.

### 1.5   Conclusion

This chapter has provided the overall rationale for the study. The Pension Freedoms made decision making at and into retirement more complex than previously (HM Treasury, 2014). Despite the provision of free guidance under the brand 'Pension Wise', many individuals require Financial Advice. The 'Financial Advice Market Review' highlighted the deficit between the number of individuals who need advice and those who currently seek it (Financial Conduct Authority, 2016a). Individuals who choose not to seek advice are at risk of making poor decisions, especially when they lack sufficient pension literacy.

The aim of the study was to explore the relationship between actual and perceived pension literacy, both separately and combined, and two specific financial behaviours in order to make a contribution to narrowing the financial advice gap. The background and context to the study, alluded to above, were explained in detail and the research aim, the four research objectives and main research question were clarified in this chapter. An overview by chapter was given, providing the rationale for the structure of the thesis. The next chapter is the literature review.

# 2   Literature Review

## 2.1   Introduction

### 2.1.1   Overview

This chapter begins by introducing three main themes of literature and explaining the rationale behind their derivation. There follows a detailed review of the relevant literature pertaining to each theme, from which five additional research questions addressed in this study were derived.

The relevant literature is extensive and covers more than one academic discipline. Stolper and Walter (2017) conducted a review of literature concerning the measurement and determinants of financial literacy (just one dimension of this study) and reported that the top 20 cited publications obtained from *Web of Science* [15] cover a range of disciplines. These include accounting, behavioural finance, economics, psychology, finance, economic psychology and marketing. This review does not specifically exclude any of these. The studies included cover, to some extent, all of these areas, in that they make a relevant contribution to the themes identified in this introduction and as such, the research question. However, to review all of the relevant literature in each discipline was not possible within the parameters of this study. This was particularly the case for both the extensive volume of behavioural finance literature concerning financial decision-making and the psychology literature pertaining to meta-knowledge[16]. Therefore, this introduction provides justification for the inclusion of specific literature from this extensive base.

To determine the degree of relevance and to formulate an approach to reviewing this large body of literature, it was helpful to revisit the main research question:

> *What is the relationship between pension literacy and the propensity to consult an Independent Financial Advisor when planning for retirement in the light of the 2015 Pension Freedoms?*

Figure 2 (below) shows three main concepts pertaining to the above question. These are financial literacy, financial advice seeking and retirement planning (shown in blue). Financial literacy is the nearest concept to pension literacy in the literature,

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[15] *Web of Science* is a scientific citation index managed by *Thomson Reuters*. It allows access to multiple databases of cross-disciplinary research.
[16] This is the knowledge that an individual has about their own knowledge.

although the two are not the same. The literature pertaining to each of these concepts was expansive and although helpful, covered many areas that were not directly relevant to the research question. However, it was the relationships between them that were most meaningful in addressing the research question. These were identified as themes for the purpose of the study. The 2015 Pension Freedoms provided the context of the study and were reviewed in the previous chapter.

Three themes of literature were identified (shown in red). The first concerned the definition of financial literacy. To review this was important, both to inform the methodology of the study and to understand its meaning when referred to in this literature review, as definitions of the term are not consistent. It was important to establish exactly what 'financial literacy' means. This was to give insight to how it influences financial behaviour. However, as previously stated, pension literacy and financial literacy are not the same, consequently, it was important to determine a definition of pension literacy, the focus of this study. This was informed by the literature and is presented with an accompanying model at the end of section 2.2.5.
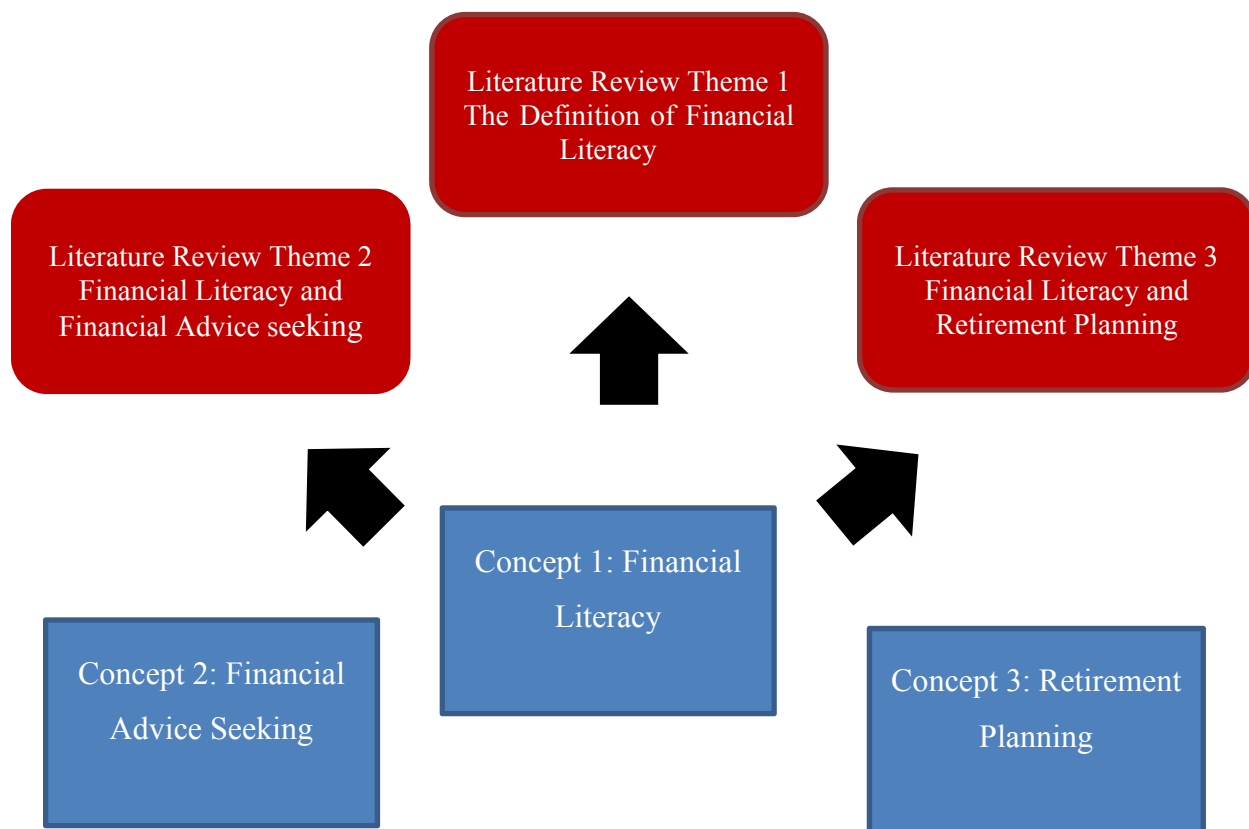


*Figure 2* Themes and Concepts reviewed in the Literature (Author's own).

Two further themes concerned financial literacy and financial behaviour; these were financial literacy and financial advice and financial literacy and retirement planning. In relation to the first of these, the literature addressing the effect of financial advice on financial behaviour, specifically retirement planning, was included, as this gave additional insight as to the possible consequences of seeking, or not seeking, advice.

The themes and concepts shown in Figure 2(above) are explained more fully in the following sections.

### 2.1.2   Theme 1- The Definition of Financial Literacy

The definition of financial literacy is the subject of many academic studies and universal agreement does not exist (De Zwaan, Lee, Liu, & Chardon, 2017; Ramalho & Forte, 2018; Stolper & Walter, 2017). Some studies have defined it as financial knowledge (Hilgert, Hogarth, & Beverly, 2003), whereas others have focused on financial judgement and decision making (Lusardi, 2008b) or being able to successfully apply financial knowledge (Moore, 2003). Other academics and government agencies have developed models including many elements (Money Advice Service, 2015; Potrich, Vieira, & Mendes-Da-Silva, 2016).

Individuals are not always good at knowing the limits of their own financial literacy (Kruger & Dunning, 1996), some studies have found a weak correlation between actual and perceived financial literacy[17] (Parker, Bruine de Bruin, Yoong, & Willis, 2012).

Studies have attempted to measure perceived financial literacy (Allgood & Walstad, 2016; Disney, Gathergood, & Weber, 2015), particularly overconfidence (Gentile, Linciano, & Soccorso, 2016). Research has shown some individuals to hold overly favourable views of their own capabilities (Lundeberg, Fox, Brown, & Elbedour, 2000; Yates, Lee, & Bush, 1997), particularly, those individuals with poor financial literacy (Anderson, Baker, & Robinson, 2015). These individuals, it is argued, lack the ability to recognise their own illiteracy and of particular relevance to this study, have been found to be less likely to seek financial advice (De Zwaan et al., 2017;

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[17] Perceived financial literacy is the perception that an individual has pertaining to their own standard of financial literacy. 'Actual' and 'perceived' are the terms that will be referred to in this study. However, other studies have used 'objective' and 'subjective', as well as 'self-assessed' financial literacy to mean the same thing.

Kruger & Dunning, 1996). Therefore, measuring only actual financial literacy, may not be a reliable indicator of whether an individual is likely to seek financial advice in relation to their pension (Dunning, Johnson, Ehrlinger, & Kruger, 2003). As previously stated, there is a large body of psychology literature concerning metacognition or meta-knowledge. Although potentially related to this study, the literature was considered far too expansive to include in sufficient detail. Therefore, it was omitted to allow for contributions that were more specific to the context of this study.

The literature concerning the definition of actual and perceived financial literacy is reviewed in section 2.2.

### 2.1.3   Theme 2- Financial Literacy and Financial Advice

Section 2.3 reviews the literature concerning the general relationship between financial literacy and financial behaviour, prior to focusing on the two specific types of behaviour which were the focus of the study.

This study examined the relationship between pension literacy and the propensity of prospective retirees to consult a financial advisor when planning their retirement and making pension choices. Studies have found that seeking professional financial advice is desirable and that it correlates positively with well-being and improved financial behaviours (Xiao, Chen, & Chen, 2014). As discussed in the previous chapter, financial advice is considered desirable to ensure that individuals make well-informed pension decisions following the 2015 reforms (Financial Conduct Authority, 2016a). Consequently, the academic studies reviewed were those that examined the relationship between financial literacy and financial advice (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016).

Whether financial advice is considered a substitute for (Disney et al., 2015), or a complement to (Hackethal, Haliassos, & Jappelli, 2012), financial literacy, seeking financial advice, arguably, makes little difference when an individual does not act on it. Therefore, to give additional insight as to the potential consequences of seeking financial advice, it was helpful to review the literature addressing the relationship between financial advice and financial behaviour, specifically retirement and pension decisions. Although studies have considered the effect of financial advice on financial behaviour (Bucher-Koenen & Koenen, 2015; Calcagno & Monticone, 2015), fewer

have focused on retirement decisions in particular (Mihaylov, Yawson, & Zurbruegg, 2015). Whether participants follow financial advice was not tested empirically in this study. However, this literature was included as it contributes to a wider understanding of the relative importance of seeking advice.

The literature concerning financial literacy and financial advice is reviewed in section 2.4.

### 2.1.4  Theme 3 - Financial Literacy and Retirement Planning

Studies have found that individuals who are financially literate are more likely to plan for retirement (Lusardi & Mitchell, 2007b, 2007c) and that planning is associated with increased retirement wealth (Van Rooij, Lusardi, & Alessie, 2011b). However, individuals find planning for retirement difficult and complex (The Personal Finance Research Center, 2017). Studies have shown that individuals consult with friends and family or other non-expert sources when making pension choices (National Association of Pension Funds, 2016). However, in the absence of professional financial advice, there is a risk that individuals could make ill-informed decisions (Financial Conduct Authority, 2015a). This risk may be higher when their financial literacy is poor (Lusardi, 2009).

The literature concerning financial literacy and retirement planning is reviewed in section 2.5. The next three sections provide short overviews of the literature concerning each of financial literacy, financial advice seeking and retirement planning. Although the inter-relationships between them form the three main themes of this review, these studies were relevant to aspects of the research, such that it would have been remiss to exclude a brief review of them here.

### 2.1.5  Financial Literacy

The subject of financial literacy is a well-researched area, with a rapid increase in publications in recent years (De Zwaan et al., 2017; Potrich et al., 2016; Stolper & Walter, 2017). This may reflect the increased responsibility put upon individuals to interact with more complex financial products and the importance of financial literacy in being able to do so effectively.

Studies show, that although financial literacy is desirable, it is not always common. In a study sampling countries across the world[18], Lusardi and Mitchell (2011d) found that financial illiteracy was widespread, even in countries with developed financial markets. Studies from the U.S have shown that financial literacy amongst its population is poor (Hilgert & Hogarth, 2002; Lusardi & Tufano, 2015; Moore, 2003), also the case in other European nations, including the U.K (Christelis, Jappelli, & Padula, 2005; Karaa & Kugu, 2016; Kiliyanni & Sivaraman, 2016; Money Advice Service, 2015).

Numerous studies have identified the characteristics of individuals who are more financially literate. Men have been shown to be more financially literate than women (Alessie, Van Rooij, & Lusardi, 2011; Balloch, Nicolae, & Philip, 2015; Hasler & Lusardi, 2017; Lusardi & Mitchell, 2013; Lusardi, Mitchell, & Curto, 2014). Financial literacy has also been shown to positively correlate with wealth, education level and larger family size (Calvet, Campbell, & Sodini, 2007; Hung, Meijer, Mihaly, & Yoong, 2009; Klapper, Lusardi, & Panos, 2011; Van Rooij, Lusardi, & Alessie, 2011a). Individuals who are less financially literate have been found more likely to have low levels of education, be single and be from minority ethnic backgrounds (Hilgert & Hogarth, 2002; Lusardi & Mitchell, 2011b). These individuals are less likely to invest in shares and likely to be either young or old, not middle aged (Van Rooij et al., 2011a).

Particularly pertinent to this study, conflicting evidence exists regarding the financial literacy of older people. Financial literacy in older generations has been found to be poor, negatively affecting their ability to make informed retirement choices (Lusardi, 2012; Lusardi & Mitchell, 2011b; Lusardi et al., 2014). However, conversely, more recent research has found that financial capability increases with age and that older adults show higher levels of financial capability (Xiao, Chen, & Sun, 2015).

Many of these studies are U.S based, however, recent evidence suggests similar trends exist in the U.K. The Financial Capability Strategy, a ten year plan aimed to improve the publics' ability to manage money (Money Advice Service, 2015), showed many

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[18] Financial literacy was measured using the answers to a small number of questions based on financial knowledge termed the 'Big 3'. Most studies discussed here use the same approach first used by Lusardi and Mitchell. The measurement of financial literacy is examined in the methodology chapter, including a critique of the 'Big 3'.

individuals as unable to understand simple financial concepts. This may affect their ability to manage money and select appropriate financial products and services. Lack of financial literacy is often reflected in undesirable financial behaviour, such as failure to provide for retirement, building up significant debt or failing to save.

A subset of the literature examines financial literacy and financial advice. Most empirical evidence shows financially literate individuals to be more likely to seek advice (Bucher-Koenen & Koenen, 2015; Calcagno & Monticone, 2015; Van Rooij et al., 2011a), and those less literate, less likely (Calcagno & Monticone, 2015; Hackethal et al., 2012). The majority of evidence finds overconfident individuals, whose perceived knowledge is higher than it is, less likely to seek advice (Gentile, Linciano, & Soccorso, 2016; Guiso & Jappelli, 2007; Hackethal et al., 2012; See, Morrison, Rothman, & Soll, 2011). This literature is examined in section 2.4.

Another subset of the literature concerns financial literacy and retirement planning. Studies show a relationship between financial literacy and retirement and pension choices (Chan & Huff Stevens, 2008; Mastrobuoni, 2007; Money Advice Service, 2015). Individuals with poor financial literacy are less likely to save for retirement and accumulate sufficient wealth to retire comfortably (Lusardi, 1999; Lusardi & Mitchell, 2011d; Robb, Babiarz, & Woodyard, 2012). This literature is examined in section 2.5.

In summary, this literature review focused on those areas of financial literacy pertaining to either retirement planning or financial advice seeking, as these relate directly to the research question. However, pension literacy was associated with the participants' demographic characteristics to provide additional information about which groups were more or less likely to seek advice or plan for retirement. Therefore, it was useful to briefly acknowledge the wider body of research briefly discussed above.

### 2.1.6 Financial Advice Seeking

Academic research about the demand for financial advice is extensive (Calcagno & Monticone, 2015; Stolper, 2015; Stolper & Walter, 2017). Factors that determine whether individuals seek financial advice are well researched and include cost, trust and familiarity with the advisor (Van Dalen, Henkens, & Hershey, 2016).

Studies have found sociodemographic factors to be correlated to financial advice seeking. Individuals with high levels of income and wealth have been found more likely to seek financial advice (Allgood & Walstad, 2016; Bluethgen, Gintschel, Hackethal, & Mueller, 2008; Collins, 2012; Finke, Huston, & Winchester, 2011), although those with little wealth may have less incentive (Jappelli & Padula, 2013). The propensity to seek advice has been found to increase with age (Bluethgen et al., 2008; Hackethal et al., 2012), experience of investing (Hackethal et al., 2012), and being risk averse (Gerhardt & Hackethal, 2009). Men have been found less likely to seek financial advice than women (Guiso & Jappelli, 2007) and there is conflicting evidence on whether being married increases the likelihood of seeking financial advice (Hung & Yoong, 2010) or decreases it (Halko, Kaustia, & Alanko, 2012). Higher levels of education have also been shown to increase the propensity to seek financial advice (Elmerick, Montalto, & Fox, 2002).

This study was concerned with the effects of pension literacy on the demand for financial advice, as opposed to other factors. However, the demographic characteristics of individuals more or less likely to seek advice were identified in the study. It was important therefore, to briefly review the research concerning the associations between sociodemographic factors and seeking financial advice.

### 2.1.7  Retirement Planning

The factors that influence retirement planning are broad and the literature on retirement and pension decision-making is extensive (Corsini & Spataro, 2015; Kim, Kwon, & Anderson, 2005; The Personal Finance Research Center, 2017). Behavioural biases may affect the way in which individuals make financial decisions (Financial Conduct Authority, 2013). The behavioural finance literature was too expansive to address fully, however, overconfidence bias was relevant to the study and is widely discussed in the literature (Nosić & Weber, 2010). In this study, the term 'overconfidence' was used when perceived exceeded actual pension knowledge. The studies reviewed in this chapter define overconfidence in relation to financial literacy, retirement planning and financial advice seeking in a similar way, as opposed to some behavioural finance literature that may define overconfidence in other ways.

The marketing discipline makes a significant contribution to the area of retirement decision making. For example, studies have examined the motivations behind the

purchase of financial products and services, such as pensions and financial advice. Gough and Nurullah (2009) argued that intangibility of the product makes the purchase of financial services different from that of goods. Consequently, consumers may find it hard to evaluate quality and value when making choices about their retirement, particularly about pensions. However, as this study was concerned with the effect of pension literacy, not marketing, on retirement planning and decision making, the marketing literature was not reviewed in detail.

2.1.8   <u>Conclusion</u>

This introduction has attempted to explain the rationale for the inclusion or exclusion of literature within this review, as well as to explain the reasons for its structure based on three themes.

Table 1 (below) summarises the key themes from the literature discussed in this section and indicates their significance in relation to this study. The remainder of this chapter presents a review of the three main themes. Further research questions and related hypotheses are presented at the end of each relevant section that gives rise to them throughout the chapter.

Table 1 *Summary of Themes in the Literature and their Significance to the Study*

| Theme/Finding | Significance to this Study | Sources of Literature |
|---|---|---|
| Financial literacy levels in many populations, including the U.K are low. | Significant as forms a pretext of this study. The pension literacy of participants was measured using a test of pension literacy. | Lusardi and Mitchell (2011c), Hilgert and Hogarth (2002), Lusardi and Tufano (2015), Moore (2003). Christelis, Jappelli and Padula (2005), Karaa and Kugu (2016), Kiliyanni and Sivaraman (2016), Money Advice Service (2015). |
| Financial literacy is gender related and is higher in men than women. | In order to identify the characteristics of those most at risk of making poor pension choices, this was significant and was tested in this study. | Alessie, Van Rooij and Lusardi (2011), Balloch, Nicolae and Philip (2015), Lusardi and Mitchell (2014), Lusardi, Mitchell and Curto (2014) Hasler and Lusardi (2017). |
| Financial literacy is related to wealth and incomes, in that individuals who are wealthier and/or have higher incomes, have better financial literacy. | As above. | Calvet, Campbell and Sodini (2007), Hung, Meijer and Yoong (2009), Klapper, Lusardi and Panos (2012), Van Rooij, Lusardi and Alessie (2011). |
| Financial literacy is related to education, in that individuals who have higher levels of education have better financial literacy. | As above. | Calvet, Campbell and Sodini (2007), Hung, Meijer and Yoong (2009), Klapper, Lusardi and Panos (2012), Van Rooij, Lusardi and Alessie (2011). |
| Financial literacy is low in individuals from minority ethnic groups. | As above[19]. | Hilgert and Hogarth (2002), Lusardi and Mitchell (2011a). |
| Individuals with poor financial literacy are less likely to invest in stocks. | Less relevant to pension literacy although this may be significant when considering portfolio choices in relation to DC pensions. Not tested in this study. | Van Rooij et al (2011) |
| Financial literacy of older individuals is poor. | Very relevant to pension literacy as individuals continue to make pension decisions into old age in relation to the 2015 pension reforms. | Lusardi (2012), Lusardi and Mitchell (2011a), Lusardi et al (2014), Money Advice Service (2015) |

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[19] After data collection it was decided to omit ethnicity as there was an insufficient number of respondents from non-white British ethnic origins. This gender profile was nonetheless in line with that of the North East region (Office for National Statistics, 2018a).

| Theme/Finding | Significance to this Study | Sources of Literature |
|---|---|---|
| Financial literacy increases with age. | Contradicts the previous finding. This is significant in relation to pension choices. The relationship between age and pension literacy was tested in this study. | Xiao, Chen and Sun (2015). |
| Individuals with high financial literacy are more likely to seek financial advice. | Very important to the research question in order to profile individuals potentially at risk of making poor pension choices without advice. The relationship between actual and perceived pension literacy and advice seeking was tested in this study. | Bucher-Koenen and Koenen (2011), Calcagno and Monticone (2015), Van Rooij et al (2011), Hackethal et al (2012) |
| Overconfident individuals are less likely to seek financial advice. | Very significant. It is important to determine if this group was less likely to seek advice about pensions as those with low actual financial literacy may be at risk of making poor pension choices without advice. Overconfident individuals were identified and the relationship between overconfidence and financial advice seeking tested. | Gentile et al (2016), Guiso and Jappelli (2007), Hackethal et al (2012), See et al (2011) |
| Cost, trust and familiarity are factors that determine the demand for financial advice. | These factors, although important, were beyond the scope of the study that focused on the relationship between financial and pension literacy and the demand for financial advice. | Van Dalen, Henkins and Hershey (2016) |
| Individuals with higher income and wealth are more likely to seek advice (and conversely those with lower income and wealth less likely). | It was important to determine the characteristics of individuals potentially at risk of making poor choices through not seeking financial advice. This was tested. | Bluethgen et al (2008), Collins (2012), Jappelli and Padula (2013) |
| Older individuals are more likely to seek financial advice, the propensity increasing with age. | Very relevant to pension literacy as individuals may continue to make pension | Bluethgen et al (2008), Hackethal et al (2012) |

| Theme/Finding | Significance to this Study | Sources of Literature |
|---|---|---|
| | decisions into old age in relation to the 2015 pension reforms. This was tested. | |
| Individuals with higher education levels are more likely to seek advice. | It was important to determine the characteristics of those individuals potentially at risk of making poor choices through not seeking pension advice. This was tested. | Elmerick, Montalto and Fox (2002) |
| Being married increases the propensity to seek advice. | As above. | Hung and Yoong (2010) |
| Being married lowers the propensity to seek advice. | As above. | Halko, Kaustia and Alanko (2012) |
| Men are less likely to seek advice than women. | As above. | Guiso and Jappelli (2007) |
| Individuals make pension choices using the 'path of least resistance'. | Potentially important as default arrangements are not always the optimum choice. Without advice, this may be significant. This was not examined specifically, as beyond the scope of the study. | Byrne and Blake (2010) |
| Investors choose less risky assets as retirement gets nearer. | Less significant to this study that looks at retirement planning more generally. | Bodie (2003) |
| Individuals choose current gratification over retirement savings | As above. | Hastings and Mitchell (2011) |
| Females are less likely to plan for retirement than males | Significant to this study and was tested. | Petkoska and Earl (2009), Richardson (2008) |

## 2.2 The Definition of Financial Literacy

### 2.2.1 Introduction

This section reviews the definition of financial literacy according to academics and government agencies[20]. The main purpose of this was to identify the elements of these that could be justifiably applied to pension literacy and incorporated into a composite definition and accompanying model. To so define pension literacy was important to ensure the test of pension literacy included the requisite elements, either in the test itself, or in the survey within which the test was embedded.

The definition of financial literacy is still not crystallised in the literature (Ramalho & Forte, 2018). Some academics have argued that consensus on a definition of financial literacy is important, as without agreement it is not possible to measure and interpret it effectively, make comparisons across time and populations, or develop educational interventions. However, despite agreement being desirable, there is some consensus that no one standard definition currently exists of what it means to be financially literate (De Zwaan et al., 2017; Huston, 2010; Paiella, 2016; Remund, 2010; Stolper & Walter, 2017).

Some academics have defined financial literacy simply as a specific form of knowledge, (Hilgert et al., 2003; Lusardi, 2008a, 2008b). In addition, familiarity with basic economic concepts and the ability to make simple decisions that demonstrate application of financial knowledge are cited as important (Lusardi & Mitchell, 2007a; Lusardi & Mitchell, 2007b; Lusardi & Tufano, 2015). As well as this, displaying positive financial behaviours and integrating information and knowledge, as well as learning from financial experiences are all included as elements of financial literacy (Moore, 2003). In addition to actual knowledge, an individual's perceived knowledge and confidence are also cited as important (Hung, Parker, & Yoong, 2009), as too is the ability to evaluate and make informed judgements, for example, in the choice of financial instruments (Mandel & Klein, 2007).

Government agencies have incorporated many of the above elements when defining financial literacy, however, also refer to the wider notion of 'financial capability', explored later in this section (Money Advice Service, 2015; OECD, 2013). In the U.S,

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[20] Some writers have defined pension literacy specifically and these studies are included, although the majority focus on the concept of financial literacy.

the President's Advisory Council on Financial Literacy (PACFL) was established to improve financial literacy among its citizens, following the 2008 financial crisis. Its definition of financial literacy emphasises the ability to use skills and knowledge to manage personal finances over the whole of ones' life.

In his systematic review of literature aimed at clarifying the concept 'financial literacy', Faulkner (2015) found that although the term started to appear as early as the late 1990s, it was not until after the 2008 crisis that coverage of the concept substantially increased. Financial literacy has become increasingly important as individuals assume greater responsibility for their own financial well-being in a financial environment that continues to grow in complexity. Consumers are required to make choices in relation to debt and savings products, as well as their own pension investments (Hastings, Madrian, & Skimmyhorn, 2013; Money Advice Service, 2014, 2015; Stolper & Walter, 2017). In the U.K, the increased prominence of financial literacy is reflected in the emergence of strategies aimed to improve the financial capability of the population (Money Advice Service, 2015).

As well as the lack of consensus over the definition of the concept, an additional problem is that some academic studies concerning financial literacy do not attempt to define it at all, leaving it to the reader to infer the meaning (Hung, Parker, et al., 2009; Huston, 2010). In one review of the literature addressing the definition of financial literacy by Huston (2010), it was found that in 72% of 71 studies reviewed, no conceptual definition of financial literacy was provided, despite using methodologies that attempted to measure it.

### 2.2.2  Towards a Composite Definition of Financial Literacy

This section reviews three studies from 2009/10 that took a similar approach to defining financial literacy. These papers provide useful summaries of academic research up to 2010. All three, reviewed well-cited academic work attempting to define financial literacy and then contribute their own definitions. Each paper cites similar bodies of literature as the other two and as such, to some extent cross validate the work of the others. Academics since 2010 have made reference to the models presented here, serving to show they made a significant contribution to the definition of financial literacy. For example, in 2016, Huston's financial literacy model was used as the basis for research exploring the relationship between financial literacy and

financial advice (Seay, Kim, & Heckman, 2016). Ramalho and Forte (2018) cite Hung's model, discussed below, in their study of overconfidence in Brazil. Potrich, Vieira and Mendes-Da-Silva (2016) compared financial literacy models in the literature and found Hung's model to be the most effective. Stolper and Walter (2017) cited all of the three papers discussed below as making the most significant contributions to determining the definition of financial literacy. As such, they were helpful in determining an understanding of the meaning of the concept for this study.

The first of these studies is by Hung et al (2009). Hung et al reviewed definitions of financial literacy provided in 18 academic studies that attempted to operationalise the concept by measuring it in some way. The first part of their paper drew on these numerous definitions, many cited previously, and compared financial literacy to other related but distinct concepts such as numeracy. They grouped definitions into five categories that defined financial literacy as; a specific form of knowledge; the ability to apply knowledge; ones' perceived knowledge; displaying good financial behaviour and learning from financial experiences. As a consequence, categorising in this way, it was possible to reduce the wide range of definitions into a smaller number of more manageable categories, making the measurement of financial literacy less problematic.

Hung et al (2009) claimed that previous definitions, despite containing many elements of financial literacy, were deficient. They argued that the mutual relationship between financial knowledge, skills and behaviour are important and that these should be included in a composite definition:

> *'Financial literacy is a knowledge of basic economic and financial concepts, as well as the ability to use that knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being' (p.9).*

They presented their own conceptual model, shown in Figure 3 (below). The model represents financial knowledge, a basic form of financial literacy, which is reflected in ones' perceived knowledge and influences ones' financial skills that in turn depend on that knowledge. Financial behaviour depends on all three elements of actual knowledge, perceived knowledge and skills. Experiences from financial behaviours feed back to influence both actual and perceived financial knowledge. One can argue however, that these relationships are not perfect. Other externalities could have an

impact on any of these factors. These include individuals' attitudes, environmental factors and available resources.
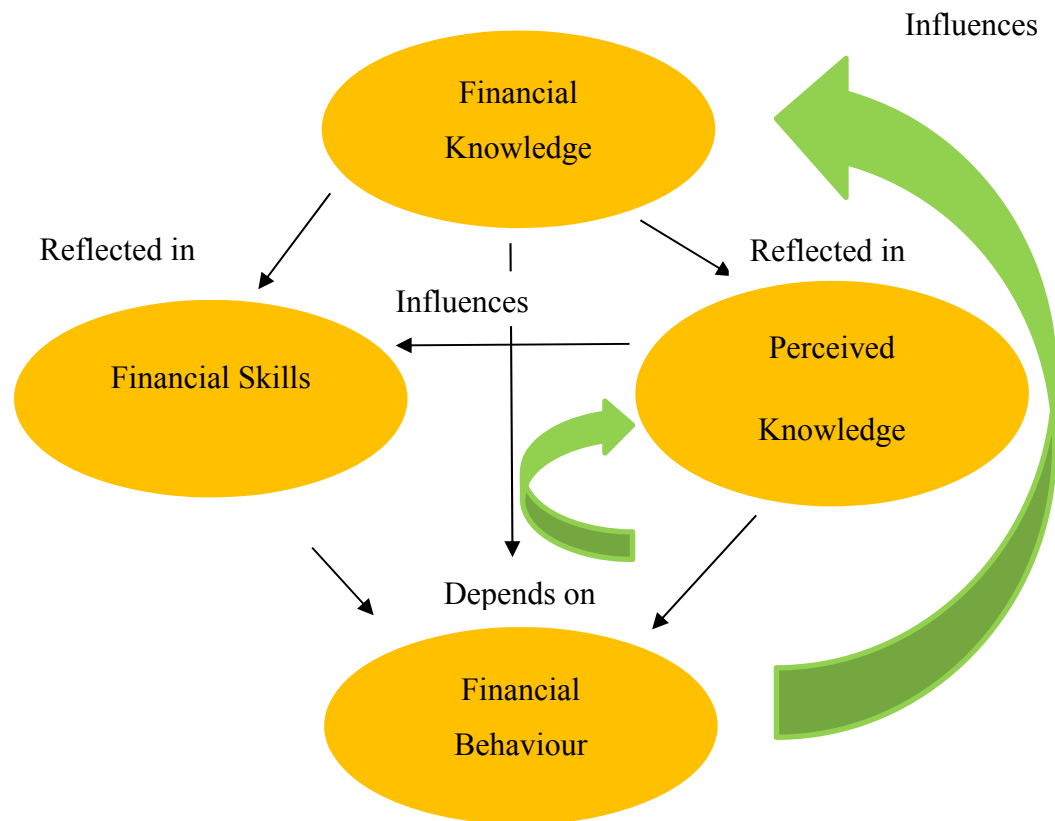


*Figure 3 H*ung's Conceptual Model of Financial Literacy. Adapted from 'Defining and Measuring Financial Literacy' by A. Hung, A. Parker and J. Yoong, 2009, *Working Paper No.708,* page 9, RAND Corporation.

This model was useful, it could be applied to pension literacy and financial behaviour and was appealing because of its simplicity. Both perceived and actual knowledge, as well as skills, are likely to influence financial behaviours (both seeking financial advice and retirement planning). Financial behaviour and experiences relating to pensions feed back to ones' perception of ones' own pension knowledge, which may or may not be reflective of ones' actual knowledge. These elements were thus important to include in the definition of pension literacy for this study and were incorporated. The relationship between financial knowledge and financial behaviour was also an important theme in this study and was also reflected in the definition.

In the second study, using a similar methodology to Hung et al (2009), Remund (2010) reviewed over 100 definitions of financial literacy cited in academic papers since the year 2000. He argued that at the time of his review, the U.S government and its agencies had moved closer to a common understanding of financial literacy, but the research community had not. As such, attempts to draw comparisons of financial literacy across populations was problematic. Consequently, the value of empirical research and practical interventions to address poor financial literacy were prevented from reaching their full value.

Remund (2010) identified five personal attributes from his review that contribute to the definition of financial literacy: The first is knowledge of financial concepts. This element is well cited and most measures of financial literacy are based on knowledge. Other academics have previously attempted to validate this by showing that increased financial knowledge leads to improved financial well-being (Braunstein & Welch, 2002; Ramalho & Forte, 2018). However, Remund argued that with knowledge as the only element, definitions are too vague to help with further research. According to Remund, the second attribute is the ability to communicate about financial concepts. An individual with the ability to communicate, is capable of asking for help from another individual or a finance professional. Fox, Bartholomae, and Lee (2005) defined this aspect of financial literacy as being '*crucial to effective consumer decision making*' (p.195). Smith, Finke and Huston (2012) argued that even in the absence of financial literacy, 'rented' knowledge from an advisor can positively impact financial outcomes. Government agencies in the U.K included the ability to communicate in their definition of financial capability discussed later in this section (Money Advice Service, 2015). The third attribute is aptitude in managing personal finances. Emmons (2005) also focused on the practical aspects of

> *'keeping track of cash resources and payment obligations, knowledge of how to open an account for saving and how to apply for a loan, basic understanding of health and life insurance, ability to compare competing offers, and plan for future financial needs' (p.336).*

The final two attributes are skill in making appropriate financial decisions and confidence to plan for future financial needs. The former is arguably a test of financial literacy in itself and brings ethics and integrity into consideration.

In addition to these five attributes, some studies in Remund's review introduced other dimensions such as global awareness, workplace satisfaction, defence against fraud and ability to manage debt. Remund built a holistic conceptual definition, drawing dimensions from the literature he reviewed:

> *'Financial literacy is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate, short-term decision making and sound long-range financial planning, while mindful of life events and changing economic circumstances' (p.284).*

In building a definition of pension literacy, some elements such as knowledge, ability and skills were similar to Hung's model and did not add anything more (Hung, Parker, et al., 2009). Confidence, is a related but distinct concept to perceived knowledge and was judged to be important when planning for retirement or consulting a financial advisor. The additional context of changing economic conditions is also relevant for pensions, as individuals may need to adapt their plans in the light of change. These elements were added to the definition of pension literacy.

In the same year, another very well cited paper attempted to summarise the wide range of methods used by researchers to measure financial literacy over the ten years prior. The final study by Huston (2010) examined 71 previous studies, drawn from 52 different data sets. The criteria for selection was based on whether a study attempted to capture, what Huston termed '*human capital*' (p.297) related to personal finance. In other words, whether a test of financial literacy was administered during the study. The majority were U.S studies and represented the period 1996 to 2008, with Huston claiming that although not exhaustive, the sample represented the majority of academic research published between these dates.

The majority (72%) of studies did not define financial literacy and only eight definitions were identified. Of these, two focused only on ability, three only on knowledge, and three on knowledge and ability with a stated outcome, such as retirement planning. The terms financial literacy and knowledge were used interchangeably in 47% of the studies, highlighting the need for further clarification.

Huston developed a conceptual framework of financial literacy, shown in Figure 4 (below).

Human Capital

APPLICATION DIMENSION

ABILITY and CONFIDENCE to effectively apply and use knowledge related to personal finance concepts and products

KNOWLEDGE DIMENSION

Stock of knowledge acquired through EDUCATION and/or EXPERIENCE specifically related to essential personal finance concepts and products

Financial Knowledge

Financial Literacy
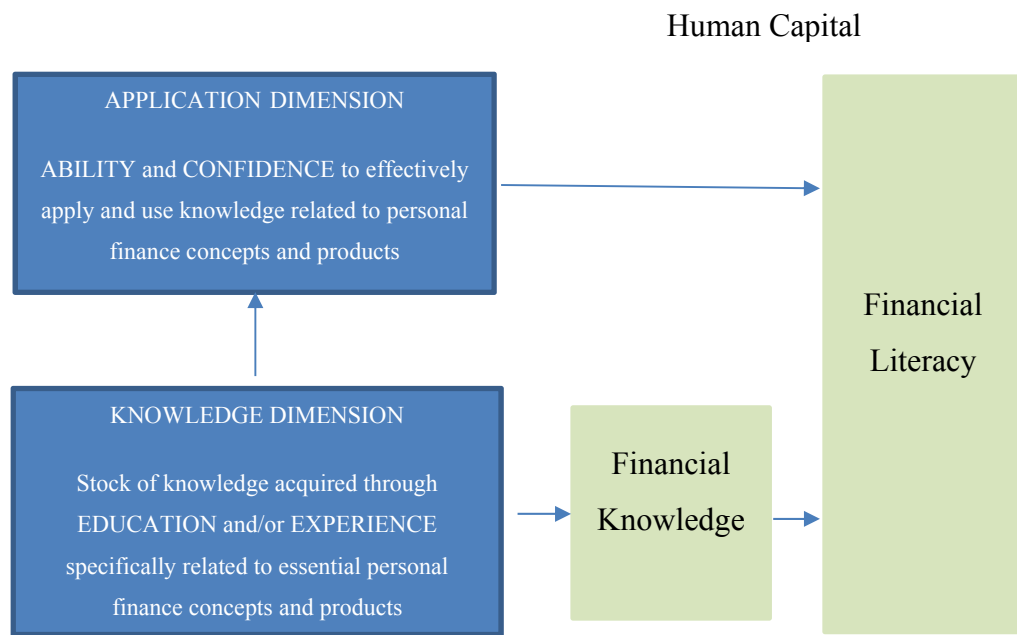
*Figure 4* Huston's Model of Financial Literacy. Adapted from 'Measuring Financial Literacy', by S. Huston, 2010, *Journal of Consumer Affairs, Volume 44,* page 307.

The model shows that financial literacy and financial knowledge are both different aspects of human capital, with financial knowledge a dimension of, but not the same as, financial literacy. This implies, like Hung (2009) and Remund (2010), that financial literacy is more than just financial knowledge. The model shows how knowledge is acquired through education and experience. However, in order to be financially literate, appropriate application is required. An individual must also have the ability and confidence to use their knowledge to make effective decisions.

Similar to Hung (2009), Huston (2010) argued that financial literacy is one component that drives behaviour to enhance financial well-being. However, other influences can affect financial behaviours. These include behavioural and cognitive biases, self-control issues, family and peer influences and economic, community and institutional situations. A person deemed financially literate, may not act in a desirable way due to any or all of these factors. Although beyond the scope of this study, it was important to acknowledge that these factors may influence financial behaviour.

In developing a definition of pension literacy, Huston's model reinforced some elements already identified (knowledge, ability and confidence). It also suggested that

individuals' ability and confidence about their pensions may be the result of their education and experience, such as pension seminars, personal finance education and previous pension scheme exposure. As such, these additional elements were included in the definition of pension literacy.

In concluding this review of these three academic papers, it seemed clear that financial literacy encompasses more than a knowledge of financial concepts. Financial skills and positive financial behaviours are essential, as well as an individual's perception of their own knowledge and their confidence. This built towards a wider understanding of financial literacy or financial capability, a term explored in more detail in section 2.2.4.

### 2.2.3 The Relationship between Actual and Perceived Financial Literacy

Some definitions of financial literacy include perceived financial knowledge. Studies have shown this to significantly influence financial behaviour (Allgood & Walstad, 2016; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016).

It was important to include perceived pension literacy in the definition as a considerable number of studies have shown that perceived financial literacy is not indicative of actual financial literacy (Allgood & Walstad, 2016; Asaad, 2015; Carlson, Vincent, Hardesty, & Bearden, 2009; Dunning et al., 2003; Kiliyanni & Sivaraman, 2016; Kramer, 2016; Olejnek & Bialowas, 2015; Parker et al., 2012; Radecki & Jaccard, 1995). Psychology literature suggests that individuals are not always good at knowing the limits of their own knowledge (Kruger & Dunning, 1996). As such, an individual's perception of their own financial literacy should not be a proxy of how literate an individual actually is (Agnew, Szykman, Utkus, & Young, 2011; Allgood & Walstad, 2016). This has important implications for policy makers when targeting interventions (De Zwaan et al., 2017; Kramer, 2016).

In the behavioural finance literature, overconfidence is a concept explored at length, studies showcase many empirical ways of testing whether individuals are overconfident. Kramer's (2016) definition of overconfidence was adopted in this study, in that an individuals are deemed overconfident when their actual financial literacy is lower than they perceive it to be. Other well-cited academics have used a very similar definition (Asaad, 2015; De Zwaan et al., 2017; Gentile, Linciano, & Soccorso, 2016; Gort, 2009; Porto & Xiao, 2016; Taylor, 2009).

In the psychology literature, Kruger and Dunning (1996) discussed the 'above-average effect'. This is the tendency of the average person to assess their skills and abilities as above average, relative to others. They hypothesised that unskilled individuals in particular suffer a dual burden, arguing that

> '…incompetent individuals lack the meta-cognitive skills that enable them to tell how poorly they are performing, and as a result, they come to hold inflated views of their performance and ability' (p.1121)

This definition infers that overconfidence applies predominantly to those with lower levels of knowledge.[21] However, one could argue there is a higher statistical chance of over-estimating ones' ability, when actual ability is lower, than when it is higher. In their study, Kruger and Dunning (1996) found that individuals with low actual knowledge[22] were most likely to make overestimations. This occurred both when asked to assess their own ability and when asked to compare themselves relative to their peers. To add strength to their argument, they were also able to evidence that this group were unable to accurately reassess their own performance, even when shown the performance of their peers. Sometimes this had the effect of over-inflating their opinion even more. Allgood and Walstad (2016) corroborated these findings some years later. In their study, based in the U.S, they identified four groups according to objective and subjective financial literacy[23]. They found that individuals with high subjective but low objective financial literacy, were overconfident compared to other groups. This is concerning, if self-assessed financial literacy affects financial behaviour, it implies that individuals who are most overconfident are those who know the least. It has been argued therefore, that financial education should aim primarily at improving an individuals' ability to assess their own financial literacy more accurately (Gentile, Linciano, & Soccorso, 2016).

In a paper reviewing financial literacy across eight countries[24], Lusardi and Mitchell (2011d) found young people to have relatively lower levels of financial literacy, but also to rate themselves accordingly. However, older individuals consistently rated

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[21] Kruger and Dunning defined 'incompetent individuals' as those in the bottom quartile of their sample.
[22] Their study measured ability over three areas. These were humour, logical reasoning, and grammar.
[23] These groups were high subjective/high objective, low subjective/high objective, high subjective/low objective and low subjective/low objective.
[24] These were the U.S, Sweden, the Netherlands, Italy, Russia, Japan, New Zealand, and East Germany.

their financial literacy higher than it actually was. There were also geographical differences. For example, in the U.S individuals reported their own financial literacy as high, whereas the Japanese rated their financial literacy as low when asked to self-assess. In terms of gender, women were more likely to rate themselves as less financially literate compared to men. Other research has found that gender is not significant in determining overconfidence[25] (De Zwaan et al., 2017).

### 2.2.4   Financial Literacy Definitions in the UK

In the U.K, there have been fewer academic studies on financial literacy, most have been from the U.S and there is little specifically on definitions of the concept. Most contributions have come from policy papers and the work of government agencies, the most important of which are reviewed in this section. It could be argued that there is a risk of political bias within policy papers. However, this was less of a concern as the objective of the review was purely to identify definitions of financial literacy.

In 2006, the Financial Services Authority (FSA) in the U.K, set up a steering group to develop a financial capability strategy and commission the first baseline survey of financial capability (Atkinson, McKay, Collard, & Kempson, 2007). This criticised previous work for not attempting to measure peoples' skills, experiences or environments. The steering group found it necessary to first define financial capability in order to develop survey questions to measure it effectively. To this end, they conducted focus groups and interviews with consumers and experts, as opposed to using quantitative methods, more common in academics studies. Atkinson et al (2007) reported on the results and identified three areas of financial capability that influenced behaviour. These were knowledge and understanding, confidence and attitudes, and skills. With the addition of 'attitudes', these were largely the same elements seen in the three models already reviewed. The survey 'Financial Capability in the UK: Establishing a Baseline' measured financial capability across five domains, measuring financial literacy in terms of financial behaviour. These domains were; making ends meet; keeping track of personal money; planning ahead; choosing financial products and staying informed about financial matters. Similar types of behaviours have been linked with financial literacy in the academic literature discussed in the previous

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[25] Although the authors of this study cite the over-representation of females as a limitation which may have had an impact on their finding.

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section. In March 2012, The Money Advice Service launched the 'Money Lives' project (Money Advice Service, 2014). The project aimed to explore the drivers of financial capability specific to financial behaviour and considered the influence of environment, context, culture, seasonal changes and aspirations. Results explored financial behaviours in three areas: keeping track of finances, living within means, and planning-ahead. These were influenced by five drivers of skills, knowledge, opportunity, attitudes and motivation that constituted financial capability, influenced by experience and personality (Figure 5).
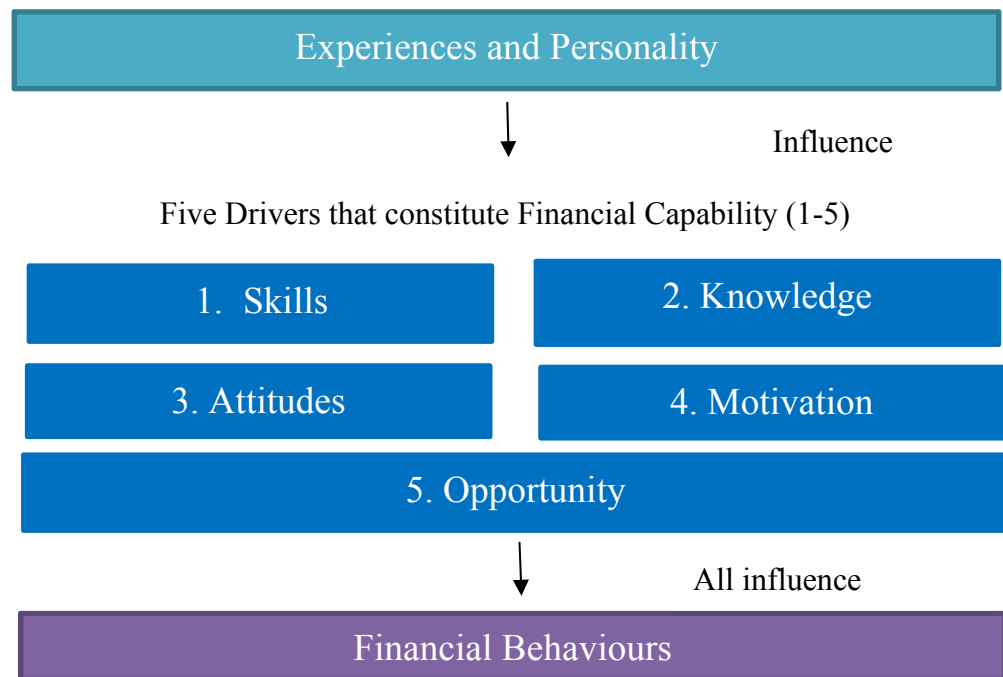


*Figure 5* Model of Financial Capability. Adapted from 'Money Lives: The financial behaviour of the U.K', Money Advice Service, 2014.

Opportunity, attitudes and motivation were elements not seen in the models reviewed so far, although attitude has been included as a determinant of financial behaviour in other academic studies (Garber & Koyama, 2016; Potrich et al., 2016; Ramalho & Forte, 2018). Motivation is significant to pension decisions, individuals with more wealth may have increased motivation to manage their pension well, although conversely, those with less wealth may have a greater need to. Wealthier individuals may have more opportunity to seek financial advice as they are able to afford the cost. Attitudes towards pensions, savings and financial advice may also be significant in

determining financial behaviour. For example, lack of trust in financial advisors may prevent individuals from seeking advice and attitudes towards saving may affect retirement planning. These factors, although not specifically examined in this study, still needed to be acknowledged. Opportunity, attitude and motivation were added to the pension literacy definition for this study.

In 2015, the Money Advice Service launched a ten year strategy to address financial capability in the U.K[26] (Money Advice Service, 2015). Progress towards achieving the strategy is assessed on an ongoing basis, the most recent review took place in 2018 (Financial Capability Board, 2019).

They used the following definition of financial capability:

> '...*people's ability to manage money well, both day-to-day and through significant life events, and their ability to handle periods of financial difficulty...people's financial skills and knowledge and their attitudes and motivation...to achieve the best possible financial well-being*' (p.6)

Their accompanying model of financial capability is shown in Figure 6 (below). This shows how 'enablers and inhibitors' influence 'financially capable behaviours' that ultimately determine 'financial well-being'. Digital engagement (under enablers) has not been considered in other models and is increasingly important to effectively engage with retirement planning, for example, through engagement with on-line sources of advice and guidance or the new 'pensions dashboard'[27]. Digital engagement was incorporated in the definition of pension literacy under 'financial skills'. Other parts of this model did not add anything new to the pension literacy definition.

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[26] The first phase of this strategy was referred to as the 'Financial Capability Strategy for the UK'. This is later referred to as the 'National Strategy' in line with terminology used by the Financial Claims and Guidance Act 2018. This was due at the time of writing in autumn 2019.
[27] The 'Pensions Dashboard' is a digital interface enabling pension savers to see all of their pensions in one place. The objective by Government, regulators and businesses was to make this available from 2019.
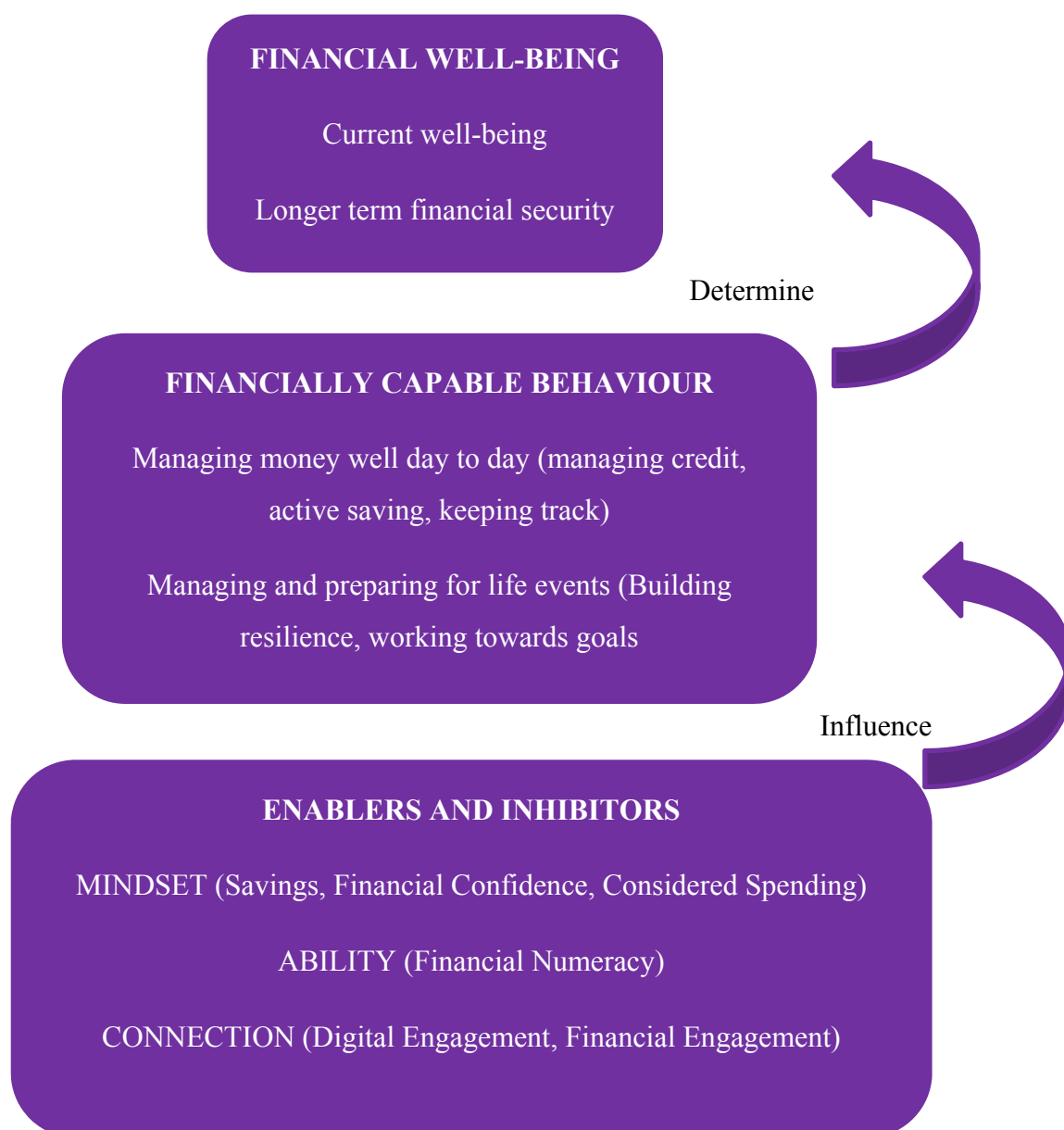
*Figure 6* Model of Financial Capability. Adapted from 'The Financial Capability Strategy for the UK', Money Advice Service*, 2015.

2.2.5   <u>A New Definition and Model of Pension Literacy</u>

As discussed, some studies in the academic literature have defined financial literacy according to financial knowledge (Alessie et al., 2011; Lusardi, 2008a; Lusardi & Mitchell, 2011d). However, other studies have applied broader definitions that allude to financial capability, justifying the inclusion of many more elements in addition to just knowledge of financial concepts (Hastings et al., 2013; Hung, Parker, et al., 2009; Huston, 2010; Money Advice Service, 2014, 2015; Remund, 2010). This suggests a

complex model incorporating elements or traits that contribute to a person being deemed financially literate, including elements of personality, such as confidence. These definitions informed a definition of pension literacy.

The Personal Finance Research Unit in the U.K, argued that the skills required for retirement planning include a number of complex considerations, different to those required for day to day money management[28] (The Personal Finance Research Center, 2017). With this in mind, the definition of pension literacy adopted in this study was derived from both the academic literature and public policy papers, using the elements of their definitions of financial literacy, justified as applicable specifically to pension literacy. It is as follows:

> *Pension literacy is one's knowledge and skills in relation to pensions that are sufficient to make effective and optimal choices about ones' own retirement. This includes assessing ones' own level of pension knowledge accurately and having the confidence, motivation, appropriate attitude, mind-set and communication skills to consult with sources of advice and guidance when and as required.*

This is supported by the model in Figure 7 (p.62). The model shows two sets of drivers that may affect actual and perceived pension knowledge and skills (including financial and digital skills). The first set, derive from an individuals' background such as experiences (for example, having had a pension in the past), education (both general education and access to pension specific education, such as pension seminars), and opportunity (for example, resulting from higher levels of wealth or being in employment that offer an occupational pension scheme). The second set, relate to individuals' personal characteristics (that could be influenced by the first set of drivers) such as confidence, attitudes, mind-set, communication skills and motivation in relation to pensions. Personal characteristics and background may have a direct impact on financial behaviour, as well as having the potential to influence both actual and perceived pension knowledge and skills, which in turn also affect financial behaviour (in this study, seeking financial advice and retirement planning). In chapter 3, this model was applied to ensure that pension literacy was measured effectively in

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[28] Their report cites standard of living, how long money will last, how to manage assets, how to minimise tax and provision for social care as considerations in retirement planning.

the survey. Table 2 (below) summarises the literature from which the pension literacy definition and model were derived.

Table 2 *Sources of Literature informing the Pension Literacy Definition and Model*

| Element of Model | Reference |
|---|---|
| Actual pension knowledge and skills | Hung et al (2009), Remund (2010), Huston (2010), Money Advice Service (2015) |
| Perceived pension knowledge and skills | Hung et al (2009) |
| Confidence | Remund (2010), Huston (2010) |
| Attitude | Money Advice Service (2015), (Ramalho & Forte, 2018) |
| Mind-set Communication | Money Advice Service (2015) Remund (2010), Money Advice Service (2015) |
| Motivation | Money Advice Service (2015) |
| Experience | Huston (2010), Money Advice Service (2015) |
| Education | Huston (2010) |
| Opportunity | Money Advice Service (2015) |
| Financial behaviour | Hung et al (2009), Remund (2010), Huston (2010), Money Advice Service (2015) |
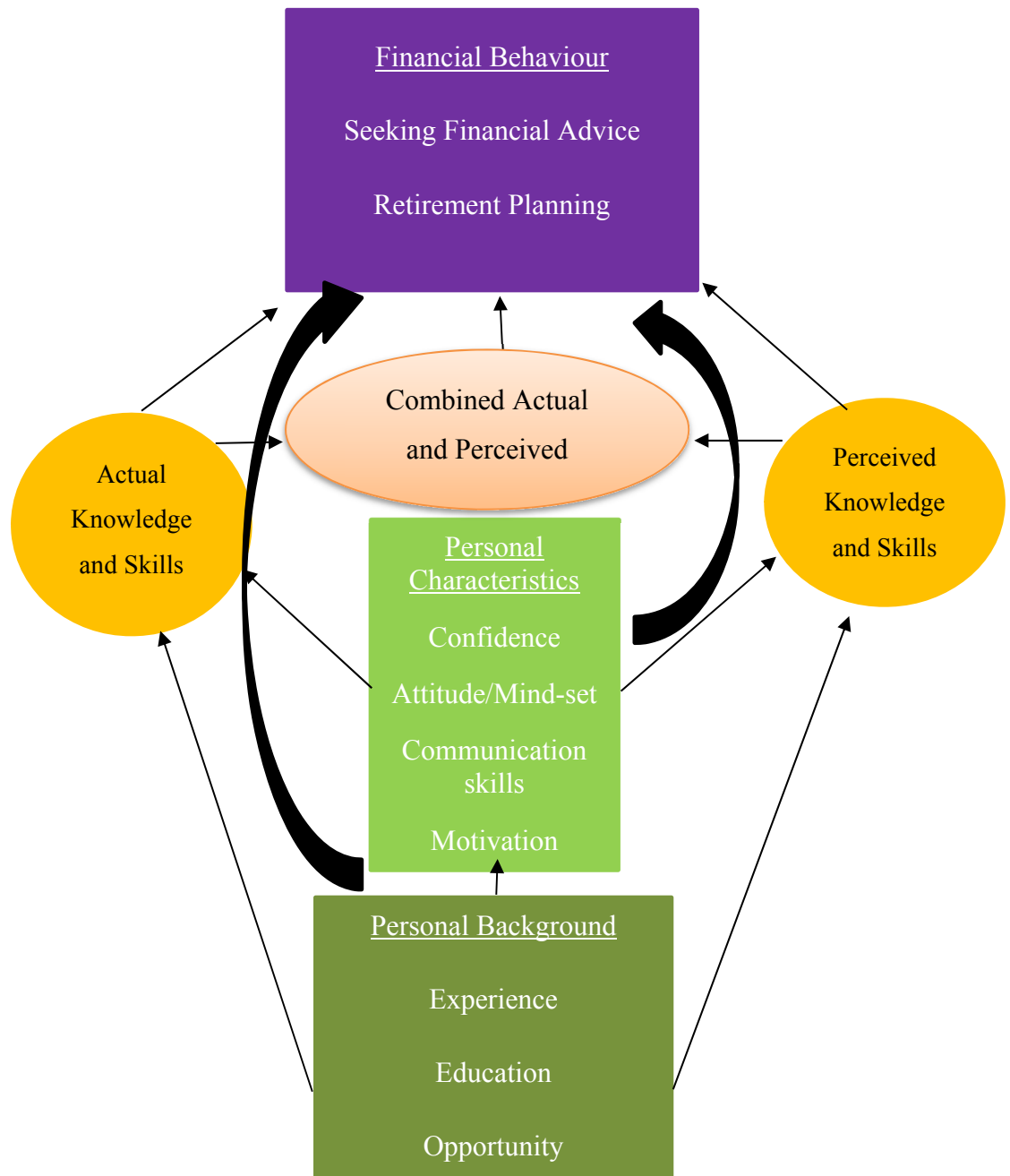
*Figure 7* Model of Pension Literacy (Author's own)

From this section, the following research question was derived:

Research question 1: Can individuals assess their own level of pension literacy accurately? (Section 2.2.3)

This was addressed by testing the following hypothesis:

$H_1$: There is a relationship between individuals' actual and perceived pension literacy.

The remainder of this chapter reviews the literature in relation to the remaining themes as discussed in the introduction.

## 2.3 Financial Literacy and Financial Behaviour

### 2.3.1 Introduction

Seeking financial advice and retirement planning are both types of financial behaviour. This study was concerned with the relationship between pension literacy and both of these and the relevant literature is reviewed in later sections of this chapter. As a precursor to this however, there follows a short review of literature exploring financial literacy and other types of financial behaviour. Some of the findings were relevant to this study, the reasons for which are justified in the following sections.

### 2.3.2 Actual Financial Literacy and Financial Behaviour

Many factors influence the financial behaviours displayed by individuals, including financial literacy (Allgood & Walstad, 2016). Many definitions of financial literacy include being able to demonstrate effective financial behaviour (Huston, 2010; Money Advice Service, 2014, 2015; Ramalho & Forte, 2018; Remund, 2010; Stolper & Walter, 2017). This has been evidenced across a number of domains, such as investment decisions, credit and debt accumulation, retirement planning and stock market participation.

Research has shown that financial literacy is positively associated with retirement planning (Boisclair, Lusardi, & Michaud, 2015; Lusardi & Mitchell, 2011a; Lusardi & Mitchell, 2007c). Studies have found a positive correlation between financial literacy and participation in the stock market (Balloch et al., 2015; Christelis, Jappelli, & Padula, 2010; Clark, Lusardi, & Mitchell, 2015; Van Rooij et al., 2011a). In particular, studies have demonstrated a positive link between financial literacy and portfolio diversification and the effective management of risks (Calvet et al., 2007; Clark et al., 2015; Gaudecker, 2015; Guiso & Jappelli, 2007). Studies also found a positive association between financial literacy and good investment decisions (Calvet et al., 2007; Gaudecker, 2015). All of these findings are relevant to pension decisions, particularly applicable to individuals who are members of DC schemes (Li, Burr, & Miller, 2019).

There appears to be less research exploring the relationship between financial literacy and areas of personal finance other than savings and investment. In an early study, Hilgert et al (2003) demonstrated that individuals with higher levels of financial literacy are generally better at managing personal finances, including effective budgeting and the management of credit. There are a number of studies showing associations between poor financial literacy and financing mistakes. Examples include paying a high cost for borrowing, such as using payday loans, making suboptimal mortgage decisions or incurring high transaction costs (Disney et al., 2015; Lusardi & Tufano, 2015; Moore, 2003). Individuals with poor financial literacy were also found less likely to use credit cards efficiently and to accumulate large levels of debt (Allgood & Walstad, 2016; Lusardi & Tufano, 2015). Klapper et al (2011), in a study of financial literacy and the financial crisis, suggested that financially literate individuals are more able to deal with macroeconomic shocks. In addition, they are less likely to overreact to changes in financial markets (Browning & Finke, 2015), be more patient when making financial choices (Benjamin, Debastian, & Shapiro, 2013), and exhibit fewer behavioural biases (Grinblatt, Keloharju, & Linnainmaa, 2009).

### 2.3.3 Perceived Financial Literacy and Financial Behaviour

There is evidence in the literature to suggest that both actual and perceived financial literacy affect financial behaviour (Allgood & Walstad, 2016; Asaad, 2015; Henager & Cude, 2016; Kramer, 2016).

Allgood and Walstad (2016) stated that

> '…*it is the combination of actual and perceived financial knowledge that may have the greatest influence on the financial behaviours for improving financial well-being' (*p.695).

They examined the relationship between financial literacy and financial behaviour across five areas: credit cards, financial investments, mortgages and loans, insurance and financial advice seeking. Their results demonstrated that by using a combined measure of objective and subjective[29] financial literacy, it was possible to predict financial behaviours more effectively than with objective measures alone. They advised that future research should use both measures. This supports other previously

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[29] Allgood and Walstad use the terms 'objective' and 'subjective' instead of 'actual' and 'perceived' to mean the same thing.

discussed work that argued perceived knowledge to be an element of financial literacy (Hung, Parker, et al., 2009).

Confidence is required in order to apply financial knowledge and can be positively associated with good financial decisions (Goel & Thakor, 2008; Hung, Parker, et al., 2009). It has been argued that self-efficacy gives individuals this confidence to take action (Bandura, 1982; Tang & Baker, 2016). However, in order to affect a positive financial outcome, if an individual is overconfident, this could be detrimental (Asaad, 2015). As financial confidence affects financial behaviour, if an individual thinks one knows more than they do, they could make framing errors in decision making or engage in more costly behaviours (Asaad, 2015; Parker et al., 2012). In behavioural finance literature, studies have shown overconfident individuals to believe themselves more able to predict the behaviour of stock markets and consequently to take riskier decisions (Barber & Odean, 2002). Overconfident investors may be unwilling to seek financial advice (Guiso & Jappelli, 2007) and may under-diversify their portfolios (Gaudecker, 2015). In addition, overconfident individuals tend to underestimate risk (Goel & Thakor, 2008). Some of these findings are relevant to pension accumulation decisions, for example, in allocating funds over alternative asset classes or levels of risk.

2.3.4   Conclusions on Financial Literacy and Financial Behaviour

The main concepts to emphasise from this section are as follows: It is essential to consider the relationship between both actual and perceived financial literacy and financial behaviour (Allgood & Walstad, 2016). This is particularly important, as they do not always positively correlate with each other (Asaad, 2015; Parker et al., 2012). Although confidence is important to effectively apply financial knowledge, of concern are overconfident individuals, whose perceived knowledge is higher than their actual knowledge. The evidence suggests that this group may be at risk of displaying poor financial behaviour, a major concern in the context of this study. Of further concern, these individuals have been found to be least financially literate (Allgood & Walstad, 2016; Gentile, Linciano, & Soccorso, 2016). Table 3 (below) summarises the main findings from the literature in relation to financial literacy and financial behaviour.

The next two sections review the literature pertaining to the two specific types of financial behaviour relevant to this study; financial advice seeking and retirement planning.

Table 3 *Summary of Literature: Financial Literacy and Financial Behaviour*

| Studies | Personal Finance Domain | Findings |
| --- | --- | --- |
| Boisclair et al (2015), Bucher-Koenen and Lusardi (2011), Lusardi and Mitchell (2007c), Van Rooij et al (2012). | Retirement planning | Individuals who are more financially literate are more likely to plan for retirement. |
| Balloch et al (2015), Christelis et al (2010), Clark et al (2015), Van Rooij et al (2011). | Investment | Individuals who are more financially literate are more likely to participate in the stock market. |
| Calvert et al (2007), Clark et al (2015), Gaudecker (2015), Guiso and Jappelli (2007) | Investment | Individuals who are more financially literate diversify their portfolios and manage risks more effectively. |
| Calvert et al (2007), Gaudecker (2015) | Investment | Individuals who are more financially literate make better investment decisions. |
| Hilgert et al (2003) | Budgeting and management of credit | Individuals who are more financially literate budget and manage credit more effectively. |
| Disney et al (2015), Lusardi and Tufano (2015), Moore (2003) | Borrowing | Low literates pay higher costs of borrowing, are more likely to use payday loans, make suboptimal mortgage choices and are more likely to incur higher transaction costs. |
| Allgood and Walstad (2016), Lusardi and Tufano (2015) | Borrowing | Low literates are less likely to use credit cards effectively and are more likely to accumulate large levels of debt. |
| Klapper et al (2012) | Investment | Individuals who are more financially literate are more able to deal with macroeconomic shocks. |
| Browning and Finke (2015) | Investment | Individuals who are more financially literate are less likely to overreact to changes in financial markets. |

| | | |
|---|---|---|
| Benjamin et al (2013) | Multiple domains | Individuals who are more financially literate are more patient when making financial choices |
| Grinblatt et al (2012) | Investment | Individuals who are more financially literate show fewer behavioural biases. |
| Allgood and Walstad (2016) | Debt, Investment, Insurance and financial advice seeking | Both perceived and actual measures of financial literacy are more useful in predicting financial behaviour than only using actual measures. |
| Goel and Thakor (2008), Hung et al (2009) | Multiple domains | Confidence is required to apply financial knowledge and make good financial decisions. |
| Asaad (2015), Parker et al (2012) | Investment | Overconfident individuals are more likely to make framing errors and engage in costly investment behaviours. |
| Barber and Odean (2000) | Investment | Overconfident individuals may take riskier decisions as they believe they can predict the movement of the stock market. |
| Guiso and Jappelli (2007) | Financial advice | Overconfident individuals are less likely to seek financial advice. |
| Gaudecker (2015) | Investment | Overconfident individuals are more likely to under diversify their investment portfolios. |
| Goel and Thakor (2008) | Investment | Overconfident individuals underestimate risk. |

## 2.4 Financial Literacy and Financial Advice

### 2.4.1 Introduction

This section reviews the literature concerning the association between financial literacy and the propensity to seek financial advice. It begins by asking whether seeking financial advice is desirable and why this may the case. Studies that have attempted to identify the demographic characteristics of individuals who are most likely to seek financial advice are then briefly reviewed, followed by a more detailed consideration of the relationship between financial literacy and financial advice seeking. In particular, the debate in the literature as to whether financial advice is a complement to, or a substitute for, financial literacy is presented. Finally, there is a brief review of studies relating to the association between financial advice and financial behaviour

### 2.4.2 Is Financial Advice seeking Desirable?

Early studies found that seeking financial advice is desirable and correlates positively with well-being and other improved financial behaviours (Atkinson et al., 2007; Xiao et al., 2014). These findings were supported in a more recent U.K study, that found individuals who use financial advisors accumulate higher levels of pension wealth, have increased savings in equity asset classes and receive more income in retirement (Brancati, Franklin, & Beach, 2017).

In the context of the 2015 Pension Freedoms, financial advice is required for many, but not all, individuals depending on their circumstances. The free guidance offered under the brand 'Pension Wise' is generic and not specific to an individual's personal situation (Financial Conduct Authority, 2016a; Thurley, 2015). Two years since the implementation of the reforms, the Personal Finance Research Centre found only 34% of pre-retired and 35% of retired individuals had used a financial advisor for pensions advice (The Personal Finance Research Center, 2017).

Blanchett and Kaplan (2013) used a measure, gamma[30], to quantify the benefit of financial advice. Gamma was based on five financial planning decisions/techniques and quantified the extra financial value gained by making superior investment

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[30] The authors developed the concept 'Gamma' to quantify how superior financial planning choices can add value. They measured gamma using a certainty-equivalent, utility adjusted retirement income metric focused on five planning techniques/decisions.

decisions. They found by using an advisor, retirement income could be increased by 22.6%. Following a similar approach, Grable and Chattterjee (2019) applied a measure zeta[31] to show that portfolio volatility and loss were reduced in periods of economic uncertainty when individuals used the services of a financial advisor. This was found to be particularly significant in the period following the 2008 financial crisis. From a psychological perspective, individuals who use a financial advisor, have been found to be more likely to set long term goals and to be more confident about their pension plans (Park & Yao, 2015).

### 2.4.3 Drivers of seeking Financial Advice

Research has shown that in terms of demographics, wealth, income, educational achievement and older age are factors positively associated with financial advice seeking (Hanna, 2011). This was supported by Finke, Huston and Winchester (2011) who found older, wealthier, more educated and female individuals more likely to seek advice. This was also the case for individuals with a higher tolerance for risk (Hanna, 2011) and higher self-efficacy (Lim, Heckman, Letkiewicz, & Montalto, 2014). Individuals aged 20–30 and in their mid-50's to mid-60's have been found more likely to seek advice than other age groups, perhaps reflecting the timing of mortgage and pension choices. Wealthier and self-employed individuals have been found more likely to seek financial advice than less wealthy and employed individuals (Brancati et al., 2017). Individuals with large pension pots have also been found more likely to seek advice (The Personal Finance Research Center, 2017).

There are many reasons why individuals may be reluctant to seek financial advice. These include lack of trust in financial advisors (Brancati et al., 2017; Georgarakos & Inderst, 2011; The Personal Finance Research Center, 2017) for individuals with both low and high financial literacy (Lachance & Ning, 2012); cost (Lachance & Ning, 2012; The Personal Finance Research Center, 2017; Thurley, 2015); myopia (Godek & Murray, 2008); a low perception of value gained (Wei, Zhao, & Zheng, 2016); and

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[31] Zeta is a function of alpha (the additional value gained over and above the market return, typically what financial advisors are expected to produce for their clients), and gamma (the value added through financial planning beyond management of portfolio assets). Zeta, represents the value of financial advice in that it reduces the volatility of assets in a client's portfolio.

an inability to assess value, due to the intangibility of the service (Gough & Nurullah, 2009).

In a recent U.K study, trust and financial capability were shown to be the most significant factors as to whether individuals were likely to seek financial advice, with lack of trust in advisors the strongest driver (Brancati et al., 2017). It was found that in the case of individuals with high financial capability, women were more likely to seek advice than men. However, this was reversed when financial capability was low. Low earners with high levels of financial capability, were nearly just as inclined to seek advice as high earners with low levels of financial capability, implying that financial capability is a stronger driver of advice seeking than wealth.

The literature on the drivers of financial advice seeking is extensive and although many of these factors were important, they were beyond the scope of this study that examined the effect of pension literacy on the propensity to seek financial advice. The rest of this section considers the literature concerning financial literacy and financial advice specifically.

### 2.4.4    Is Financial Advice a Complement to, or a Substitute for, Financial Literacy?

A debate exists in the literature as to whether financial literacy and financial advice are complements to, or substitutes for, each other. If a complementary relationship exists (financially literate individuals are more likely to seek advice), there are important implications for policy in ensuring that less literate individuals, in need of more help, have access to it. The following narrative presents a series of academic papers that addressed this issue. They are presented together, as parts of their methods were adapted for this study (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Porto & Xiao, 2016).

Willis (2011) argued that it is not possible, or desirable, to turn people into financial experts, a view supported by the Money Advice Service (2015). As such, delegating financial decisions to an expert makes sense, suggesting that financial advice is a substitute for financial literacy. However, for this to be effective, individuals with poor financial literacy must seek advice in the first place. These individuals may find collecting and processing financial information more difficult (De Zwaan et al., 2017). Therefore, in seeking advice, it has been argued, this group save more time and effort

than do individuals with higher levels of financial literacy (Stolper & Walter, 2017). However, there is no guarantee they will do so.

Disney et al (2015), in a U.K study about credit advice, also argued that professional advice is a substitute for financial literacy. They found individuals with higher levels of financial literacy to be 60% less likely to use the service of a credit counsellor. Therefore, for individuals with low levels of financial literacy, debt advice provides a safety net. Hung and Yoong (2010) also supported the idea that financial advice is a substitute for financial literacy in a U.S study of DC pension scheme members. Individuals with low levels of financial literacy were more likely to solicit advice in relation to portfolio choices, in a hypothetical choice experiment aimed at examining whether behaviour changed as a result of financial advice.

In a U.S study, Robb et al. (2012) argued that individuals make decisions to seek financial advice based on the trade-off between the time taken to make the decision themselves (time intensive) and using a financial advisor (cost intensive). They studied the relationship between financial literacy and financial advice in relation to credit/borrowing, savings and investment and comprehensive planning advice. They found, like Disney et al (2015), that financial literacy was negatively related to debt counselling, but unlike Disney, positively related to advice seeking in other areas. This suggested that in everything but debt advice, a complementary relationship between financial literacy and financial advice exists. This was supported by Collins (2012), although using U.S data from 2009. He found individuals with higher incomes, educational achievement and financial literacy more likely to seek financial advice.

This complementary relationship was also observed in a more recent U.S study that used longitudinal data to examine the relationship between financial literacy, financial confidence and the demand for financial advice (Seay et al., 2016). Results showed both financial literacy and financial confidence to be positively associated with seeking financial advice, controlling for trust. They also found that financial literacy was higher in individuals that used the services of a financial advisor and retained their services, as opposed to individuals that discontinued using a financial advisor, having previously done so. This is not surprising, one could argue the experience of using an advisor over a prolonged period is more likely to impact financial literacy positively than a one off encounter. It suggests however, that seeking advice influences financial

literacy, not the other way round. Moulton, Loibl, Samak and Collins (2013) also found financial confidence and financial advice seeking positively associated in another U.S study. This supports the inclusion of financial confidence in the definition of pension literacy, as without it an individual may not approach an advisor in the first place. However, financial confidence may not be indicative of actual financial literacy, as has been argued previously (Allgood & Walstad, 2016).

Calcagno and Monticone (2015) argued that financial literacy and financial advice are complements, not substitutes. Applying a quantitative methodology, they assessed the relationship between the two using a model of portfolio allocation. Participants in their study decided whether to delegate portfolio allocation choices to an informed financial advisor or make the choices themselves. Findings showed that individuals with low levels of financial literacy were less likely to seek financial advice. They concluded that in order to benefit from financial advice, financial literacy is required, making them complements to each other.

Allgood and Walstad (2016), in a U.S study, asked survey participants about financial advice seeking in relation to aspects of personal finance. By categorising participants into four groups according to their actual and perceived financial literacy[32], they examined the relationship between financial literacy and financial advice seeking. Like Calcagno and Monticone (2015), they argued that financial literacy and financial advice are complements and hypothesised that individuals with high financial literacy are more likely to seek financial advice. This they argued, is because these individuals have a higher level of awareness of the potential gain or loss resulting from financial decisions[33]. In support of this, they found the group with both high actual and perceived financial literacy more likely to seek advice than the group where these were both low. They also found that individuals' perceived and actual financial literacy were not always reflective of each other, with some individuals basing the decision to seek financial advice on their perceived, not their actual knowledge. Individuals who perceived their financial literacy to be high were more likely to seek financial advice.

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[32] The groups were 'high perceived, high actual', 'high perceived, low actual', 'low perceived, high actual' and 'low perceived, low actual'. Participants were allocated according to whether they scored above or below the mean score when actual and perceived financial literacy were assessed.

[33] The exception to this was financial advice in relation to debt, where a negative relationship was expected. This is because debt has to be a problem before an individual seeks advice. Their findings confirmed this.

This effect was stronger for individuals whose actual financial literacy was low rather than high. They found that when perceived financial literacy was high, the contribution to the decision made by actual financial literacy was relatively small. This they argued, highlighted the importance of considering a combined measure of actual and perceived financial literacy in examining any association with financial behaviour. It also supports the inclusion of both actual and perceived pension literacy in this study.

In the same year, Kramer (2016) carried out research in the Netherlands that stressed the importance of perceived financial literacy, specifically on the propensity to seek financial advice. He examined separate and combined measures of actual and perceived financial literacy, particularly focusing on the role of overconfidence. Similar to Allgood and Walstad (2016), Kramer identified four groups to classify individuals.[34] Individuals with low actual, but high self-assessed financial literacy were deemed overconfident. Findings showed the groups with high levels of self-assessed financial literacy, or confidence, were less likely to seek financial advice. Additionally, the most confident households sought advice approximately half as much as households with comparatively lower levels. This effect was most prominent in wealthy households. This, Kramer suggested, in contrast to Calcagno and Monticone (2015) and Allgood and Walstad (2016), was that financial advice and self-assessed financial literacy are substitutes to each other. This is specifically the case, he argued, when applied to groups for whom careful decision-making is important, such as the wealthy and those with poor financial knowledge. Given that most individuals cannot easily measure their actual financial knowledge, Kramer argued it more likely the decision to seek advice will be based on what individuals think they know, which may or may not be reflective of their actual knowledge. Kramer advised policy makers not to rely on financial advice to counter the effects of poor financial literacy, as individuals who have high perceived levels of knowledge are unlikely to seek help. He argued that alternatively, efforts should be made to improve individuals' perceptions of their own knowledge, as changes in financial behaviour may be more effectively prompted by these improvements, as opposed to changes in actual knowledge.

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[34] These were the same as Allgood and Walstad (2016) but terminology differs in that 'perceived' is replaced with 'self-assessed'.

In Italy, Gentile et al (2016) studied the relationship between financial literacy, overconfidence and the propensity to seek financial advice in a sample of households. Their sample was split into three groups representing under-confidence, overconfidence and appropriate confidence[35]. Confirming other studies (Allgood & Walstad, 2016; Calcagno & Monticone, 2015; Porto & Xiao, 2016), they found financial literacy positively related to the demand for financial advice, suggesting a complementary relationship. They also found evidence, supporting Kramer (2016), that financial advice seeking was negatively correlated to overconfidence. Findings also showed perceived financial literacy to be significantly and negatively associated with high levels of actual financial literacy, showing some individuals were unable to assess their own financial literacy. This was more prevalent among male, wealthy and risk averse individuals. Gentile et al (2016) supported Kramer and argued that financial regulation, such as capping advisor charges, was not enough to protect those with low levels of financial literacy, as they are unlikely to seek financial advice. Efforts at education should be aimed, not only at raising levels of financial literacy, but also raising individuals' awareness of their own capabilities, thus minimising overconfident behaviours and behavioural biases.

Finally in this section, Porto and Xiao (2016) also studied overconfidence and financial advice seeking in the U.S. In a similar way to Allgood and Walstad (2016), and Kramer (2016), they used four groups to classify individuals according to their levels of actual and perceived financial literacy[36]: Their findings showed the 'competent' group likely to seek advice in all domains tested (debt, savings and investments, mortgages and loans, insurance and tax planning). This group used financial advice to confirm their existing knowledge, using financial advice as a complement to their own financial literacy, confirming other studies (Collins, 2012; Seay et al., 2016). The 'naïve' group were less likely to seek financial advice in all domains excluding debt, so for this group financial advice was more remedial (Moulton et al., 2013). Porto and Xiao (2016) found overconfident individuals twice as likely to receive debt advice than the other groups but less likely to seek advice regarding investments, which could apply to pensions. This group were less likely to

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[35] This was defined as when actual and perceived literacy were both the same.
[36] These are overconfident (low objective, high subjective), under-confident (high objective, low subjective), competent (both high), and naïve (both low).

seek advice in areas that would help them to wealth maximise, confirming other studies (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016). Porto and Xiao argued that overconfident consumers are less likely to seek financial advice because they believe they already have the knowledge required to make financial decisions.

This view was supported in a review of U.K studies into financial capability and retirement planning carried out on behalf of the Money Advice Service (The Personal Finance Research Center, 2017). It found that in a study of DC pension savers post pension freedoms, individuals with high levels of confidence did not perceive the need to seek advice[37].

Table 4 (below) summarises the findings of the literature in relation to financial literacy and seeking financial advice, particularly the debate as to whether financial advice is a complement to, or substitute for, financial literacy. The following section considers the association between financial advice and financial behaviour.

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[37] 81% of individuals with high confidence did not use advice, as opposed to 60% of individuals with medium confidence and 55% of those with low confidence. The study was from Optimisa Research, Retirement Choices: Measuring the effectiveness of the code of conduct following its implementation (London: ABI, 2014, p.22)

Table 4 *Summary of Key Literature: Financial Advice and Financial Literacy, Complements to, or Substitutes for?*

| Study | Country of Study | Finding | Substitute or Complement |
|---|---|---|---|
| Willis (2001), Money Advice Service (2015) | U.S | Individuals are not and should not be expected to be financial experts. | Substitute |
| Disney et al (2015) | U.K | Individuals with low levels of financial literacy are more likely to seek debt advice. | Substitute |
| Hung and Yoong (2010) | U.S | Individuals with low levels of financial literacy seek financial advice regarding portfolio pension choices. | Substitute |
| Robb et al (2012) | U.S | Financial literacy is negatively related to debt counselling. | Substitute |
| Robb et al (2012) | U.S | Financial literacy is positively related to savings and investment and comprehensive financial planning advice. | Complement |
| Collins (2012) | U.S | Individuals with higher incomes, educational achievement and financial literacy are more likely to seek financial advice. | Complement |
| Seay et al (2016) | U.S | Financial literacy and financial confidence are positively correlated with financial advice, after controlling for trust. | Complement |
| Moulton, Loibl, Samak and Collins (2013) | U.S | Financial confidence is positively related to seeking financial advice. | Complement |
| Calcagno and Monticone (2015) | U.S | Individuals with low levels of financial literacy are less likely to delegate portfolio choices to an advisor. | Complement |

| Allgood and Walstad (2016) | U.S | Individuals base decisions to seek advice mostly on perceived knowledge, when this is high, they are more likely to seek advice. | Complement (based on perceived knowledge) |
|---|---|---|---|
| Kramer (2016) | Netherlands | The most confident households (high-perceived financial literacy) seek advice only about half as much as the less confident households do. Most prominent in wealthy households. Overconfident households are less likely to seek financial advice. | Substitute (based on perceived knowledge) |
| Gentile et al (2016) | Italy | Financial literacy is positively correlated to seeking advice. | Complement (based on actual knowledge) |
| Gentile et al (2016) | Italy | Overconfident individuals will not seek advice as they make decisions based on perceived and not actual knowledge. | Substitute (based on perceived knowledge) |
| Porto and Xiao (2016) | U.S | 'Competent' are (high perceived and actual financial literacy) more likely to seek advice. | Complement |
| Porto and Xiao (2016) | U.S | Individuals that are 'naïve' (low perceived and actual financial literacy) are less likely to seek advice in all domains apart from debt. | Substitute for debt. Complement for other categories in study. |
| Porto and Xiao (2016) | U.S | Overconfident individuals are twice as likely to receive debt advice but are less likely to receive advice on investments. Overconfident individuals are likely to base the decision to seek advice on perceived, not actual knowledge. | Complement for debt advice. Substitute for investment advice based on perceived knowledge). |
| Stolper (2015) | Germany | More financially literate individuals are less likely to follow financial advice as they have an 'outside option'. Less literate individuals are more likely to follow financial advice, as they do not have the ability to consider alternatives themselves. | Substitute |

| The Personal Finance Research Centre (2017) | UK | Individuals with large pension pots are more likely to seek advice. There is a link between seeking advice and confidence. Individuals who are more confident are less likely to seek advice. | Substitute based on perceived knowledge. |

2.4.5   Does Financial Literacy affect the Propensity to Follow Financial Advice?

Seeking financial advice does not ensure that the best financial outcome will be achieved, especially if an individual does not follow the advice. This section reviews a selection of literature that examines the relationship between financial advice and financial behaviour. Most studies on financial literacy and financial advice stop short of examining this link[38] (Stolper, 2015). This short section aims to provide additional insight into the implications of seeking financial advice. It is so closely linked to the themes so far discussed, to leave it out would be an omission detrimental for a full representation of the literature. However, it was not tested empirically in this study. In addition, the section touches on the effect of education on financial behaviour. This is outside the scope of the study, but is briefly covered at the end of the section for completeness.

In Germany, Bhattacharya et al (2012) investigated the behaviour of customers of a large brokerage firm who were offered investment advice in the absence of moral hazard[39]. They found that not only did those who need advice most, often failed to obtain it, of individuals who did seek advice, most did not follow it. This was confirmed by later studies (Allgood & Walstad, 2016; Calcagno & Monticone, 2015), for individuals who did follow the advice, portfolio efficiency improved, as opposed to individuals who did not. Wealthier clients and clients with lower risk portfolios were also found to have followed financial advice. However, their research was unable to identify reasons why individuals did not follow advice, having been given it.

Stolper and Walter (2015) extended the work of Bhattacharya et al (2012) by asking clients of a German advisory firm if the subject of advice influences whether it is followed. Their study examined advice concerning retirement savings and insurance of major life risks, as opposed to investment advice. It tracked the behaviour of 6,000 clients given advice free from agency conflicts, comparing individuals' post advice actions with the recommendations of the advisor. They found two thirds of clients ignored the advice (after a period of three months, 55.9% of clients had taken no action

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[38] In Stolper et al (2017), the authors identify 14 studies of financial literacy and financial advice, only four explore financial advice and its effect on behaviour.
[39] Moral hazard exists in a situation where the advisor is seen as biased due to being incentivised to sell the financial products that are being advised. This was addressed in the U.K by the Retail Distribution Review in 2012.

and 10.8% made decisions completely unconnected to the advice given). In addition, they found financially literate individuals less likely to implement financial advice.

Stolper and Walter (2015) attempted to rationalise the findings from previous literature, arguing that financial sophistication in relation to financial advice comprises of two elements. The first is the ability to understand the advice and the second is the ability to question and process the information. This latter ability has been referred to as an 'outside option' (Bucher-Koenen & Koenen, 2015). It was argued that if an individual is able to understand advice, they are more likely to pay to obtain it. However, if an individual is able to question the advice and seek out alternative information, they may be less likely to follow it. The less financially literate, Stolper and Walter (2015) argued, do not have an outside option. Therefore, they are more likely to follow advice as they lack the financial sophistication to make an alternative choice:

> *'As a result, the literature distinguishes two groups of individuals: the less financially sophisticated who need to rely on advice and the more financially savvy who are able to make their own judgement' (p.4).*

A U.K study in 2012 focused on financial advice seeking in respect of the shift from DB to DC pensions, prior to the introduction of the Pension Freedoms (Turner & Muir, 2012). Findings showed poor financial literacy to be a barrier for individuals when it came to following financial advice, quoting jargon and confusing terminology as specific problems. It was argued, not only do individuals lack the financial literacy to follow advice, they also lack sufficient interest to improve their financial literacy as a consequence of interacting with an advisor.

Brancati et al (2017) studied 17,520 consumers from the U.K that took advice in the period 2001-2007, focusing on their financial outcomes in 2012-2014. They found that having taken financial advice, nine out of ten individuals followed it and the majority (62%), did not seek a second opinion. This implies that motivating individuals to seek advice in the first instance is the issue to which the financial services industry should be concerned, as most are then likely to follow it. However, not all research supports this.

It was argued in the previous section that individuals with higher levels of financial literacy may be more likely to seek financial advice, although this has been found to

be the reverse for overconfident individuals (Calcagno & Monticone, 2015; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016). However, Bucher-Koenen and Koenen (2015), in a study of German households, found individuals with better financial knowledge less likely to follow the advice of financial advisors in relation to private pensions. Hackethal et al (2010) in a study of German brokerage clients, found those more likely to follow advice perceived their own financial knowledge to be low and that of the advisor to be high. Clients who were more knowledgeable were less likely to implement advice, suggesting a negative relationship between financial literacy and following advice. In a similar study, Georgarakos and Inderst (2011), based on a sample of investors across Europe, found that only investors with perceived low financial knowledge were more likely to rely on financial advisors.

Calcagno and Monticone (2015), in their study of bank customers in Italy, found financially literate customers more likely to seek advice. They surmised this was because these customers appreciate the potential value of the information provided by an advisor. However, this group was less likely to permit an advisor to assume full responsibility for their portfolio choices, whereas customers with low levels of financial literacy were more likely to fully delegate portfolio decisions. This suggests that financial literacy is relevant to the decision of whether to follow advice and seems to support the idea of an 'outside option' (Stolper, 2015).

Studies have examined the effect of financial education on financial behaviours. Financial education is not the same as financial advice. However, education may also act as a complement to an individuals' financial literacy in the same way that financial advice has been argued to do (Kramer, 2016). The empirical evidence showing effects of financial education on improving levels of financial literacy is mixed. Some studies have shown that financial education has the most effect on individuals with the lowest level of general education and wealth (Caskey, 2006; Clark, d'Ambrosio, McDermed, & Sawant, 2003; Elmerick et al., 2002; Lusardi, 2002, 2004) and that it may increase the willingness to rely on an expert for advice (Elmerick et al., 2002). However, other studies have found that education does not often result in changed behaviours (Choi, Larrick, Madrian, & Metrick, 2006) and that overconfidence can be made worse with an assurance that one has completed a course (Willis, 2008). It has been argued that unbiased financial advice, not education, may be a faster way to achieve desirable

behaviour in relation to pension choices, which has an effect in the medium to long term only (Collins, 2012).

### 2.4.6 Conclusions on Financial Literacy and Financial Advice

The majority of evidence appears to show that financial literacy and financial advice are complements, not substitutes. This means that individuals who are more financially literate are more likely to seek financial advice (Allgood & Walstad, 2016; Calcagno & Monticone, 2015; Gentile, Linciano, & Soccorso, 2016; Porto & Xiao, 2016; Robb et al., 2012). However, it has been shown in some studies that individuals make the decision on whether to seek financial advice based on their perceived and not their actual financial literacy (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016). When considering individuals with high perceived financial literacy, particularly those who are overconfident, studies have indicated this group to be less likely to seek financial advice (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016). This was important for this study. It indicates that encouraging the public to access financial advice about their pensions by addressing issues such as cost and trust in financial services, is counterproductive when consumers may not seek it for the above reasons.

In support of the argument that financial literacy and financial advice are complements, Calcagno and Monticone (2015) argued that financial advisors seek out consumers who are more knowledgeable. Robb et al (2012) acknowledged the possibility that clients with greater resources are more likely to be attractive to advisors. This is concerning if financial advice is important for individuals making pension choices. If the less wealthy, or less financially literate, need financial advice, there may be a reluctance from the industry to supply it. This is likely to widen the advice gap further (Financial Conduct Authority, 2016a).

The importance of both actual and perceived financial literacy has become clear in the preceding text, as both drive the propensity to seek financial advice in different ways and they are not always reflective of each other (Allgood & Walstad, 2016). Hence, in this study, both measures were tested for their association with the propensity to seek financial advice, both individually and combined together. Allgood and Walstad (2016) argued that

*'Future research should take into account both what people know about financial matters and also what they think they know when controlling for financial literacy. Both financial knowledge and perception appear to affect financial literacy and in turn appear to affect financial behaviour…'* (p 695).

There is limited research about the reasons why individuals do or do not follow financial advice (Stolper & Walter, 2017). However, following advice has been shown to lead to favourable outcomes (Bhattacharya et al., 2012). Financially literate individuals are more likely to seek advice, with those who are in most need, those with poor financial literacy, less likely to seek it. However, financially literate individuals are less likely to follow advice, this may be because of the presence of an 'outside option' (Stolper, 2015). This supports the argument that for this group, financial advice is a complement to their existing knowledge. Individuals with poor financial literacy see financial advice as a substitute for their lack of knowledge. Therefore, they are more likely to follow financial advice, as they lack the ability to consider alternative options (Hackethal et al., 2010; Stolper, 2015). Whether individuals follow pension advice provided by financial advisors was outside the scope of this study. However, the literature was sufficiently brief to have covered here. Its inclusion is justified as it provides additional context and emphasises the importance of seeking advice in the first place.

This study addressed the relationship between pension literacy and the propensity to seek financial advice in relation to the 2015 Pension Freedoms. The following research questions were derived:

Research question 2: What is the relationship between pension literacy and the propensity to seek financial advice in relation to pensions? (Section 2.4.2 and 2.4.3)

Research question 3: Are pension literacy and financial advice seeking complements to, or substitutes for, each other? (Section 2.4.4)

These were both addressed by testing the following hypotheses:

$H_2$: There is a relationship between individuals' actual pension literacy and seeking pension advice.

*H3*: There is a relationship between individuals' perceived pension literacy and seeking pension advice.

*H4*: There is a relationship between individuals' combination of actual and perceived pension literacy and seeking pension advice.

The next section reviews the literature concerning the effect of financial literacy on retirement planning and decision making.

## 2.5   Financial Literacy and Retirement Planning

### 2.5.1   Introduction

This section reviews the literature concerning financial literacy and retirement planning. This study focused on planning for retirement and the pension choices made leading up to and into retirement. Therefore, it was also interesting to first consider whether financial literacy changes with age. This literature is explored in section 2.5.2. Following this, there is a review of studies that examine the relationship between financial literacy and retirement planning and ultimately how this affects wealth accumulation in retirement.

Rising life expectancy, falling birth rates and the pressure on both state and private pensions over recent years has led to a shift from DB to DC pension schemes (Financial Conduct Authority, 2016b). This has placed more responsibility for retirement planning and decision making on individuals, requiring them to save, invest and spend money effectively over their lifetime (Finke, Howe, & Huston, 2017). In the U.K, implementation of the 2015 Pension Freedoms gave individuals more choices at and into  retirement, including the option to withdraw their pension savings from the age of 55 (HM Treasury, 2014). There are risks that individuals may under-save, invest poorly and even run out of money in retirement (Money Advice Service, 2015). It can be argued that this risk is higher when knowledge about pensions is poor (Hannant, 2015). A recent evidence review, conducted on behalf of the Money Advice Service, found that individuals fail to plan for retirement because of their short term time horizons. They also have difficulty dealing with unknowns, such as care costs and their own longevity. In addition, lack of pension knowledge was cited as a reason for lack of engagement with retirement planning (The Personal Finance Research Center, 2017).

2.5.2   Age and Financial Literacy

In some areas of personal finance, there is evidence that the quality of financial decision-making declines with age. In a U.S study, Finke et al (2017) found a consistent linear decline in financial literacy after aged 60, consistent across various demographic subgroups. Other studies however, have shown the ability to make effective investment choices improves with age, up to the age of 70, but then declines (Korniotis & Kumar, 2009). Specifically, U.S research has shown that the quality of credit decisions and resistance to other behavioural biases, such as framing, declines with age (Agarwal, Driscoll, Gabaix, & Laibson, 2009; Parker et al., 2012). These findings supported earlier work in the U.S, Canada and Germany, showing financial literacy in older age groups as low (Lusardi, 2012; Lusardi & Mitchell, 2011b, 2011d). Finke et al (2017) argued that older age groups in the U.S specifically, may have lower levels of financial literacy due to having had less experience of 401(k) pension schemes[40], having lower levels of higher education, and in the case of women, having delegated financial decisions to men.

Yi, Burr and Miller (2019) in the U.S, investigated the associations between age, financial literacy and the type of pension plan. They found that individuals with DC plans, either with or without additional DB plans, were more financially literate. Yi et al (2019) surmised that older individuals nearing retirement, required to manage DC schemes, self-educate to improve their financial skills and knowledge resulting in higher levels of financial literacy. This also suggests an experiential approach to raising financial literacy by exposure to financial decision-making opportunities. These findings also support the inclusion of 'experience' in the pension literacy model, as they suggest that individuals gain financial literacy as a consequence of their exposure to financial products, such as pensions.

Another U.S study found that financial capability increased with age. Specifically, financial confidence did not decline with age and overconfidence was positively correlated with older age (Xiao et al., 2015). Conversely, in the U.K, an earlier study conducted by the Financial Services Authority, found financial capability to decline

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[40] These U.S pension schemes require a more active role from pension scheme members when choosing how to invest their pension savings than had been the case previously.

with older age, peaking at around aged 60-70, then declining. This is sometimes called the 'life-stage effect' (Atkinson et al., 2007).

The Institute for Social and Economic Research in the U.K also found a significant correlation between age and financial capability. Individuals younger than aged 45 were found to have below average financial capability, whereas individuals aged 55 and older had higher than average financial capability (Taylor, 2009).

These studies are in part contradictory and the relationship between age and financial literacy in relation to pensions specifically needs further clarification. Therefore, this relationship was examined in this study.

### 2.5.3 Financial Literacy, Retirement Planning and Wealth Accumulation

This section reviews the literature concerning financial literacy and retirement planning. Much earlier work relating to this area is attributed to Lusardi and Mitchell in the U.S. Their financial literacy questions have been added to numerous surveys around the world to infer links between financial literacy and financial behaviour.

Lusardi and Mitchell's three financial literacy questions, reviewed in more detail in chapter 3, were initially added to the 2004 Health and Retirement Study (HRS), a national U.S survey (Lusardi & Mitchell, 2007c). By embedding the questions within large national surveys, due to sample size, they could have more confidence in the generalisability of the findings (Lusardi & Mitchell, 2011d, 2013). Lusardi and Mitchell found that financial literacy was an important determinant of retirement planning having controlled for demographic characteristics (Lusardi, 2015; Lusardi & Mitchell, 2011b).

An international project 'Financial Literacy around the World' (the Flat project) covered eight countries[41] that added Lusardi and Mitchell's questions to national surveys to study the link between financial literacy and retirement planning (Lusardi & Mitchell, 2011d). Table 5 (below) presents a summary of the pertinent findings from these studies[42]. In most countries, it was found that financially literate individuals were more likely to plan for retirement, having controlled for economic characteristics and

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[41] Japan, Germany, Netherlands, Russia, Italy, USA, Sweden, New Zealand.
[42] Findings concerning the demographic characteristics of those more or less financially literate are omitted as they were discussed in the introduction to this chapter.

circumstances. The results were consistent even though pension schemes across countries varied widely. Only the study in New Zealand found there was no positive correlation between financial literacy and retirement planning. This finding was attributed to the dominant public sector pension provision, leading to a reduced perception of the need to plan (Alessie et al., 2011).

Table 5 *Summary of the FLAT Project Studies: Financial Literacy and Retirement Planning*

| Country | Paper | Main findings | Author |
|---|---|---|---|
| Germany | Financial Literacy and Retirement Planning in Germany. | Positive association between financial knowledge and retirement planning. | Bucher-Koenen & Lusardi (2011) |
| Japan | Financial Literacy and Retirement Planning in Japan. | Increased financial literacy increases the chances of having a retirement plan. | Sekita (2011) |
| The Netherlands | Financial Literacy and Retirement Planning in the Netherlands. | In 2010 (post financial crisis) more people had thought about retirement planning than previously. Found a causal effect of financial literacy on retirement planning. | Alessie et al (2011) |
| USA | Financial Literacy and Retirement Planning in the United States. | Those scoring higher on financial literacy questions are more likely to plan for retirement leaving them better prepared for old age. | Lusardi & Mitchell (2011b) |
| Italy | Financial Literacy and Pension Plan Participation in Italy. | Financial literacy has a positive and significant association with participating in a pension plan. | Fornero & Monticone (2011) |
| New Zealand | Financial Literacy and Pension Plan Participation in New Zealand. | Financial literacy is not associated with planning for retirement. Author surmises this is because the country has a dominant public pension and therefore individuals do not perceive the need to plan. | Crossan, Feslier, & Hurnard (2011) |
| Russia | Financial Literacy and Its Consequences: Retirement Planning: Evidence from Russia during the Financial Crisis | Significant and positive relationship between financial literacy and planning for retirement when examining private pension funds. | Klapper & Panos (2011) |
| Sweden | Financial Literacy and Retirement Planning in Sweden. | Individuals who reported retirement planning, when tested, had higher financial literacy levels. Knowledge of risk diversification is particularly important and correlated to retirement planning. | Almenberg & SÄVe-SÖDerbergh (2011) |

In addition to the significant number of studies in the U.S and the countries in the FLAT project, research from other countries has shown a similar relationship between financial literacy and retirement planning and are briefly summarised here.

Chile was one of the first countries to undergo pension reform. In 1982, the public 'Pay as you go' system was replaced with a fully funded, privately managed, mandatory system based on a DC scheme. Garabato and Moure (2016) looked specifically at the relationship between financial literacy and retirement planning in Chile following this change. They used Lusardi and Mitchell's questions to test financial literacy and found both financial literacy and retirement planning to be low when compared to countries that were part of the 'Flat Project' (Lusardi & Mitchell, 2011d).

Using Italian data from 2010, Ricci and Caratelli (2015) examined the effect of both trust and financial literacy on retirement planning. Results found both of these factors important drivers of planning for retirement and the decision to join a private pension scheme.

In a Canadian study, again using Lusardi and Mitchell's questions, it was found that the most financially literate of the population were most likely to plan for retirement (Boisclair et al., 2015).

Early work by academics in the U.K, show both financial literacy and retirement planning levels to be low. Atkinson, McKay, Collard and Kempson (2007), in contrast to the quantitative approach adopted by other studies, interviewed over five thousand individuals about retirement planning. Findings showed many individuals were not making adequate provision for retirement.

It can be argued that the ultimate success of the Pension Freedoms depends upon the financial capability and behaviour of individuals aged from 55 with pension savings through to the end of their life (Lloyd & Lord, 2015). Writing on behalf of the Strategic Society Centre in the U.K, Lloyd and Lord (2015) sought to examine the extent to which retirees displayed financial capability when making pension decisions. Their findings showed low levels of financial capability and engagement with pensions that also declined with age. This is significant, as post reforms, individuals may continue to make decisions for many years after retirement due to the flexible nature of the new

regime. Continued engagement is therefore important for some individuals. However, many individuals do not even know the type of pension they own or the features of their scheme, indicating poor levels of pension knowledge (Banks & Oldfield, 2007; Barrett, Mosca, & Whelan, 2013).

A study into financial capability and retirement planning in the U.K[43] summarised relevant recent research. The study reviewed around 60 pieces of 'insight' research. These included qualitative studies, analysis of large data sets and consumer surveys as opposed to academic contributions. Key findings showed that only one half of individuals living in the U.K are contributing to a pension plan and that 12 million are not making adequate provision for their retirement. They also reported that most individuals cannot conceive their future and do not think about their income needs in retirement, or the possibility of the need for long term care (The Personal Finance Research Center, 2017).

Some studies have found that financial literacy is a powerful predictor of wealth in retirement, discussed in the next section (Bucher-Koenen & Lusardi, 2011; Lusardi, 1999, 2008b; Lusardi & Mitchell, 2007a; Lusardi & Mitchell, 2011b). Research has shown that individuals who calculate how much they need to save for retirement, are more likely to actively do so and are, therefore, more likely to reach retirement with up to three times the wealth of those who do not (Lusardi & Mitchell, 2011c).

Munnell, Hou and Webb (2014) showed that over half (53%) of U.S households were likely to be subject to reduced standards of living when they retire. Another U.S study showed that only 46% of individuals surveyed expected to have enough income in retirement and only 42% of individuals aged 35 to 60 thought themselves adequately prepared for retirement (Kim & Hanna, 2015).

Lusardi and Mitchell (2007a) studied retirement planning and wealth accumulation using data relating to baby boomers[44] from the 2004 HRS and comparable individuals in 1992. In both cohorts, planning for retirement was positively associated with accumulated wealth and when tested, the relationship was unaffected by changes in financial markets. Baby Boomers were seen to rely more on housing equity rather than

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[43] This study contributed to the U.K National Financial Capability Strategy.
[44] 'Baby boomer' is a term for individuals born after the second world-war when there was an increase in birth rate.

their pension savings in retirement. In considering the relationship between retirement planning and wealth, Lusardi and Mitchell (2007a), having demonstrated that lack of planning was associated with specific demographic groups[45], questioned whether it was a proxy for low educational achievement or low income. They argued that individuals with low income may not see the need to plan, as they perceive the benefit to be low. They found however, that retirement planning continued to be a determinant of wealth, even after having considered other reasons why wealth levels may be low. In addition, they demonstrated that planning influenced wealth and not the other way round.

Clark, Sandler and Allen (2012) surveyed employees in three large U.S companies and found most had a very poor understanding of private and public provided pension benefits that impacted their retirement wealth. They argued that most employees were not sufficiently financially literate to make effective pension choices, which in turn would not allow them to optimise their well-being. Misconceptions about eligible retirement ages and benefits were found to have an effect on an individuals' age of retirement, causing individuals to retire either too early or too late, depending on the type of misunderstanding.

Studies have also linked financial literacy to the investment performance of pensions. In a later study, Clark, Lusardi and Mitchell (2015) showed that financially literate individuals are likely to hold a greater proportion of equity in their pension portfolios, linked to higher average returns. They are also likely to have portfolios with 38% less non-systematic risk[46], indicating that they have diversified their portfolio more effectively than those individuals who are less financially literate. Clark et al (2016), in a study of Federal Bank employees, found a positive relationship between financial literacy and both the propensity to participate in a 401(k) pension plan and the profitability of such a plan, affecting their wealth in retirement.

Similar findings linking financial literacy, retirement planning and its positive association with wealth accumulation has been seen in studies in other parts of the world. Hastings and Mitchell (2010) demonstrated a positive association between

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[45] See Table 1, p.44.
[46] Non-systematic risk is that portfolio risk that can be diversified away. A well-diversified portfolio will have very little non-systematic risk as it will be well diversified.

financial literacy and retirement wealth in Chile. This supported earlier findings of Behrman et al (2007c) showing both financial literacy and education to have a positive association with both wealth accumulation and pension contributions of Chileans. Landerretche and Martinez (2013), in a study specifically focusing on pension knowledge, showed that Chileans with better knowledge were more likely to accumulate greater pension savings. Individuals with better pension literacy were also more likely to undertake switching between pension funds to ensure optimum performance and even to invest in the pension system in the first place. A related study, also in Chile, found that poor investment decisions were often driven by poor levels of financial literacy (Kristjanpoller & Olson, 2014).

Using Italian data, Jappelli and Padula (2017) found that financially literate individuals expected higher returns on their investments. These findings supported their earlier study specifically about pension wealth, showing financial literacy gained early in life to be positively associated with pension wealth accumulation in later years (Jappelli & Padula, 2014).

Banks and Oldfield (2007) studied the effect of numerical and cognitive ability on wealth and retirement saving in a sample of older adults in the U.K. They found levels of numeracy and retirement portfolio wealth to be strongly correlated.

### 2.5.4 Confidence, Perceived Financial Literacy and Retirement Planning

This section examines the relationship between perceived financial literacy and confidence and retirement planning. The association between these factors and financial behaviour in general was reviewed in section 2.3.3. This section adds to this discussion, considering the literature addressing retirement planning specifically.

In one of the few studies specifically examining pension literacy, which was conducted in Poland, it was found that pension decisions were more associated with an individuals' self-assessment of their financial knowledge, rather than their actual financial knowledge (Olejnek & Bialowas, 2015). As well as their actual financial literacy, Parker et al (2012) found that individuals with more confidence in their financial literacy were more likely to plan for retirement, as well as effectively minimise fees charged to their pension portfolios. This supports earlier research that found financially literate individuals better equipped to minimise fees when assessing

alternative investment funds, maximising their pension accumulations (Landerretche & Martinez, 2013; Mitchell & Lusardi, 2011).

In Canada, research conducted on behalf of the Financial Consumer Agency in 2014, studied financial knowledge and confidence separately in Canadians in age groups 55-64 and 65 and over (Hui, Nguyen, Palameta, & Gyarmati, 2016). The association of both financial knowledge and confidence with three domains of financial behaviour related to retirement preparedness were examined. These were debt and money management, saving and future planning, and protection and best financial practices. Results showed that on its own, having financial knowledge was not enough to ensure desirable financial behaviour, as a lack of confidence could hinder acting on it. However, financial confidence could compensate for low levels of knowledge. Overconfidence however, had detrimental effects on financial behaviour in some domains, potentially limiting the ability to plan and save for retirement. This supports some academic studies that have drawn similar conclusions in relation to financial literacy and financial advice seeking (Allgood & Walstad, 2016; Kramer, 2016). However, it contradicts others, that have stated to be confident is more important than to be appropriately confident, where actual and perceived knowledge are equal (Parker et al., 2012). Parker et al (2012) presented significant findings regarding under-confident individuals, unlike later academic studies that focused predominantly on overconfidence bias (Allgood & Walstad, 2016; Kramer, 2016). In the three domains examined, under-confident individuals did not perform as well as those who were confident or overconfident. This was particularly the case in the domain of saving and planning, implying that this group may under-save for retirement.

Research by the Pensions Policy Institute (PPI) in the U.K found that some 55-70 year-olds have low levels of confidence in their knowledge of financial markets and are attracted to investments that have little or no investment risk, such as individual savings accounts (ISAs)[47]. ISAs are likely to provide lower returns than investing within a pension wrapper. Findings showed that individuals lack the financial literacy to perceive the need for some level of risk-taking to achieve satisfactory investment returns and consequently an acceptable level of income in retirement (Echalier, Duffield, Weir, & Ripley, 2015).

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[47] Individual savings accounts. These are tax free savings accounts in the U.K.

The Citizens Advice Bureau in the U.K also found individuals to have low levels of confidence in making pension choices. In qualitative research asking individuals about their experience with pensions, they reported that individuals are unsure about products, such as DC pensions, even after having purchased them. They argued there is a risk that, as pensions are complex, individuals may take the option that is the easiest to understand, over that which is best for them[48]. (Citizens Advice Bureau, 2015). Inertia was also cited as a reason for failing to plan for retirement in a later study by the Personal Finance Research Centre in the U.K (2017).

2.5.5   Conclusion

Studies show that worldwide financial literacy and specifically knowledge about pensions is low (Lusardi, 2008b; Lusardi & Mitchell, 2011d; Lusardi et al., 2014; The Personal Finance Research Center, 2017) and a significant number of individuals are not planning for their retirement in the most effective way (Clark et al., 2012; Financial Conduct Authority, 2016a; Kim & Hanna, 2015; Lusardi & Mitchell, 2007c; The Personal Finance Research Center, 2017). It has been shown that financially literate individuals are more likely to plan for retirement (Lusardi, 2009; Lusardi & Mitchell, 2007a). This is important, as individuals who plan seem to accumulate more wealth in retirement (Bucher-Koenen & Lusardi, 2011; Hastings & Mitchell, 2010), have better portfolio performances (Clark et al., 2015), diversify away more risk, minimise fees (Parker et al., 2012) and make more effective investment decisions (Jappelli & Padula, 2017).

Confidence and perceived financial literacy are also significant traits in retirement planning. Confident individuals are more likely to plan and make effective pension decisions (Olejnek & Bialowas, 2015; Parker et al., 2012). However, overconfidence is associated with negative consequences in relation to retirement planning and savings behaviour (Hui et al., 2016; Palameta, Nguyenm, Hui, & Gyarmati, 2016).

In the U.K, policy papers report on the public's poor financial literacy and confidence in relation to pensions (Money Advice Service, 2015; The Personal Finance Research Center, 2017). This may influence the ultimate success of the Pension Freedoms, if

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[48] At the time of this study, the FCA were proposing on rules about investment pathways to improve retirement outcomes for consumers. https://www.fca.org.uk/news/press-releases/fca-proposes-rules-investment-pathways-and-other-measures-improve-retirement-outcomes-consumers

suitable help and support cannot be effectively provided to those who need it (Financial Conduct Authority, 2018; Lloyd & Lord, 2015).

This study addressed the relationship between pension literacy and retirement planning. This section gave rise to the following research questions:

Research question 4: How does pension literacy change with age? (Section 2.5.2)

Research question 5: What is the relationship between pension literacy and retirement planning? (Sections 2.5.3 and 2.5.4)

These were addressed by testing the following hypotheses:

RQ4:

$H_5$: There is a relationship between actual pension literacy and age.

$H_6$: There is a relationship between perceived pension literacy and age.

RQ5:

$H_7$: There is a relationship between individuals' actual pension literacy and retirement planning.

$H_8$: There is a relationship between individuals' perceived pension literacy and retirement planning.

$H_9$: There is a relationship between individuals' combination of actual and perceived pension literacy and retirement planning.

The next section draws conclusions to the literature review.

## 2.6   Conclusion to the Literature Review

This chapter has reviewed the literature relevant to this study. Section 2.1 focused on rationalising the scope of the literature. An overview was provided of the three concepts, financial literacy, financial advice seeking and retirement planning, from which the three themes were derived that made up this review. The chapter focused on the relevant literature pertaining to these three themes; the definition of financial literacy, financial literacy and financial advice and financial literacy and retirement planning, which was reviewed in detail.

In Section 2.1 the potential contribution from the behavioural finance discipline was acknowledged as important. However, much was beyond the scope of this study, which focused on the relationship between financial and pension literacy, not behavioural biases and financial behaviour. The exception to this was overconfidence, which in this study was defined as the positive difference between perceived and actual financial literacy (Allgood & Walstad, 2016; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016). The focus of the review, therefore, was on academic papers aligned with this definition, as opposed to the wide range of behavioural finance studies examining the concept in other ways. Additionally, the literature from the psychology discipline concerning meta-knowledge was acknowledged as potentially relevant. This body of literature was considered too large to review in detail and its exclusion from the literature review was justified.

Section 2.2 – Moving on from defining financial literacy in terms of financial knowledge, academics and government agencies have embraced definitions encompassing broader concepts such as skills, attitudes and effective financial behaviour. It is also important that individuals have an accurate perception of their own level of knowledge, in addition to the confidence to execute optimal financial behaviours such as retirement planning and seeking financial advice (Huston, 2010; Money Advice Service, 2015; Remund, 2010). Various models of financial literacy were reviewed in this section and from these a definition and model applicable to pension literacy was derived for use in this study. These also offer the first contribution of the study.

Section 2.3 – Perceived and actual financial literacy both influence individual's financial behaviour (Allgood & Walstad, 2016). This is important as they do not

always correlate positively with each other (Asaad, 2015). Individuals whose actual financial literacy is lower than they believe it to be are 'overconfident'. This group may be at risk of making poor pension choices (Gentile, Linciano, & Soccorso, 2016). In this study, both actual and perceived pension literacy were measured and the characteristics and behaviour in relation to the pension choices of overconfident participants identified.

Section 2.4 – The majority of literature suggests financial advice is a complement to, not a substitute for, financial literacy and individuals who are financially literate are more likely to seek financial advice. However, studies have found that individuals base their decisions on perceived rather than actual knowledge and overconfident individuals may be less inclined to seek advice (Allgood & Walstad, 2016; Olejnek & Bialowas, 2015). This study explored the relationship between both actual and perceived pension literacy and the propensity to seek financial advice, thus making a contribution to the debate.

Limited research exists about the reasons why individuals do or do not follow financial advice, despite the former being associated with positive outcomes (Stolper & Walter, 2017). Financially literate individuals are more likely to seek advice, but are less likely to follow it, suggesting for this group financial advice is a complement to their existing knowledge. For those with poor financial literacy, using advice as a substitute for their lack of knowledge, there is a higher likelihood of the advice being followed (Hackethal et al., 2010). This section gave additional insight as to the impact of seeking financial advice, although it was not specifically examined empirically in this study.

Section 2.5 – Financial literacy in the U.K and around the world is low (Lusardi & Mitchell, 2011d; Money Advice Service, 2015). Many individuals are not effectively planning for their retirement, despite planning being associated with increased pension wealth (Kim & Hanna, 2015). Financially literate and confident individuals are more likely to plan for retirement (Parker et al., 2012). Overconfidence however, has been associated with poor retirement planning and savings behaviour (Hui et al., 2016). This study explored the relationship between actual and perceived pension literacy and retirement behaviours, such as planning for retirement.

Having reviewed the academic literature, chapter 3 addresses the methodological approach and research design, starting with a review of the research questions derived from this chapter.

# 3  Methodology and Methods

## 3.1  Introduction

The purpose of this chapter is to set the study within an appropriate methodological framework and to explain the specific research methods employed to address the research questions. Section 3.2 begins by clarifying the research questions and related hypotheses arising from the literature. These are mapped to both the model of pension literacy (section 2.2.5) and the relevant literature from which they were derived.

Section 3.3 discusses the theoretical and methodological basis upon which the research methods were based. The study followed a realist ontology and positivist epistemology. This is justified and the application to the study made clear.

In previous studies, financial literacy has been measured in two main ways; using surveys and observing associations between financial literacy and positive financial behaviours. The literature concerning the measurement of financial literacy is reviewed in section 3.4, providing the academic justification for the choice of survey method to collect data in this study.

The survey included a test of pension knowledge, central to the research. Both the test and the process by which it was developed offer the second contribution of the study. Therefore, this section is sufficiently detailed to enable it to be replicated by others. The test itself measured the knowledge element of pension literacy, other elements from the model were incorporated in other parts of the survey, including perceived pension literacy, financial confidence and the specific financial behaviours relevant to the study.

The data sample was a cluster based on the North East region of England. Section 3.6 describes the approach to data collection, including the sampling methodology.

After having administered tests of financial literacy, previous studies have used various methods to determine participants' scores. These range from simply totalling the number of correct answers, to more complex methods involving the application of principal components or factor analysis. Section 3.7 reviews this empirical literature, providing the basis for the scoring measures used in this study and offering justification for measuring pension literacy in more than one way.

Based on the empirical literature, section 3.8 describes the approach to determining actual and perceived pension literacy scores and the classification of participants into four groups based on the combination of their actual and perceived pension literacy.

One-way analysis of variance (ANOVA) was employed to compare mean pension literacy scores across demographic subgroups. To test the association between pension literacy and both seeking financial advice and retirement planning, in line with previous studies, logistic regression was employed. Section 3.9 describes the rationale behind the use of these statistical techniques and explains the process by which they were applied to test the hypotheses.

Section 3.10 discusses issues of reliability, replicability and validity. Section 3.11 presents the ethical concerns of the study, section 3.12 considers the limitations concerning method and finally, section 3.12 concludes the chapter.

## 3.2    Review of Research Questions

The 2015 Pension Freedoms made choices at and into retirement more complex than they had been previously (Financial Conduct Authority, 2015b). This study was about individuals' ability to plan for retirement and their propensity to seek financial advice in the light of these reforms. This short section reviews the research questions and the related hypotheses.

The literature reviewed in the previous chapter related to the key research question:

> *What is the relationship between pension literacy and the propensity to consult an Independent Financial Advisor when planning for retirement in the light of the 2015 Pension Freedoms?*

From the review of literature, the following five sub-questions emerged:

1. Can individuals assess their own level of pension literacy accurately?
2. What is the relationship between pension literacy and the propensity to seek financial advice in relation to pensions?
3. Are pension literacy and financial advice seeking complements to, or substitutes for, each other?
4. How does pension literacy change with age?
5. What is the relationship between pension literacy and retirement planning?

Table 6 (below) shows the research questions, hypotheses, related literature and links to the pension literacy model. Linking the elements of the pension literacy model to each hypothesis was helpful for survey development insofar as ensuring that the survey collected sufficient information to address the hypotheses. It was also helpful for data analysis in determining those elements of pension literacy that were driving particular financial behaviours. Although not all elements of the model were required to address the hypotheses, those that were not were incorporated into the survey to collect additional useful information. This enabled more expansive answers to be provided to the research questions. This is explained in more detail in section 3.5.

The following section discusses and justifies the philosophical and methodological approach to addressing the research questions in this study.

Table 6 *Research Questions, Hypotheses, the Pension Literacy Model and Related Literature*

| Research Questions | Hypotheses | Elements of Pension Literary Model | Literature (chapter 2 section reference) |
|---|---|---|---|
| RQ1: Can individuals assess their own level of pension literacy accurately? | $H_1$: There is a relationship between individuals' actual and perceived pension literacy. | Actual and perceived pension literacy | 2.2.3 |
| RQ2: What is the relationship between pension literacy and the propensity to seek financial advice in relation to pensions?<br><br>RQ3: Are pension literacy and financial advice seeking complements to, or substitutes for, each other? | $H_2$: There is a relationship between individuals' actual pension literacy and seeking pension advice.<br><br>$H_3$: There is a relationship between individuals' perceived pension literacy and seeking pension advice.<br><br>$H_4$: There is a relationship between individuals' combination of actual and perceived pension literacy and seeking pension advice. | Actual and perceived pension literacy<br>Financial behaviour | 2.4.2, 2.4.3, 2.4.4 |
| RQ4: How does pension literacy change with age? | $H_5$: There is a relationship between actual pension literacy and age.<br><br>$H_6$: There is a relationship between perceived pension literacy and age. | Actual pension literacy<br>Perceived pension literacy<br>Personal background | 2.5.2 |
| RQ5: What is the relationship between pension literacy and retirement planning? | $H_7$: There is a relationship between individuals' actual pension literacy and retirement planning.<br><br>$H_8$: There is a relationship between individuals' perceived pension literacy and retirement planning.<br><br>$H_9$: There is a relationship between individuals' combination of actual and perceived pension literacy and retirement planning. | Actual and perceived pension literacy<br>Financial behaviour | 2.5.3, 2.5.4 |

### 3.3 The Role of Theory in Social Research

### 3.3.1 Deductive and Inductive Approaches

Theory can be described as '*a body of understanding*' (p.9) (Christensen & Carlile, 2009). It is important to establish the relationship between theory and research, in particular, whether theory guides research or is generated as a result. These contrasting approaches can be described as deductive and inductive, alternatively theory testing and theory building. In a deductive approach the researcher establishes hypotheses based on known theory and tests these through empirical observation (Bryman, 2012). Conversely, an inductive approach will attempt to construct theory through observing reality and forming explanations of what is seen (Saunders, Lewis, & Thornhill, 2015). These contrasting approaches are shown in Figure 88 (below). This section justifies the research philosophy and methodological approach underpinning this study.

Deductive Research

Inductive Research

*Predict*

*Confirm*

Statements
of
Association
MODELS

Categorisation based
upon attributes of
phenomena
FRAMEWORKS AND
TYPOLOGIES

Observe, describe and measure the
phenomena
CONSTRUCTS
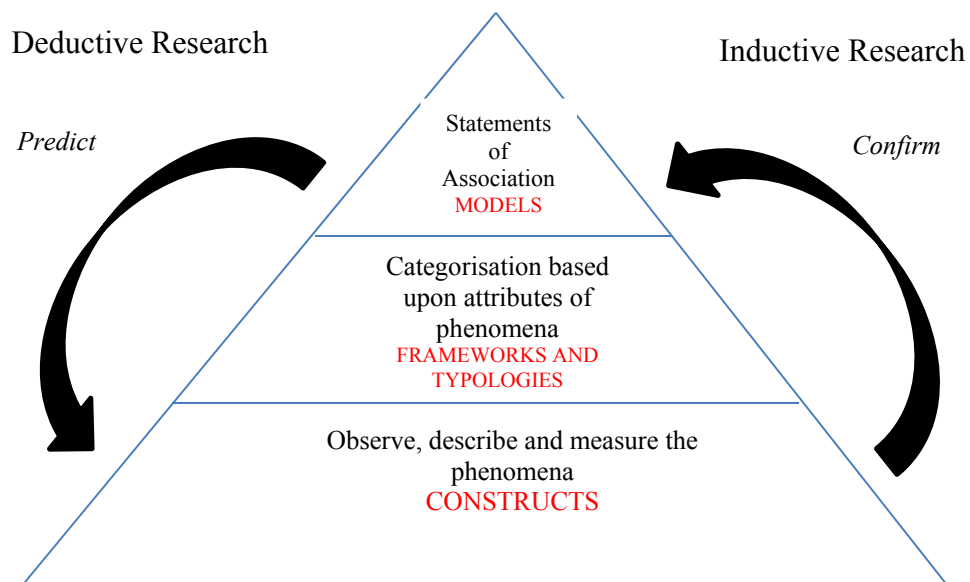
*Figure 8* Inductive and Deductive Research *Source: Course Research: Using the Case Method to Build and Teach Management Theory, by Carlile and Christensen (2009)*

This study followed a deductive process. Theories concerning the association between actual and perceived pension literacy and financial behaviour were identified from the academic literature. Hypotheses were developed in order to test these. The construct of pension literacy was operationalised and a test of pension literacy was developed with experts from the financial services industry. This was used to test pension literacy and its relationship with financial behaviour in adults aged over 40 from the North

East of England. This section justifies the research philosophy and methodological approach underpinning this study.

### 3.3.2   Research Philosophy and Methodological Approach

It has been argued that the way in which theoretical and philosophical underpinnings relate to methodological approaches is less than clear, made even more confusing by different and sometimes conflicting terminology (Crotty, 2015). Some of this lack of cohesion concerns ontology (assumptions about the nature of reality) and epistemology (assumptions about the nature of knowledge). Whilst it is common to consider ontology as distinguishable from epistemology (Bell & Bryman, 2015; Bryman, 2012; Easterby-Smith, Thorpe, & Jackson, 2015), some may merge them together (Crotty, 2015). Ontology and Epistemology were considered separately in this study in line with the most common approach. This allowed the author to break down complex ideas more effectively to align each with the study separately, therefore, enabling each philosophical position to be fully justified.

### 3.3.3   Realist Ontology

Ontology is the study of being, concerned with the fundamental categories of existence and non-existence including life, reality and nothingness (Bell & Bryman, 2015). It is concerned with whether something is real and objective, or subjective and socially constructed. Although the terms 'objectivism' and 'constructionism' have also been used to mean the same thing (Bell & Bryman, 2015), 'realism' and 'nominalism' are the terms used here.

Realism is a position that implies that phenomena presented to us are external facts. They are beyond influence and have existence that is independent of social actors (Bryman, 2012). Realism implies there is a single truth. Nominalism, in contrast states that there is no truth and that facts are human creations (Easterby-Smith et al., 2015). This study followed a realist ontology, it measured individuals' actual and perceived pension literacy that exists whether an individual is aware of it or not. It has been shown that actual and perceived financial literacy do not always correlate with each other (Kramer, 2016). This provides evidence of the existence of pension literacy, whether or not the individual has a perception of that reality.

### 3.3.4   Positivist Epistemology

Epistemology is the study of the nature of knowledge and how we know what we know (Bell & Bryman, 2015). There should be a clear link between epistemology and ontology (Easterby-Smith et al., 2015). There are two contrasting approaches concerning how research is conducted, these are positivism and social constructivism. Positivism was first attributed to the 19th century French philosopher August Comte. Comte argued from both an ontological perspective that reality is objective and external, and from an epistemological assumption that, only through empirical verification can knowledge be of significance. Positivism therefore, holds that the world exists externally and its properties can be measured by objective methods, rather than inferred subjectively (Crotty, 2015; Easterby-Smith et al., 2015). Although positivism has been criticised as having little regard for choice, individuality, freedom and moral responsibility, it does provide a structured, objective approach that allows the researcher to operationalise concepts to answer pre-determined questions (Cohen, Manion, & Morrison, 2017). This study followed a positivist epistemology. Easterby-Smith et al (2015) identifies the philosophical assumptions that underpin a positivist approach. These assumptions and the extent to which they applied to this study are presented in Table 7 (below).

Table 7 *Assumptions of a Positivist Epistemology applied to the Research Study - Adapted from Easterby-Smith et al, 2015*

| Assumption | Explanation | Applicability to Study |
|---|---|---|
| Independence | The observer is independent from what is observed. | The research instrument (survey) was on line and the participant responses were completely independent of the researcher. |
| Value-freedom | The choice of subject and sample is chosen from objective criteria and not human beliefs. | Participants were self-selecting based on objective criteria of individuals aged over 40 that had not yet fully retired. Participation was voluntary. |
| Causality | Aims of the research should be to identify causal relationships that explain behaviour. | Causal relationships between pension literacy and financial behaviour were tested. Correlation and logistic regression statistical techniques sought to explain causal relationships. |
| Hypothesis and deduction | Science proceeds through making hypotheses and deducing what kind of observations will show these to be true or false. | Hypothesis for testing were developed from the literature for testing. Appropriate statistical tests were selected based upon the data and the hypotheses. |
| Operationalisation | Concepts can be defined in a way that can be measured quantitatively. | Pension literacy (both actual and perceived) were operationalised and measured quantitatively using an assessment of pension literacy that was then scored in various ways. Both measures were combined and individuals assigned to one of four groups based on comparison to sample means. |
| Reductionism | Problems are better understood when reduced to small elements. | Variables were identified from the four groups and were examined at a micro level to show demographic characteristics and relationships with each outcome variable. Pension literacy was reduced to smaller components using principal components analysis. |
| Generalisation | In order to generalise, it is required to select random samples of a sufficient size to allow inferences to be drawn about the wider population. | Sample was of sufficient size to allow inferences to the population under examination. Study was a cluster based on the North East region of England. |
| Cross-sectional analysis | Regularities can be identified by making comparisons of variations across samples. | Comparisons in pension literacy were made according to demographic characteristics. |

### 3.3.5 Quantitative Methodology

Research methodology translates ontological and epistemological positions into procedures for application (Sarantakos, 2013). A quantitative methodology entails the collection and examination of numerical data. It reflects a deductive relationship with theory, as well as frequently a positivist epistemology and a realist ontology. This study followed a quantitative methodology using a survey design, incorporating a test of pension literacy. Data from the survey was analysed using statistical techniques described later in this chapter.

### 3.3.6 Fixed and Flexible Designs

Positivist methods start with hypotheses about the nature of the world and then attempt to confirm or refute them. This can be achieved by the selection of experimental and quasi-experimental methods (Easterby-Smith et al., 2015). Research designs can be fixed or flexible. Fixed designs mainly follow a quantitative methodology and follow two broad traditions, experimental and non-experimental research designs. This study followed a fixed design. In an experimental design, the researcher actively introduces some form of change to a situation, in a non-experimental design this is not the case. The details of a non-experimental design are specified fully before the main data collection stage and therefore, as with this study, a pilot phase is often incorporated. This study followed a non-experimental design. A test of pension literacy was developed as part of a survey, which was piloted before main data collection took place.

This section has justified the research philosophy and methodological approach underpinning the study. The choice of survey method to measure pension literacy followed that predominantly used in the academic literature. The following section discusses the most relevant empirical studies concerning the measurement of financial literacy using surveys, in doing so it seeks to justify the research method applied in this study.

## 3.4 The Measurement of Financial Literacy - Review of Empirical Studies

### 3.4.1 Overview of Section

This section reviews some of the academic and policy literature pertaining to the measurement of financial literacy. To consider this separately from the definition of financial literacy was important. These studies provide the academic justification for the choice of survey method as well as informing its' development.

In the literature, two main ways of measuring financial literacy have emerged. Hilgert et al (2003) provided an early example of the use of surveys to measure cognitive ability and financial knowledge in a U.S study of household financial management. Many subsequent studies have adopted their approach, providing an objective way in which to measure financial literacy (Huston, 2010). Moore (2003) and other academics discussed below, adopted an alternative approach. They demonstrated causality between financial literacy and decision making behaviours, defining financial sophistication as skill in avoiding poor financial decisions. These two approaches are reviewed in this section.

### 3.4.2 Test Based Knowledge Measures: The 'Big 3'and the 'Big 5'

Test and survey based methods are by far the most common used to measure financial literacy (Hastings et al., 2013; Stolper & Walter, 2017). The substantial volume of work by Lusardi and Mitchell from the U.S was introduced in chapter 2. Their five questions testing financial literacy have been included in numerous studies around the world, often incorporated into national surveys. The questions are based on the principles of simplicity, relevance, brevity and capacity to differentiate (Lusardi & Mitchell, 2011d). They test three-core concepts; compound interest, real rates of return and risk diversification. Academics using them have argued that individuals who fail to answer these questions correctly will have difficulty making decisions about financial products involving investments or real rates of return over time. Being ignorant of risk diversification may lead to being unable to manage financial assets effectively (Hastings et al., 2013). In 2017, the 'Big 3' were used in an Australian study of financial literacy, overconfidence and financial planners (De Zwaan et al., 2017) and in a study of financial literacy and personal savings in Vietnam (Nguyen, Rozsa, Belas, & Belasova, 2017). This demonstrates these questions remain relevant.

In 2008, the 'Big 3' were incorporated into the National Financial Capability Study (NFCS), a survey representing the entire U.S adult population (Lusardi & Mitchell, 2013). Two more questions were added, one on mortgage interest and the other on bond pricing. This expanded set of questions became known as the 'Big 5'. The first three of these were adapted for use in this study and were incorporated into the first section of the test of pension knowledge. They are reproduced in Table 8 (below).

Table 8 *'Big 5' Questions - Lusardi and Mitchell (2014). '*The Economic Importance of Financial Literacy*:* Theory and Evidence*', Journal of Economic Literature (p. 351)*

| Ques | Wording (Question and Multi Choice Answers) | Concept |
|---|---|---|
| 1 | Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left your money to grow*? (More than $102, Exactly $102, Less than $102, Do not know, Refuse to answer)* | Numeracy/Compound interest |
| 2 | Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in your account *(More than today, Exactly the same, Less than today, Do not know, Refuse to answer)* | Understanding of inflation/Real rates of return |
| 3 | Please tell me whether this statement is true or false. 'Buying a single company's stock usually provides a safer return than a stock mutual fund' (*True, false, Do not know, Refuse to answer)* | Risk diversification |
| 4 | If interest rates rise, what will typically happen to bond prices? (*They will rise, They will fall, They will stay the same, Don't know. Prefer not to say)* | Asset pricing |
| 5 | Suppose a 15 year mortgage and a 30 year mortgage have the same Annual Percentage Rate and the same amount borrowed. The total amount repaid will be: *(Higher for the 15 year mortgage, Higher for the 30 year mortgage, The total amount repaid on both mortgages will be the same, Don't know, Prefer not to answer)* | Mortgage interest |

### 3.4.3    Criticisms of Test Based Measures of Financial Literacy

Despite the large body of literature using the 'Big 5', Hastings et al (2013) argued that there is little evidence about whether the approach is the best way to measure financial

literacy. They were critical there was no incentive for respondents to make considered judgements or consult other sources of information in order to compensate for lack of knowledge, as they may do in reality. Financial capability includes making appropriate use of external sources, such a finance professional, if one lacks financial knowledge. This requires the ability to communicate. The importance of communication skills in retirement planning was identified and included as one of the personal characteristics in the pension literacy model (section 2.2.5).

Lusardi and Mitchell (2011d) themselves discussed possible measurement errors in their approach relating to the 'Big 5'. One such error related to framing, meaning the manner in which a question was asked has the potential to affect the answer. Participants answered differently when the wording of question three was inverted (Lusardi & Mitchell, 2011b, 2011c; Van Rooij et al., 2011a). Lusardi and Mitchell (2013) also considered the possibility that some of the correct answers could be the result of guessing. Other academics had also cited this as a drawback of the 'Big 3', in that guessing will yield a correct answer 33% or 50% of the time, depending on the number of potential answers (Hastings et al., 2013). Considering surveys generally, Meyer, Urban and Ahlswede (2015) argued that the quality of data has declined over time. They argued that the number of participants that choose 'non-response' options on surveys has increased, as well as the number that decline to participate at all. It was acknowledged that these issues pose additional difficulties and could impact the reliability of results.

Paiella (2016) attempted to validate commonly used survey questions used to measure financial literacy (including the 'Big 5') using Italian data. She found strong positive correlation between individuals responding to questions about future asset returns and those correctly answering financial literacy survey questions[49]. She argued this was evidence that these questions accurately reflect financial competence.

Other academics have tested the reliability of test-based measures in their ability to measure financial literacy and its subsequent association with financial behaviour.

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[49] Using data from the 2008 Italian Survey of Household Income and Wealth, Paiella argued that the willingness to answer questions about future asset returns and financial literacy are related to each other.

Hung et al (2009) performed a construct validation[50] of seven measures calculated from financial literacy questions (including the 'Big 5') asked of the same set of respondents in four different waves of the Rand American Life Panel[51]. They demonstrated stability in the measurement of financial literacy across items, time and measurement strategy showing good internal consistency. They found that the measures were highly correlated with each other and had good test-retest reliability.

However, in the light of the broad range of conceptual definitions of financial literacy reviewed in chapter 2, a potential weakness of the 'Big 5' is they only test one aspect of financial literacy, that of knowledge.

### 3.4.4    Other Ways to Measure Financial Literacy

Atkinson and Messy (2011) accepted that financial knowledge is best assessed by a comprehensive set of questions. However, they argued that these should be supplemented with additional questions to assess attitude and financial behaviour. Some academics have followed this approach.

Huston (2010) reviewed 71 previous financial literacy studies, finding that four distinct areas of behaviour were covered to varying degrees. These were money basics, borrowing, investing and protecting resources. Just over one third of studies focused only on one content area and only one quarter covered all four areas.

Huston (2010) cited the National Endowment for Financial Education 2006 survey in the U.S as a good example of a model that tested wider elements of financial literacy, including financial behaviours and confidence. The survey assessed understanding of key financial concepts, as well as the degree to which participants felt they had the confidence and ability to manage their own personal finances. By testing behaviours relating to budgeting, saving, borrowing and investing, Huston argued that it was possible to move beyond only testing knowledge and test real aptitude in financial literacy. By achieving such coverage, the ability to make decisions, form long term plans, understand the implication of life events and make sense of economic conditions that may not be within a person's control, could be assessed. This gives a clearer

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[50] A construct validation shows to what extent a test measures what it claims to measure. In this case, the extent to which the survey questions measured financial literacy.
[51] The American Life Panel is a nationally representative panel of more than 6,000 participants in the U.S. who are interviewed via the internet on a regular basis.

indication of financial competence. Studies using the 'Big 5' only, could be criticised as not covering all of these content domains (Lusardi & Mitchell, 2007a; Lusardi & Mitchell, 2007c).

Focusing on four content areas relating to behaviour concerning budgeting, saving, borrowing and investing was also cited by Remund (2010) as being a suitable way to test financial literacy. He suggested asking an equal number of questions about each area. In addition to this, Remund recommended using a survey method but stresses the need to include measures of self-assessment and confidence.

In measuring financial capability, Taylor (2010), writing in the U.K, also agreed that financial capability should capture a range of skills, behaviour and knowledge in relation to an individuals' ability to manage their personal finances.

The OECD (2012) adopted a different approach to measuring financial literacy and designed questions in three areas: knowledge and understanding (content); approaches and mental strategies (processes) and financial situations (contexts). This study was limited to 15-year-old students but there is no reason why the approach could not be applied to older individuals.

In a later study by Xiao et al (2014), separate measures were used to examine financial outcomes and financial capability. Financial satisfaction was used as the indicator of a financial outcome. Three sets of related variables; perceived financial capability, financial literacy and financial behaviour were used to measure financial capability.

Early work by the FSA in the U.K (Atkinson et al., 2007) measured financial capability over five domains; managing money; planning ahead; choosing products; making ends meet and staying informed, creating financial capability scores within each domain. In more recent work, the Money Advice Service measured financial literacy in terms of managing money well; preparing for life events and coping with financial difficulties (Money Advice Service, 2015).

To conclude, in considering measurement strategies, test based and survey methods are the predominant way of assessing financial literacy to date, both in academic studies and in those performed on behalf of government agencies. Surveys testing financial literacy have included measures of knowledge, financial behaviours, attitudes, skills, confidence and self-assessments of knowledge. Although criticisms

of the survey approach exist (Stolper & Walter, 2017), there is sufficient evidence that it remains a valid method (Hung, Parker, et al., 2009; Paiella, 2016).

Following the same approach as many academics and government agencies, this study used a survey method to measure pension literacy. The next section explains the approach to building the survey. The approach to measuring pension literacy is explained in sections 3.7 and 3.8.

## 3.5    Building the Survey

### 3.5.1    Test of Pension Knowledge - Survey to Validate the Areas for Testing

The first stage was to develop the questions to test the knowledge element of the pension literacy model. In order to develop a valid test of pension knowledge, it was necessary to consult with professionals from the financial services industry. This stage was required to establish face validity[52] (Hardesty & Bearden, 2004). It was essential to ensure that the test questions were valid, accurate and set at the right level of difficulty.

The author worked hard to establish a network of professionals working in the financial services industry from an early stage of the research and was invited to contribute to a round table at the Financial Conduct Authority in December 2016 to discuss the financial advice gap (Financial Conduct Authority, 2016a). Some of the attendees[53], and other professionals known to the author were approached to help in developing the survey. Those that agreed formed the 'expert panel'.

An initial survey was drafted, the aim was to establish broad question areas that could be included in a test of pension knowledge. The question areas were divided into three sections: basic financial literacy, basic pension literacy and the 2015 pension reforms. Despite the criticisms of the 'Big 5', three of them were adapted for inclusion in the first section as they tested financial literacy skills relevant to pension planning.

In completing the survey, the panel members were asked to state whether the particular question area should be included or excluded. There was also an option for 'don't know' and opportunity for qualitative comments at the end of each section. As an

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[52] Face validity means that a measure reflects the concept which it is intended to measure. Here pension knowledge.
[53] These were all individuals with prominent positions in the pensions and financial services industry.

additional measure of validity, a final question determined the length of time the respondent had worked in the financial services industry, indicating their experience.

The survey was distributed to 26 individuals and 20 completed the survey. Fifteen had worked in the industry for over 15 years, one over 10 years, two between five and 10 years and two under five years. This demonstrated a sufficient level of experience. The question areas and the results of the survey are shown in Table 9 (below).

A 75% cut off point was selected for the purposes of selecting question areas for further development. As such, in section one, the question on long period returns was excluded (question five - 65%). There was one question in section three regarding 'uncrystallised pension funds lump sums' that was retained for consistency initially[54], but scored 65% and was later removed (question 22). It was decided that the jargon incorporated was too difficult to expect a non-expert to understand its meaning.

Individuals involved in this stage were thanked and asked if they would be willing to review the final question set. A smaller number of individuals agreed to do this, adding to the robustness of question development.

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[54] This question involved one of a number of drawdown options and to exclude only this option would have been inconsistent, as the other options were to be included. However, due to its complexity and the advanced level of jargon, it was removed at a later stage as it was considered above what a non-expert could be expected to know. These decisions were made with the help of a professional financial advisor.

Table 9 *Question areas presented in Expert Validation Survey and Results*

| Section/Question | Broad Question Area | Include | Do not include | Don't know |
|---|---|---|---|---|
| S1 – Q1 | Compound interest: A question that tests ability to perform a straightforward compound interest calculation. | 15 | 5 | 0 |
| S1 – Q2 | The effect of inflation on the value of money: A question that tests understanding of how inflation erodes the purchasing power of money. | 20 | 0 | 0 |
| S1 – Q3 | Risk Diversification: A question that asks whether investment in a single stock is more risky than investment into a fund. | 20 | 0 | 0 |
| S1 – Q4 | Time value of money: A question that tests understanding of the relative value of money now, as opposed to 3 years from now. | 17 | 2 | 1 |
| S1 – Q5 | Long period returns: A question that asks which asset class is likely to give superior returns over a long period when presented with a choice of asset classes. | 13 | 4 | 3 |
| S1 – Q6 | Asset volatility and risk: A question that asks which asset class is likely to display the highest volatility over time, when presented with a choice of asset classes. | 15 | 3 | 2 |
| S1 – Q7 | Please add any further comments relating to this section. Please comment on anything else you think should be asked relating to basic financial literacy. | | | |
| S2 – Q8 | Income needs in retirement: A question to see whether an individual can conceptualise how their income in retirement, compared to income pre-retirement. | 20 | 0 | 0 |
| S2 – Q9 | Pension Fund value: A question to test ability to estimate the level of income that can be bought with a given pension fund. | 17 | 1 | 2 |
| S2 – Q10 | Longevity risk: A question that tests conceptualisation of how long a pension fund may last given certain parameters. | 19 | 1 | 0 |
| S2 – Q11 | Effects of inflation: A question that tests understanding of how inflation could impact pension fund investments and the need for income in retirement. | 19 | 0 | 1 |

| | | | | |
|---|---|---|---|---|
| S2 – Q12 | Market risks and returns: A question that tests understanding of how investment returns and market risks could impact available income in retirement. | 19 | 0 | 1 |
| S2 – Q13 | Risk and Return: A question that tests understanding of how risk and return are related, when faced with options for investment of pension funds into portfolios with different risk profiles. | 16 | 2 | 2 |
| S2 – Q14 | Please add any further comments relating to this section. Please comment on anything else you think should be asked relating to basic pension literacy. | | | |
| S3 – Q15 | Pension Access: A question to test knowledge of the minimum age it is permitted to access pension funds flexibly under the Freedoms. | 16 | 3 | 1 |
| S3 – Q16 | Types of pension schemes: A question to determine understanding of the terms 'defined benefit' and 'defined contribution'. | 19 | 1 | 0 |
| S3 – Q17 | Eligibility of funds for pension freedoms: A question to test understanding of which pension types can be accessed under the pension freedoms. | 17 | 1 | 2 |
| S3 – Q18 | Tax free withdrawals: A question to test knowledge of the percentage of pension fund that can be withdrawn with no tax to pay. | 18 | 2 | 0 |
| S3 – Q19 | Taxation above the tax free limit: A question to test knowledge of the tax implications of withdrawing above the tax free limit. | 17 | 2 | 1 |
| S3 – Q20 | Options for Access: A question that tests understanding of the term 'annuity'. | 19 | 1 | 0 |
| S3 – Q21 | Options for Access: A question that tests understanding of the term 'flexi-access drawdown'. | 15 | 3 | 2 |
| S3 – Q22 | Options for Access: A question that tests understanding of the term 'uncrystallised funds pension lump sum (UFPLS).' | 13 | 4 | 3 |
| S3 – Q23 | Consequences of death: A question to test knowledge of what happens to a pension fund in the event of death. | 19 | 1 | 0 |
| S3 – Q24 | Please add any further comments relating to this section. Please comment on anything else you think should be asked relating to the 2015 pension freedoms. | | | |

*Note* Please note that the qualitative comments have not been reproduced here but were considered in the next stage of question development.

### 3.5.2    Test of Pension Knowledge - Development of Question Set

The next stage was to develop the full question set based upon the results of the validation survey. To ensure the accuracy and appropriate wording of the questions, the author worked closely with a Pensions Advisor from a local investment management firm, working through several iterations of questions before the final set was determined. During the process, it was decided to combine questions relating to areas 12 and 13. The same was applied to questions relating to areas 18 and 19. Three additional questions were added at this stage[55]. These tested knowledge of pension types, advisor fee determination and the size of pension fund requiring financial advice in relation to DB to DC transfers. In addition, there were a small number of other revisions to question position, both as a consequence of working with the financial advisor and consulting with those experts from the validation stage who had agreed to help.

To enhance completion rates, it was important to keep the test to a manageable number of questions to prevent individuals getting bored. However, a sufficient number was required, in order to cover all the areas validated by the expert panel. In the literature, the number of questions in tests of financial literacy differs widely. Huston (2010) found a minimum of three, and a maximum of 68 items used in tests (with averages between 10 and 16).

The assessment of pension knowledge included 20 questions (numbered 8-27 in the full survey), split as follows:

- Section one: Basic Financial Literacy – five questions
- Section two: Basic Pension Literacy – eight questions
- Section three: 2015 Pension Freedoms – seven questions

Each of the questions were multiple choice with one correct answer, two distractors and the options of 'don't know' and 'refuse to answer'. The next section describes the development of the other parts of the survey.

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[55] These questions were not covered in the broad categories, but upon consulting with the pension advisor, were deemed to be important in assessing pension literacy.

### 3.5.3 Additional Survey Questions

To capture the wider concept of pension literacy depicted by the model (section 2.2.5), 20 additional questions were incorporated into the survey. These included four questions to measure perceived pension knowledge and financial confidence. Likert scales have been commonly used in other studies to measure these concepts (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Lusardi et al., 2014; Parker et al., 2012; Porto & Xiao, 2016). Following this approach, this study used a 5-point Likert scale applied to the following question:

> 'On a scale of 1 to 5, where 1 is very poor and 5 is excellent, how would you rate your own level of knowledge about pensions?' (Q5 and Q39)

De Zwaan et al (2017), stressed the importance of asking respondents to self-assess before taking a test, to avoid the result impacting their self-assessment. In this study, the above question was included twice, once before completing the test and once after having done so, but prior to the participants receiving their score. The purpose of this was to determine if the participants' perception of their pension literacy changed as a result of having completed the test. To assess participants' level of financial confidence:

> 'On a scale of 1 to 5, where 1 is not confident at all and 5 is very confident, how confident are you that you will be financially secure in retirement?' (Q4)

> 'On a scale of 1 to 5, where 1 is not confident at all and 5 is very confident, how confident do you feel about making choices on how to draw your pension?' (Q6)

To assess financial behaviour, four questions were added:

Financial advice:

> 'Which of the following would you be likely to consult (or already have done so) prior to making a decision on how to draw your pension?' (Respondents were given a range of options to indicate all that applied) (Q2)

> 'Do you intend to pay for independent professional financial advice prior to making your pension choices?'(Q7 and Q40)

Participants were also asked the second question again having completed the test, but prior to receiving their score. The purpose of this was to determine if their intention to seek advice changed as a result of having completed the test.

Retirement Planning:

'Have you ever tried to work out how much income you need in retirement?' (Q3)

A positive answer to this question indicated that participants had engaged in rudimentary planning and therefore, served as a proxy for retirement planning (Lusardi & Mitchell, 2011c).

In order to assess the personal background of participants, 12 demographic and fact finding questions were included (question one and questions 28-38). The full pilot survey was developed using on-line software. Web surveys are cheaper and faster and yield higher response rates than other survey methods (Fricker & Schonlau, 2002). The full survey is available at Appendix 1. Figure 99 (below) maps the survey questions to the model of pension literacy and Figure 10 (below) shows a conceptual overview of the full survey.

As providing feedback can help to increase both survey completion rates and the number of considered responses (Davis, 2005), participants were incentivised to start the survey. So, distribution channels used the tag line 'How much do you know about your pension? – It's time to find out!' Once started, to incentivise completion of the survey, participants were given their final score and feedback, as well as the correct answers to any incorrect questions or those to which they had answered 'don't know'. Scores were split into ranges and feedback tailored to each range[56]. All categories (even the very high scoring) were directed to the 'Pension Wise' website. It was important not to give participants the idea that a high score meant no additional advice or guidance was required. As such, the feedback was worded carefully so that participants did not get this impression.

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[56] For example, 'You scored less than 20%. Your answers indicate that your pension literacy is poor. You can find more information about pensions and the impact of the 2015 Pension Freedoms at www.pensionwise.gov.uk. Feedback to participants that scored very high scores still directed them to the website.
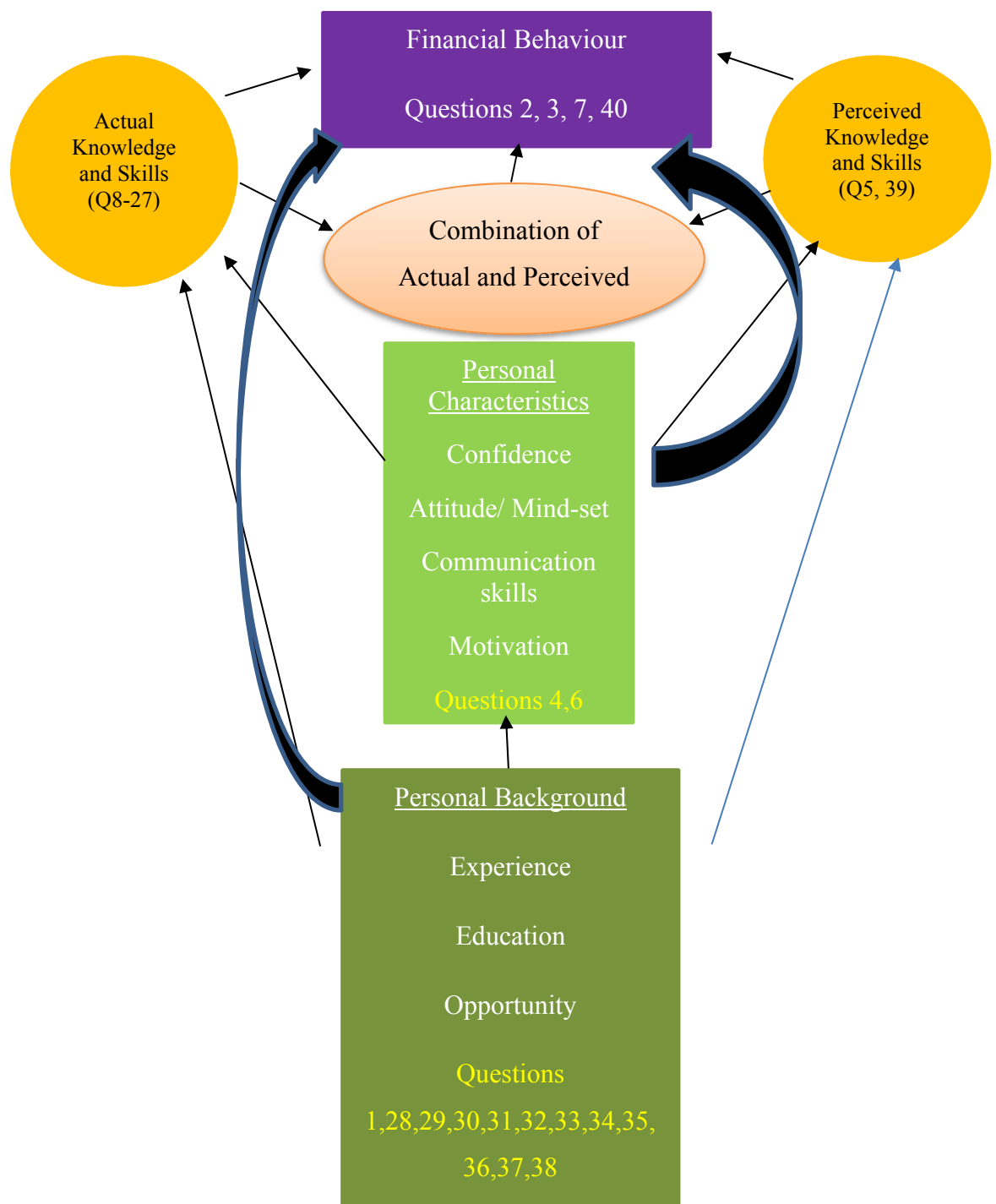
*Figure 9* Mapping of Pension Literacy Model to Survey Questions (Authors own)
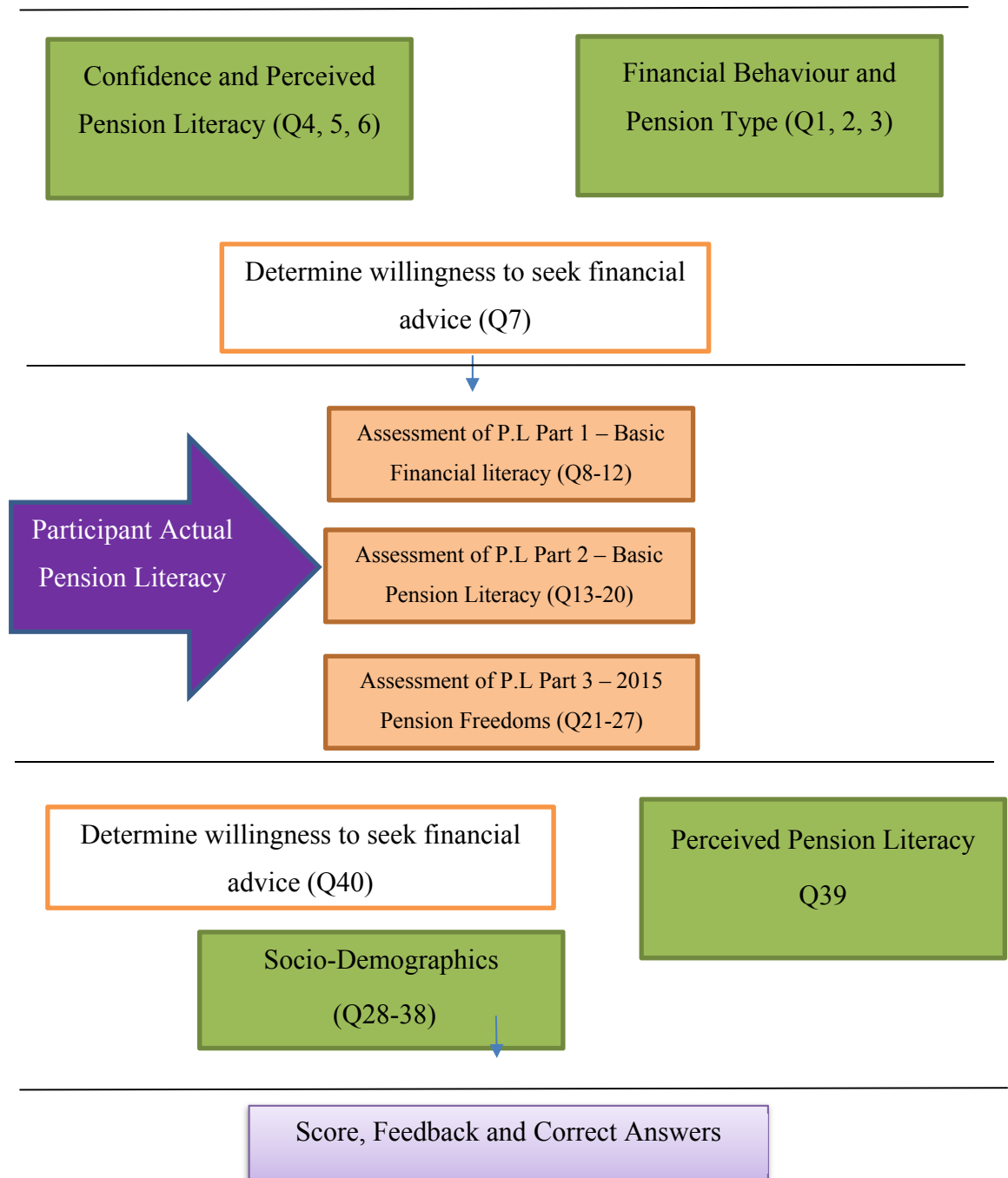
*Figure 10.* Conceptual Structure of the Survey (Author's own)

### 3.5.4 Pilot Survey

The survey was piloted to 21 individuals, aged 45-70[57] using social media (Facebook). All participants in the pilot fully completed the survey, taking an average of eight minutes. The mean (and median) test score was 65% (based on absolute score out of

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[57] Initially the targeted age group was 45-70. However, this was later extended to include those aged 40-45.

20), with a standard deviation of 22%, showing that the survey had the ability to differentiate levels of pension literacy. No changes to the questions were made as a result of the pilot as the feedback indicated that they were all understandable and clear, potentially attributed to the rigorous approach to development. The average time for completion was incorporated into the communication that accompanied the survey distribution methods for the live survey. There was considerable interest in the survey from individuals under the age of 45, indicating that this demographic was engaged in pensions and starting to consider their options. Therefore, it was decided to extend the target age demographic to 40-70 years.

The next section explains the approach to sampling and live data collection. Figure 11 (below) shows a full overview of the survey development.

*Figure 11* The Development of the Survey (Author's own)



Expert Panel Input

Financial Advisor Input

Stage 1 – Review of Literature– measuring Financial Literacy

Stage 2 - Design validation of question areas survey

Stage 3 - Issue survey to experts for face validity of question areas

Stage 4 - Amend question areas according to results and determine final question areas.

Stage 5 - Draft assessment of pension literacy and additional survey questions

Stage 6 - PILOT SURVEY

7. Further Survey Revisions

8. LIVE SURVEY

Stage 1 - The literature on the measurement of financial literacy is reviewed in section 3.4.

Stages 2, 3 and 4 - The rationale behind and process of designing the validation of question area survey is reviewed in section 3.5.1

Stage 5 – The process of drafting the 'assessment of pension literacy' with an industry expert is covered in sections 3.5.2 and 3.5.3

Stage 6 – The pilot survey and the adjustment to age demographic are covered in section 4.5.4

## 3.6 Data Collection Methods

### 3.6.1 Sampling Issues

External validity is concerned with the relevance of research findings from a piece of research to the wider population (Cohen et al., 2017). This in part depends on the sampling strategy employed. Bryman (2012) argued that only research using probability sampling is representative of the wider population. However, often sampling strategies are less than ideal (Baker, 1994). Davis (2005) acknowledged that sampling adequacy is determined by the balance of cost of obtaining data and statistical efficiency. Ideally, probability sampling would have been employed in this study to collect a sample representative of the U.K population. However, to achieve this, all individuals in the target age range were required to have an equal chance of being selected (Bryman, 2012). There were 25.3 million individuals in the target age group in the U.K (Office for National Statistics, 2018b), therefore, due to cost, practical limitations and reasons described below, this was not possible.

Initially, attempts were made to distribute the survey via relevant national websites[58]. This would have enabled quota sampling, employing sample quotas representative of each region of the U.K. However, it was not possible to gain access to these websites[59].

Further access to potential participants was made difficult due to the introduction of the 'General Data Protection Regulations' (GDPR) that came into force on 25th May 2018, replacing the 1995 EU Data Protection Directive (Information Commissioner's Office, 2018). Because, under GDPR, financial services professionals cannot use personal email to contact their clients for any purpose other than that specifically agreed, this avenue of survey distribution was unavailable[60]. It was therefore, necessary to re-address the data collection strategy.

### 3.6.2 Sampling Strategy

A non-probability convenience sampling approach was adopted using social media and email. Convenience sampling can be defined as where members of the target group are easily accessible, are willing to participate in the study and meet certain

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[58] Such as 'Money Saving Expert' and the 'Money Advice Service'.
[59] Money saving expert does have a survey forum that was available, but upon examination this was seen to have very little traffic.
[60] This avenue of survey distribution had previously been agreed based on professional contacts.

criteria (Etikan, Musa, & Alkassim, 2016). Advantages are that it is easy, affordable and the participants are more readily available. In addition, the response rate may be improved as some may be known to the researcher (Bryman, 2012).

Convenience sampling however, assumes that the sample is such that there would be no difference in the results of the study obtained from a random sample (Etikan et al., 2016), which is often unlikely to be the case because of bias (Mackey & Gass, 2005). It is important that the researcher describes how the sample may differ from a random sample, and to consider which groups may be under or over represented (Etikan et al., 2016). In this study, it was possible that older individuals in the target age range may not engage with social media or online channels of communication[61]. These individuals could have been under-represented in the final sample.

Given the nature of social media[62], potential bias was acknowledged in that individuals who viewed the survey initially were 'friends' (Facebook) or 'connections' (LinkedIn) of the researcher. Some of these individuals may have similar backgrounds and interests to the researcher (who is an accountant) and potentially may have a higher level of knowledge about finance and pensions. This was more likely to have occurred with 'LinkedIn', because 'connections' tend to be based on professional networks. In the case of 'Facebook', this was less likely as 'friends' were individuals from a wide range of occupations and professions who shared the survey with individuals not known to the researcher.

Organisational consent was granted to distribute the survey, using the global email distribution list, to all employees of Northumbria University. This included a significant number of academic staff, with potentially higher than average levels of general education. However, the email list comprised employees from a wide range of disciplines, educational levels and occupations[63]. Despite this, potential bias due to convenience sampling could not be fully eliminated.

In summary, to maximise responses, the survey was distributed via the following:

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[61] For example, older individuals may be less inclined to use Facebook and some individuals have come away from these forms of social media, due to declining popularity in favour of other social media platforms.

[62] In which individuals build up a network initially from individuals known to them.

[63] The split of academic to non-academic staff is 48% academic, 52% non-academic in the university.

- Facebook/ LinkedIn (social media).
- Northumbria University global email.
- Elders Council Bulletin, 'NOW news' and' News in Brief' (Newcastle City Council on-line publications).
- Financial Capability Bulletin (North East Region).
- Chartered Institute of Securities and Investment (CISI) regional newsletter.
- Newspaper – 'Newcastle Journal' (link to survey and article written by researcher)[64].

### 3.6.3 Responses Collected

Over a period of six months, 760 surveys were fully completed[65], 85% of these were from the North East, totalling 645 responses. Due to the large volume of North East responses, a decision was made at this stage to limit the sample to a cluster based on the North East region of England.

The survey targeted individuals between the ages of 40 and 70 not yet fully retired and this was explicitly stated in the communication accompanying its distribution. Despite this, a number of individuals outside of this age group completed the survey, including 70 respondents aged under 40, seven over 70 and six that preferred not to state their age. Consideration took place of whether to include these respondents in the sample. Individuals under age 40 were judged to be some years from making pension choices, particularly in relation to the specific options presented by the 2015 reforms. As such, they could have less pension knowledge than later in life. Because this could misrepresent the results, this group was excluded. The fact that they were sufficiently interested in pension literacy to complete the survey is worthy of note for future research. It was decided to leave respondents aged over 70 in the data sample. These individuals could still feasibly be making pension choices and inspection of these responses confirmed they had not yet fully retired. The 'prefer not to say' responses were excluded on the basis that it could not be determined whether they fell within the

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[64]    http://thejournal.newspaperdirect.com/epaper/iphone/homepage.aspx#_article124925bd-07d4-4b93-bc06-c2e15973c734/waarticle124925bd-07d4-4b93-bc06-c2e15973c734/124925bd-07d4-4b93-bc06-c2e15973c734/5/true
[65] Pilot responses were included as no changes were made to the survey following the pilot.

age demographic. Of those responses excluded, 64 were from the North East, making the final sample for data analysis 581 participants[66].

The larger the sample, the more confidence one can have in the results of quantitative data analysis (Cohen et al., 2017). The North East region had 1.04 million individuals aged between 40 and 70 (Office for National Statistics, 2018b), therefore, the sample of 581 had sufficient statistical power to make inferences about the population of the North East region (Field, 2013). The responses that were not included in the data sample, were retained to test the logistic regression models. This is discussed further in chapter 6, including consideration of the limitations of this approach.

The next section describes the data analysis methods. The empirical studies are reviewed before the data analysis methods used in this study are discussed.

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[66] The full sample was $N = 581$. However, due to the exclusion of 'refuse to answer' responses to certain questions in the survey, the number of responses included in data analysis varies accordingly. This is stated as applicable in the relevant sections of the thesis.

## 3.7 Data Analysis Methods – Empirical Studies

### 3.7.1 Overview of Section

There were two main stages of data analysis. The first concerned the determination of pension literacy scores. The second involved the application of statistical techniques in order to test the hypotheses presented earlier in the chapter. The data analysis adapted methods used in previous studies, the findings of which were discussed in chapter 2 (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012). In this section, to justify the approach, these studies are revisited, focusing on methods. Specifically, this section reviews the literature concerning the determination of financial literacy scores and the grouping of participants based upon their combined levels of perceived and actual financial literacy. The methods applied in this study are then presented in sections 3.8 and 3.9.

### 3.7.2 Determining Financial Literacy Scores

Remund (2010) argued that there should be agreement as to what represents a good standard of financial literacy. However, in her review of 71 financial literacy studies discussed previously, Huston (2010) found that in 88% of them, an assessment of financially literacy was not provided. Studies that provided scores, did not make clear the score that represented a satisfactory level of financial literacy.

There are numerous ways to determine a financial literacy score. In a number of studies, the researcher uses the absolute number of correct answers (Allgood & Walstad, 2016; Bucher-Koenen, Lusardi, Allessie, & Van Rooij, 2016; Calcagno & Monticone, 2015; Collins, 2012; Porto & Xiao, 2016; Ricci & Caratelli, 2015; Robb et al., 2012). This is easy to understand and allows comparisons within the sample or between samples that use the same questions. For example, the studies comprising the FLAT project[67] used the 'Big 3' questions to compare financial literacy between eight countries (Lusardi & Mitchell, 2011d). Other studies used the percentage of correct answers, which gives more scope for comparisons between tests that use varying numbers of questions (Mandell, 2009; Volpe, Chen, & Liu, 2006). However, most studies using these approaches fail to identify the score that represents a satisfactory level of financial literacy. An exception is the study by Asaad (2015) using the 'Big

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[67] The FLAT project consisted of eight countries and studied the relationship between financial literacy and retirement planning (see Table 5, Chapter 2)

5', which assigned a score of three, four, or five as high knowledge, and two or below, as low knowledge. In addition, other studies split their samples into groups using the mean or median score to distinguish between individuals with high and low financial literacy (Allgood & Walstad, 2016; Kramer, 2016). This implies that an individual's assessment of financial literacy is relative and depends on scores of others in the sample. It also fails to observe incremental changes in literacy. For example, an individual scoring 10% may be deemed low literacy, as would an individual scoring 49%, based on a mean of 50%. There is also scope for outliers to influence the mean score.

An important failure of using absolute or percentage totals is the assumption that all questions are of the same level of difficulty. Therefore, it is useful to apply weightings to indicate that some questions may be harder to answer than others. In this way, it is possible to assign extra credit to participants who answer more difficult questions correctly. Some studies have used the weighted average total of correct answers. The weighting is given based on the inverse of the relative easiness of the question, this being measured as the number of correct answers in the complete sample (Bachmann & Hens, 2015; Gentile, Linciano, & Soccorso, 2016).

Lusardi et al (2014) used a two stage method involving PRIDIT scoring, first developed to assess insurance fraud (Brockett, Derrig, Golden, Levine, & Alpert, 2002) and previously adapted to assess financial literacy in Chile (Behrman, Mitchell, Soo, & Bravo, 2012). The PRIDIT[68] approach constructs a scoring method that weights questions according to their difficulty, as well as showing how informative they are in relation to what is being measured. To apply the method, the proportion of the sample answering each question correctly is assessed. A negative penalty is applied to an incorrect answer, increasing if more of the sample answered correctly. Similarly, a correct answer is given more credit if fewer of the sample answered the question correctly. Secondly, principal components analysis (PCA) is applied to the weighted scores. Lusardi et al (2014) analysed the principal components and computed PRIDIT weights based upon the component vector with the largest eigenvalue. These weights identified questions that were more informative, the basis of which formed a financial

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[68] Principal component analysis of RIDIT scores. RIDIT scoring was introduced by Bross in 1958. It is used to score rank ordered categorical variables (Bross, 1958).

literacy index. To test the robustness of the measure, they compared scores applying the PRIDIT method to absolute total scores compared to the sample mean. Findings showed the two measures to be highly correlated ($r = 0.977$, $p<.01$), implying both are effective ways to measure financial literacy.

Kramer (2016) used a similar method for determining financial literacy scores. Factor analysis was applied to financial literacy question responses, retaining one factor, justified by reference to a scree plot[69]. The Bartlett (1937) method[70] was applied to obtain a single factor score for each participant, using this as the measure of financial literacy. This method weights correct answers more heavily if they explain a larger part of the variance in scores and as such provides a proxy for question difficulty.

Gentile et al (2016) constructed three measures of financial literacy to ensure robustness of findings. The first was the absolute number of correct answers, the second weighted questions depending on their difficulty, the weight applied was inverse to the easiness of the question[71]. Finally, following the approach of Lusardi et al (2014), they applied principal components analysis to the weighted question answers to obtain factor scores based on the first factor only, which was reported to explain 57% of the variance.

The application of more than one method of scoring was useful to give confidence that any links between pension literacy and financial behaviour arising from the results of statistical analysis were not dependent solely on the method of scoring. As such, in line with the studies reviewed, this more robust approach was adopted for the study and is described in detail in section 3.8.

### 3.7.3 Measurement of Perceived Financial Literacy and Confidence

Some studies assessed perceived ability by measuring participants' own judgement of their level of ability (Hung, Meijer, et al., 2009; Hung, Parker, et al., 2009). Others used proxies to indicate perceived capability through variables such as education or

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[69] In factor analysis, the number of factors that should be retained can be determined with reference to the point of inflexion on a Scree plot of the data.

[70] The Bartlett method uses the Bartlett predictor to compute factor scores. It can be used in factor analysis as an alternative to the regression method. The factor scores are different according to which method is used (Bartlett, 1937).

[71] This was measured according to the number of correct answers in the sample, following the approach of Bachmann and Hens (2015).

the use individuals made of financial products and services (Georgarakos & Inderst, 2011).

It is possible to ask individuals to rate their financial knowledge and confidence using Likert scales, this method was used most often in the empirical studies. Allgood and Walstad (2016) used a single measure of perceived financial knowledge, asking participants to rank overall financial knowledge on a 7-point Likert scale. This approach was also followed by Porto and Xiao (2016) and Kramer (2016).

Asaad (2015) measured confidence and perceived knowledge using a 7-point Likert scale but used a combination of three measures of confidence[72]. The mean of the responses represented overall confidence. High confidence was deemed to be a score of six or seven and low confidence, five or less.

In examining the demand for financial advice, Robb et al (2012) also used more than one measure of confidence. They combined the mean of the responses to four statements[73] based on 7-point Likert scales. In addition, unlike other studies cited, they also measured financial satisfaction and risk attitude using a 10-point Likert.

This study, based on Robb et al (2012) and Asaad (2015), combined the answers to the three survey questions about confidence and perceived knowledge into one measure for further analysis. The rationale for this is further discussed in section 3.8.

### 3.7.4   Combined Measures of Actual and Perceived Financial Literacy

Studies have combined actual and perceived financial literacy scores into a composite measure. This provides additional information. For example, an individual who has high perceived, but low actual financial literacy is overconfident compared to one who is able to assess their financial literacy accurately.

Asaad (2015) followed the approach first used by Allgood and Walstad (2013) in creating a composite measure of perceived and actual financial literacy. They grouped participants into four, based on their levels of actual and perceived knowledge, when

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[72] These were confidence in their answers to financial literacy questions, confidence in day-to-day financial matters and confidence in their maths ability.

[73] *'I am pretty good at dealing with day to day finances, I am pretty good at maths, I keep up with the news, How would you assess your overall financial knowledge'* p.298 (Robb et al., 2012)

compared to the sample mean scores[74]. Porto and Xiao (2016) also created four groups. They named these as 'competent' (higher than average in both),' naïve' (lower in both), 'under-confident' (low subjective, high actual) and 'overconfident' (high subjective, low actual) [75] Kramer (2016) created four groups in a similar way, but by comparing scores to a median, not a mean. The median is less influenced by outlying scores. This study adapted these approaches, explained further in section 3.8.

Of particular interest was the way in which overconfidence has been measured in other studies. In its simplest form, it is where perceived is higher than actual financial literacy (Allgood & Walstad, 2013, 2016; Asaad, 2015; Porto & Xiao, 2016). This was the definition adopted for the purposes of this study. Kramer (2016) measured overconfidence (and under-confidence) by regressing self-assessed literacy against actual literacy, accounting for the difference as overconfidence (that part of self-assessed literacy not explained by actual literacy). This was similar in principal to the method just described. Gentile et al (2016) used three measures of overconfidence in their study. The first was where participants rated themselves as above average in making financial decisions. The second followed other studies and was the mismatch between self-assessed knowledge and actual knowledge. The third indicator was a 'self confidence index', linked to the number of 'don't know' answers given. Gentile argued this was a proxy for overconfidence, as participants were more likely to answer 'don't know' rather than taking a guess.

A commonly used measure of overconfidence in psychology research is the 'bias score' (Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008; Hacker, Bol, Horgan, & Rakaw, 2000). This measures the mean of all confidence scores compared with the overall success rate (Lichtenstein & Fischhoff, 1977). The score shows the direction of the difference between perceived and actual knowledge (hence showing under, and over, confidence) and the size of that difference. This approach is conceptually similar to that used in other studies described above, however, more useful when more than one measure of perceived knowledge is used. For example, if in a test of literacy, perceived knowledge was assessed after every question, as opposed to assessment

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[74] The groups were High-High (high actual, high perceived) High-Low (high actual, low perceived), Low-High (low actual, high perceived) and Low-Low (low actual, low perceived).
[75] These terms were used as an alternative to 'actual' and 'perceived' financial literacy to mean the same thing.

being made at one point in time only. This was not the case in this study therefore, using the bias score was not considered.

The approach and justification for the scoring methods used in this study are explained in the next section.

## 3.8   Establishing Pension Literacy Scores

### 3.8.1   Actual Pension Literacy

This section describes the methods used to determine pension literacy scores once the participants had completed the test. The first measure was based on the most common approach in the literature and simply totalled the number of correct answers out of 20 (Ramalho & Forte, 2018). This provided useful information, was easy to understand and checked the robustness of other methods. As discussed earlier, this method did not take account of the relative difficulty of questions.

Because of this, a second more complex method was applied. This adapted the PRIDIT scoring method described in section 3.7. Scores were weighted based on question difficulty, such that a correct answer was given more credit if most of the sample answered incorrectly and incorrect answers were penalised more heavily if most of the sample answered correctly. For example, a correct answer to question one, that 68.6% of the sample answered correctly (and 31.4% incorrectly) was scored as +0.314 for a correct answer and -0.686 for an incorrect answer. Table 10 (below) shows the weights assigned to all 20 questions[76]. It can be seen the most difficult question was question 20 and question two was the easiest. A total score was determined for each participant totalling individual question scores. This was used to represent actual pension literacy in the inferential data analysis.

Table 10 *Assignment of Question Weights*

| Question No | % Correct | % Incorrect | Weighted correct score | Weighted Incorrect score |
|---|---|---|---|---|
| 1 | 68.6 | 31.4 | 0.314 | -0.686 |
| 2 | 84.1 | 15.9 | 0.159 | -0.841 |
| 3 | 63.2 | 36.8 | 0.368 | -0.632 |
| 4 | 67.2 | 32.8 | 0.328 | -0.672 |

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[76] The 'don't know' answers were coded as incorrect for scoring. 'Refuse to answer' questions were coded as missing data.

| 5 | 71.9 | 28.1 | 0.281 | -0.719 |
|---|------|------|-------|--------|
| 6 | 37.2 | 62.8 | 0.628 | -0.372 |
| 7 | 62.2 | 37.8 | 0.378 | -0.622 |
| 8 | 60.6 | 39.4 | 0.394 | -0.606 |
| 9 | 49.7 | 50.3 | 0.503 | -0.497 |
| 10 | 54.6 | 45.4 | 0.454 | -0.546 |
| 11 | 82.8 | 17.2 | 0.172 | -0.828 |
| 12 | 70.0 | 30.0 | 0.300 | -0.700 |
| 13 | 47.5 | 52.5 | 0.525 | -0.475 |
| 14 | 61.4 | 38.6 | 0.386 | -0.614 |
| 15 | 26.0 | 74.0 | 0.740 | -0.260 |
| 16 | 54.7 | 45.3 | 0.453 | -0.547 |
| 17 | 52.2 | 47.8 | 0.478 | -0.522 |
| 18 | 57.7 | 42.3 | 0.423 | -0.577 |
| 19 | 28.7 | 71.3 | 0.713 | -0.287 |
| 20 | 13.8 | 86.2 | 0.862 | -0.138 |

In order to explore whether the concept of pension literacy could be broken down further, by grouping questions into meaningful subgroups, principal components analysis was applied to the weighted question scores in line with previous studies (Gentile, Linciano, & Soccorso, 2016; Lusardi et al., 2014). Although the test of pension literacy was structured in three sections on a thematic basis, it was important that the drivers of pension literacy emerged from the empirical data, so that meaningful factor scores could be obtained for further analysis.

The Kaiser-Meyer-Olin (KNO) measure of sampling adequacy was 0.882 and Bartlett's test of sphericity was significant ($x^2 = 1972.45$, $df = 190$ $p < .001$) indicating that the data was suitable for principle components analysis. The analysis was performed using an oblique rotation method, based on covariance. By applying Kaiser's criterion (Kaiser, 1974), five meaningful components were extracted explaining 47.2% of variance. This approach was in contrast to previous studies that retained only the largest eigenvalue[77]. Upon examination, each component was seen

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[77] With factor scores generated from this component used to indicate financial literacy.

to represent different aspects of pension literacy and so there was no attempt to reduce the number of factors. Eight questions were seen to load heavily on component one, these were all questions relating to financial literacy, as opposed to more specific pension knowledge. Seven questions loaded on component two, which were all about basic pension knowledge, including knowledge of particular types of pension products. The third component had only two questions loading on it, these questions were all about conceptualising the relationship between an accumulated pension fund and income in retirement and was therefore labelled 'pension planning'. The fourth component had only one question loaded on it. However, on examination this made sense, in that it was about advisor charging, which was the only question related to this aspect of pension literacy. The final component had two questions loaded on it. It was decided to label this as 'withdrawing your pension' as both questions concerned income needs in retirement and taxation of lump sums. These two questions could arguably have loaded on components two or four. However, one of the questions (question 14) loaded heavily on component five and although the other (question six) loaded less heavily, it was predominantly loaded on this component.

To assess reliability, Cronbach Alpha was calculated on items comprising component one (financial literacy) and component two (basic pension knowledge) separately. This was reported as 0.753 (eight items) for component one and 0.721 (seven items) for component two. This demonstrated good internal consistency (Cronbach, 1951). The other three components had only one or two questions loading on them. Therefore, Cronbach Alpha was unlikely to give a reliable result (Field, 2013).

The component structure made sense in terms of interpretation of question groupings and components one and two showed good internal consistency for the majority of scale items. This was deemed to show satisfactory internal consistency for the purposes of the data analysis, which was to derive factor scores to use as regression coefficients in the determination of pension literacy. The factor scores generated for each component were saved as five continuous variables representing individuals' scores for each of the five areas of pension literacy. These represented alternative, more detailed, measures of actual pension literacy to the total weighted score previously described. The five components are shown in Table 11 (below), with the associated questions related to each of them. Table 12 (p. 138) shows a summary of factor loadings on each component.

Table 11 *Questions Loading on Components using PCA*

| Component | Label | Questions loading on component |
|---|---|---|
| 1 | Financial Literacy | 12,3,5,4,11,8,2,1 |
| 2 | Basic Pension Knowledge | 17,18,19,20,15,16,7 |
| 3 | Pension Planning | 10,9 |
| 4 | Advisor Charging | 13 |
| 5 | Withdrawing your Pension | 14,6 |

### 3.8.2   Perceived Pension Literacy

Perceived pension knowledge was measured at two places in the survey using a 5-point Likert scale. Firstly, before completing the test of pension literacy (Q5) and secondly, after the test, but before receiving the score and feedback (Q39). Confidence was measured in two places (Q4 and Q6).

Perceived knowledge and financial confidence were combined into one composite measure labelled 'perceived knowledge'. Cronbach's alpha was applied to questions four, five and six to determine the degree to which these questions were unidimensional and therefore, could be combined (Field, 2013). Perceived knowledge and confidence have been shown to be very closely related in the literature and previous studies have taken a similar approach (Allgood & Walstad, 2016; Asaad, 2015; Robb et al., 2012). Cronbach's alpha was 0.841, which is considered good (Cronbach, 1951). Participants' scores for these three questions were totalled (out of 15) to give a perceived pension literacy score. An additional advantage of combining three Likert scales was that it enabled the perceived literacy measure to be treated as a continuous variable in further data analysis[78] (Rao & Sinharay, 2007). This was used as the main measure of perceived literacy in the inferential data analysis.

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[78] There is a debate in the literature as to whether Likert data should be treated as ordinal or continuous. A review of the arguments is given by Yusoff and Janor (2014).Where scales are combined to increase the possible number of outcomes (in this case 15 possible total scores), then the argument for treating the variable as continuous is stronger (Rao & Sinharay, 2007).

Table 12: *Principal Components Analysis - Factor Loadings after Direct Oblimin Rotation*

| Question | Question Topic[79] | Component 1 | Component 2 | Component 3 | Component 4 | Component 5 |
|---|---|---|---|---|---|---|
| 12 | Diversification of risk when investing in shares | 0.696 | | | | |
| 3 | Risk appetite and fund selection | 0.653 | | | | |
| 5 | Variability of returns between asset classes | 0.629 | | | | |
| 4 | Time value of money | 0.608 | | | | |
| 11 | Effect of inflation on income needs and pension value | 0.551 | | | | |
| 8 | Knowledge of annuities related to pensions | 0.538 | | | | |
| 2 | Effects of inflation on investment returns | 0.528 | | | | |
| 1 | Compound interest | 0.414 | | | | |
| 17 | Knowledge of pension products - drawdown | | 0.742 | | | |
| 18 | Knowledge of pension products - Annuity | | 0.662 | | | |
| 19 | Knowledge of pensions – passing on fund upon death | | 0.648 | | | |
| 15 | Fund value to seek financial advice to transfer DB to DC | | 0.479 | | | |
| 16 | Types of funds accessible under 2015 Freedoms | | 0.454 | | | |
| 7 | Knowledge of pension types – defined contribution | | 0.432 | | | |
| 20 | Age of pension access under Freedoms | | 0.301 | | | |
| 10 | Conception of how long a given fund would last | | | 0.835 | | |
| 9 | Size of pot required to buy a given pension | | | 0.529 | | |
| 13 | Knowledge of how financial advisors charge for services | | | | 0.983 | |
| 14 | Income needs in retirement compared to present | | | | | 0.846 |
| 6 | Tax free withdrawal percentage | | | | | 0.414 |

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[79] For full question wording please refer to the full test of pension literacy in Appendix 1.

### 3.8.3 Combined Pension Literacy

Each participants score (for both actual and perceived literacy described above) was compared to the sample means (Ramalho & Forte, 2018). Participants scoring below the mean were identified as low literacy and participants scoring above the mean, high literacy. In line with other studies (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Ramalho & Forte, 2018; Robb et al., 2012), the categories were combined to divide the participants into four groups, as shown in Figure 122[80] (below). These four groups were used as independent categorical variables in the data analysis.
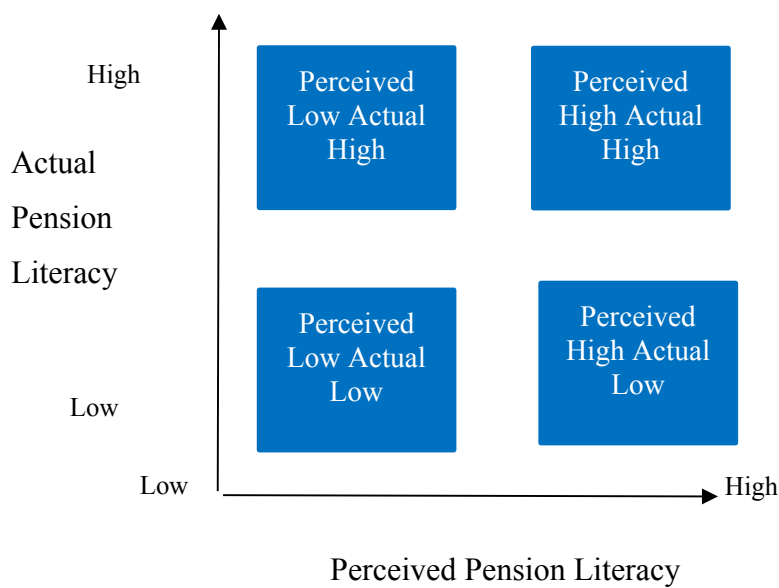


*Figure 12.* Pension Literacy: Grouped according to Perceived and Actual Pension Literacy. *Adapted from* "Financial Literacy, Confidence and Financial Advice Seeking" by Kramer (2016), *Journal of Economic Behaviour and Organisation.*

This section has explained and justified the methods by which actual and perceived pension literacy were measured, both separately and combined. The next section explains how these were used in statistical analysis in order to address the hypotheses stated earlier in this chapter.

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[80] The process was carried out using the weighted actual scores. However, to check consistency it was repeated using absolute question scores to represent actual pension literacy. The categories assigned were mainly consistent between the two methods with very few exceptions.

## 3.9 Data Analysis Methods – Logistic Regression and One-Way Analysis of Variance (ANOVA)

### 3.9.1 Logistic Regression

Logistic regression was applied to examine the relationship between pension literacy and financial behaviour. This followed the approach used in the key academic studies reviewed in chapter 2. These are summarised in Table 13 (p.143).

Logistic regression is used to predict categorical outcome (dependent) variables from continuous or categorical predictor (independent) variables. Binary logistic regression is applied when the outcome variable is dichotomous (Field, 2013). In this study, this applied to whether or not the participant was likely to engage in a particular type of financial behaviour (to seek financial advice or plan for retirement). As such, logistic regression was used to address hypotheses $H_2$ to $H_4$ and $H_7$ to $H_9$.

The concept that underpins logistic regression is the logit, the natural logarithm of an odds ratio (Peng, Lee, & Ingersoll, 2002). The objective was to determine the probability of a data case belonging to category Y (coded '1'), given known values of $X$[81]. So for example, the probability of a given individual engaging in retirement planning for a given set of predictor variables (equation 1).

$$P(Y) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_n X_{ni})}}$$

(1)

Where P(Y) is the probability of Y occurring, $e$ is the base of natural logarithms and the $\beta$-coefficients of the x predictor variables are estimated from the sample data using the maximum likelihood method.[82] The equation can also be expressed in a linear form showing the predictor variables' linear relationship with the log of the odds ratio, also termed the logit of the outcome variable (equation 2).

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[81] In linear regression, the value of Y is predicted from values of X. In logistic regression the assumption of linearity is violated as the outcome variable is categorical. Using a logarithmic transformation, it is possible to express a non-linear relationship in a way that is linear.

[82] The maximum likelihood method replaces the least square method used in linear regression. $\beta$ values are selected that are most likely to have occurred. The chosen values of $\beta$ are the ones that, when the values of the independent variables are placed in the model, result in values of Y that are nearest to the observed values.

$$logit\ (Y) = a + \beta 1 X1 + \beta 2 X2 + \cdots + \beta n Xn$$

(2)

Logistic regression is interpreted using the odds ratio, the exponential of the $\beta$ coefficient ($e^{\beta}$). The odds of an event happening are calculated as the probability of the event happening divided by the probability of the event not happening (equation 3).

$$Odds = \frac{P\ (event)}{P(no\ event)}$$

(3)

The odds ratio is the proportionate change in the odds of the event occurring caused by a unit change in a predictor variable (equation 4). A value greater than one shows that as the predictor variable increases, so do the odds of the event occurring. Whereas a value less than one means that as the predictor variable increases, the odds of the event happening decrease. This ratio was used in this study to assess the impact on financial behaviour of a change in one unit of actual or perceived pension literacy. Additionally, it was used to assess the relative odds of various categorical variables (such as gender and age) when compared to a reference category, on financial behaviour.

$$Odds\ ratio = \frac{Odds\ after\ a\ unit\ change\ in\ the\ predictor}{Original\ odds}$$

(4)

Logistic regression was conducted in two stages. Following Asaad (2015) and Robb et al (2012), the first stage was exploratory and aimed to establish the association between pension literacy and various binary outcome variables representing seeking financial advice and retirement planning. Each regression in this stage was first performed using only the main predictors of actual and perceived pension literacy. Control variables were then added based on theory and the regressions repeated. The $\beta$ coefficients and odds ratios were interpreted and the statistically significant predictors noted. The second stage involved building two logistic regression models based on the predictors found to be significant in stage one. These predicted the

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likelihood of seeking financial advice and retirement planning. The approach to this is explained in more detail in the following sections.

### 3.9.2 Assumptions of Logistic Regression

There are four assumptions that should be satisfied in logistic regression. These are that the observations should be independent of each other, there should be no multi-collinearity between independent variables, the sample size should be of sufficient size to claim statistical significance and the independent variables should be linearly related to the log odds (Field, 2013). These assumptions were tested against the final models. The results are reported in chapter 5.

Table 13 *Summary of Data Analysis Methods used in the Key Papers*

| Paper | Main themes of study | Methods | Sample |
|---|---|---|---|
| Financial Literacy and Financial Behaviour: Assessing Knowledge and Confidence (Asaad, 2015) | Relationship between confidence and overconfidence and financial behaviour. | Applied logistic regression to establish whether financial confidence and actual financial literacy affect propensity to engage in risky financial behaviours. Grouped participants into four groups according to actual and perceived scores. Reported odds Ratios to show likelihood of event happening in one group with reference to a base group (low-low group). | $N = 25,509$ U.S |
| Inappropriate Confidence and Retirement Planning: Four studies with a National sample (Parker et al., 2012) | Examined four studies exploring the role of confidence and financial knowledge in relation to retirement planning. | Applied logistic regression to determine whether fee minimisation when investing was determined by confidence (controlling for knowledge). | Data from 4 ALP[83] studies: $N = 560$-$1150$. U.S |
| The Effects of Perceived and Actual Financial Literacy on Financial Behaviours (Allgood & Walstad, 2016) | Demonstrated that combined actual and perceived measures of financial literacy are more effective at predicting financial behaviour than using individual measures. | Used probit regression[84] to examine the relationship between literacy and 22 financial behaviours over 5 domains. Grouped participants into four groups according to combination of actual and perceived financial literacy and reported odds ratios with low-low group omitted group. Control variables were 10 demographic variables. | 2009 State by state survey in U.S $N = 28,146$ |
| The Demand for Financial Professionals Advice: The role of Financial Knowledge, Satisfaction and Confidence (Robb et al., 2012) | Objective and subjective financial knowledge are both positively correlated with using financial advice for most personal finance areas. | Did six logistic regressions between each variable (knowledge, confidence, satisfaction, risk attitude, race, gender, marital status, income and other demographics) and six different types of advice. Reported coefficients and used odds ratio for interpretation of models. | 2009 NFCS $N = 28146$ U.S |

[83] ALP American Life Panel.

[84] Probit regression is similar to logistic regression in that both are generalised linear models and can be used to show the relationship between one or more predictor categorical variables and a categorical outcome. They differ in their link functions. Logistic regression uses a logit link function, probit regression uses an inverse normal link function.

| | | |
|---|---|---|
| Study to examine the effect of overconfidence on seeking financial advice | Sample divided into four groups according to mean scores. Used multinomial logistic regression[85] and Presented odds ratios for each type of financial advice. Used the competent group as the base group. | 2012 NFCS $N = 25,509$ |
| To examine the relationship between financial literacy and financial advice seeking, particularly the role of overconfidence. | Multi-variate analysis of advice seeking using a probit regression model. Presented coefficients based on a range of independent variables (socio demographic). | 2 samples: Dutch Bank 2005 (DNB) $N = 467$ and $N = 354$ |
| Financial advice acts as a complement to financial literacy in that demand for advice is positively related to financial literacy. | Used probit regression to show how actual and perceived financial literacy are related to the propensity to seek advice. | Italian households $N = 1013$ |
| Actual knowledge is positively related to savings but not perceived knowledge. | Used logistic regression to examine the relationship between actual knowledge, perceived knowledge, risk tolerance, education and major of study. Demographics used as control variables. Dependent variable was regular personal saving. | Vietnam 240 commercial banks. $N = 211$ |
| Women show less knowledge of personal finance topics than men | Participants grouped into two groups according to median score. Used as dependent variable in logistic regression. Tested gender differences using variables (class, age, race, income, experience) and male and female separately to see if independent variables were associated with financial literacy. | Students in California U.S $N = 924$ |

### 3.9.3  Defining Outcome Variables

In order to test hypotheses two, three and four concerning pension literacy and financial advice, nine binary outcome variables were defined. In the survey, participants were asked whether they intended to seek financial advice in relation to their pension choices (Q7). Participants who answered 'yes' were coded '1' and those who answered 'no' were coded '0' Those who did not know, were coded as missing values[86] as it could not be determined whether they would choose to seek advice or not. Participants were also asked to indicate which sources of pension advice and guidance they had already, or would be likely to, consult when presented with a range (Q2). Each of seven different sources of advice and guidance were defined as binary outcome variables, coded '1' indicating the participant had or would seek advice from that source, and '0' indicating they had not or would not. Finally, an additional outcome variable was created, coded '1' where participants indicated they would be likely to consult, or had consulted any, of the seven forms of advice or guidance[87].

In order to test hypotheses seven, eight and nine concerning retirement planning, just one outcome variable was defined. In the survey, participants were asked whether they had ever tried to work out how much income they would need in retirement (Q3). The outcome variables are summarised in Table 14 (below).

Table 14 *Outcome Variables for Logistic Regressions*

| Outcome Number | Binary Outcome Variable/ Label | Hypothesis |
|---|---|---|
| 1 | Do you intend to seek financial advice? (Q7) (FA_O) | $H_2, H_3$ and $H_4$ |
| 2 | Have you or do you intend to seek advice from Pension Wise? (Q2) (FA_PW) | $H_2, H_3$ and $H_4$ |
| 3 | Have you or do you intend to seek advice from an IFA? (Q2) (FA_IFA)[88] | $H_2, H_3$ and $H_4$ |

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[86] This outcome was therefore recoded as a binary outcome from the raw data. The 'don't know' answers ($n = 213$) were coded as missing for this purpose. This represented a significant volume of responses and was highlighted as a finding in itself in chapter 6.

[87] This was where the individual had ticked at least one of the options presented in question 2 indicating the various sources of advice and guidance.

[88] This question was different to that in question 7 as it asked participants whether they had already, or would be willing to, seek advice from an IFA. Question 7 was specifically about intention to pay for advice prior to making pension choices.

| 4 | Have you or do you intend to seek advice from your pension provider? (Q2) (FA_PP) | $H_2$, $H_3$ and $H_4$ |
| 5 | Have you or do you intend to seek advice from the internet? (Q2) (FA_I) | $H_2$, $H_3$ and $H_4$ |
| 6 | Have you or do you intend to seek advice from government sources? (Q2) (FA_G) | $H_2$, $H_3$ and $H_4$ |
| 7 | Have you or do you intend to seek advice from friends and family? (Q2) FA_FF) | $H_2$, $H_3$ and $H_4$ |
| 8 | Have you or do you intend to seek advice from an employer? (Q2) (FA_E) | $H_2$, $H_3$ and $H_4$ |
| 9 | Any advice at all (answered yes to any of the Q2 options) (FA_AA) | $H_2$, $H_3$ and $H_4$ |
| 10 | Have you tried to work out your income in retirement? (Q3) (RP) | $H_7$, $H_8$ and $H_9$ |

### 3.9.4 Defining Main Predictor Variables

Sections 3.8.1 and 3.8.2 described the methods used to establish continuous variables representing weighted actual pension literacy and perceived pension literacy. In addition, scores were combined to establish four categorical variables each representing a combination of weighted actual and perceived pension literacy (section 3.8.3). Additionally, the component factor scores from the PCA represented an alternative, more detailed, measure of actual pension literacy (section 3.8.1). All of these were used as main predictor variables for the stage one regressions. All continuous measures were converted to Z scores for ease of interpretation of the output.

These predictor variables were combined in three different ways, each combination representing one set of variables input into a logistic regression simultaneously. The three sets are summarised in Table 15 (below).

Table 15 *Main Predictor Variable Sets for Logistic Regressions*

| Set | Combination of Predictor Variables | No of Predictor Variables | Predictor Variables (Label) |
|---|---|---|---|
| 1 | Combined Groups | 3 | Combined groups of actual and perceived pension literacy (categorical variable with low perceived, low actual as omitted group):<br>- Low Perceived, High Actual (LOWP_HIGHA)<br>- High Perceived, Low Actual (HIGHP_LOWA)<br>- High Perceived, High Actual (HIGHP_HIGHA) |
| 2 | Total Weighted and Total Perceived | 2 | - Total Perceived score (PER_TOT)<br>- Total weighted score (ACT_TOT) |
| 3 | Components from PCA and Total Perceived | 6 | - Total Perceived Score (PER_TOT)<br>Five total factor scores from PCA analysis:<br>- Financial Literacy score (C1_FL)<br>- Basic Pension Literacy score (C2_PL)<br>- Pension Planning score (C3_PP)<br>- Advisor Charging score (C4_AC)<br>- Withdrawing your Pension score (C5_WP) |

For each set of predictors in Table 15, regressions were conducted against each of the 10 outcome variables in Table 14 (30 regressions in total). The odds ratios and $\beta$ coefficients were analysed and statistically significant predictor variables noted for the stage two regressions.

### 3.9.5 Defining Control Variables

Control variables were added to the regressions in line with other studies (Asaad, 2015; Robb et al., 2012). These were income, age, gender, employment status, marital status, and pension pot size. These variables correlated to some degree with the dependent variables and their relationship to financial advice seeking and retirement planning has been established in the literature. It was also important to include them in their own right to assess their association with the outcome variables. For example, it was useful to examine any difference in odds of seeking financial advice due to gender and age. The controls were all categorical variables, coded as dummy variables

with the first category specified as the omitted category[89]. Due to sparseness of data[90], some of the categories were collapsed (Menard, 2002). Information on ethnicity, industry and employment sector was collected in the survey. However, the sample did not include a sufficient representation across all categories to include in the regression analysis. The 30 regressions described in section 3.9.4 were repeated, this time with the addition of the six control variables. The odds ratios and $\beta$ coefficients were analysed and the statistically significant predictors noted for the stage two regressions.

The full coding of the variables can be seen in Appendix 2.

### 3.9.6   Building Logistic Regression Models

The second stage of the regressions was to build two logistic regression models to explain the odds of seeking financial advice and planning for retirement based on the predictor variables. This was informed by the stage one regressions.

Firstly, for each outcome variable, all predictor variables were entered into the model following a hierarchical approach. The main variables of interest, actual (ACT_TOT) and perceived pension literacy (PER_TOT) were entered as block one[91]. The statistically significant control variables from the stage one regressions were added as block two and the non-significant variables added as block three. The improvement to the model made by each block of predictors was assessed based on overall model evaluations and goodness of fit statistics (Field, 2013; Peng et al., 2002). Based on the results, the input variables for the final models were determined.

An interaction is where two or more predictor variables interact with each other in terms of their impact on the outcome variable (Field, 2013). The interaction between actual and perceived pension literacy was included in the stage two regressions

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[89] The first category of each control categorical predictor variable was specified as the reference category in the stage one regressions. The odds ratios were expressed with reference to this category.

[90] If all combinations of predictor and outcome variables are not sufficiently populated, this problem can arise. This is complete separation. Although software does not indicate when this has happened in the output, its' presence is detected by unusually large $\beta$ coefficients or standard errors of predictors where this has occurred (Peng & Tak-Shing, 2002). One solution is to collapse the categories (Field, 2013).

[91] The raw weighted scores were used instead of Z scores in this stage of the regressions. The purpose of the model was to calculate odds of seeking advice or planning for retirement given an individual's raw scores on the survey. These variables were chosen to model, as opposed to the component categories from the PCA or the combined groups. This was because these predictors do not require any further manipulation of the score data.

following the approach of Asaad et al (2015). If the interaction was not significant, it was excluded from the model in the interests of parsimony.

The residuals of the final models were examined and the model tested to validate the predicted probabilities (Field, 2013). This is reflected upon further in chapter 5.

### 3.9.7 One-Way Analysis of Variance (ANOVA)

One-way analysis of variance (ANOVA) is used to compare means of three or more independent groups. It was applied to examine descriptive statistics (for example, to compare mean perceived pension literacy scores in relation to age or pension type). In addition, ANOVA was applied in order to test hypotheses five and six relating to age and pension literacy.

In order to use ANOVA, it was necessary for the data to meet certain assumptions. These were, that the dependent variable for each group was normally distributed[92], there was homogeneity of variance[93] and that observations were independent of each other. These assumptions were upheld.

The 'F ratio' compares the between group variance to the within group variance. It is compared to a maximum value obtainable if there were no difference in group means in an F-distribution with the same degrees of freedom. If the 'F ratio' exceeds this value, this indicates a difference in means, indicated by a significant p value (Field, 2013).

Post hoc testing is required to assess, in the case of a significant ANOVA, which specific group means differ. Hochberg's GT2 test was applied in this study because group sample sizes were different. This test also controls the Type 1 error rate and has good statistical power[94] (Field, 2013). The statistical tests used in the data analysis are summarised in Table 16 (below).

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[92] Because the sample sizes used were $n > 30$ then the assumption of normality holds due to central limit theory. In cases where samples $n < 30$ then normality can be assumed in the population unless stated. ANOVA is also a robust test against the normality assumption (Field, 2013).

[93] This is tested using Levene's test. Where this assumption is violated Welch's $F$ test (Welch, 1951) is used which is robust when this assumption has been violated (Field, 2013).

[94] A type 1 error is rejection of a true null hypothesis. A type 2 error is the non-rejection of a false null hypothesis. The type 1 error is controlled by the test so that the overall rate remains at 0.05.

*ts and Related Hypotheses*

| | Statistical Method of Analysis | Relevant Literature |
|---|---|---|
| ion | Pearson Correlation.<br>Bland-Altman Plot.<br>Linear regression. | (Agnew & Szykman, 2005; Parker et al., 2012).<br>(De Zwaan et al., 2017) |
| d | Binary Logistic Regression. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012)<br>(Lusardi & Mitchell, 2007b, 2007c) (Asaad, 2015) |
| y and | Binary Logistic Regression. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012)<br>Lusardi & Mitchell, 2007b, 2007c) (Asaad, 2015) |
| l<br>g | Binary Logistic Regression. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb, Babiarz, & Woodyard, 2012) (Nguyen et al., 2017)<br>Lusardi & Mitchell, 2007b, 2007c) (Asaad, 2015) |
| ual | ANOVA – One-way analysis of variance. | (Finke et al., 2017; Xiao et al., 2015) |
| | ANOVA – One-way analysis of variance. | (Finke et al., 2017; Xiao et al., 2015) |
| d | Binary Logistic Regression. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012)<br>(Lusardi & Mitchell, 2007b, 2007c) |
| y and | Binary Logistic Regression. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012)<br>(Lusardi & Mitchell, 2007b, 2007c) |
| l | Binary Logistic regression<br>Chi squared. | (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016; Robb et al., 2012) (Lusardi & Mitchell, 2007b, |

### 3.10 Replicability, Reliability and Validity

### 3.10.1 Replicability

Three important criteria that enable social research to be evaluated effectively are replicability, reliability and validity (Bryman, 2012). Replicability is the extent to which another researcher can objectively replicate a study. This may be in another context, using a different sample or in another time-period (Sarantakos, 2013). For example, it may be useful to replicate this study with younger age groups or in other regions of the U.K. Alternatively, a comparable sample making choices some years after the pension reforms could be compared to this sample, who were immediately affected.

This study used an on-line test of pension knowledge, situated within a survey, which could be applied to any sample and is such replicable. In an alternative context, evaluating other forms of literacy other than 'pension literacy', other researchers could adopt the process shown in Figure 11 (p.124) to establish a comparable research instrument. This is discussed further in chapter 7.

### 3.10.2 Reliability

Reliability is concerned with the consistency and stability in measurement of a concept (Bryman, 2012). In this study, the concept measured was pension literacy. Reliability here means that if the study were to be conducted with a different sample of participants, then similar results would be obtained (Cohen et al., 2017). This was not easy to determine, as it would have required replicating the study in these circumstances. One approach suggested by Bryman (2012) is to ask participants to complete a survey more than once and determine whether the answers remain the same. In this study, this was not possible as participants were given the answers to incorrect or 'don't know' questions upon completion of the test, so would have been very likely to score higher the second time around. Despite these issues, it was possible to address reliability in the research design phase by addressing potential bias.

It was possible that in asking participants about their levels of knowledge, they wanted to present themselves in a favourable way (Robson & McCartan, 2016). Conversely, it may have appeared arrogant or boastful to express high levels of self-knowledge and therefore, influence scores in the opposite way (Yates et al., 1997). This is participant

bias. This was addressed by informing participants that the survey was completely anonymous.

When using surveys, reliability may be compromised by situational factors or the conditions in which they are completed (Cohen et al., 2017). In this study, if individuals were rushed or distracted when completing the survey, it could have resulted in ill-considered responses. This was addressed by informing participants that the survey would take eight to ten minutes to complete. In this way, participants were more likely to start the survey when they had time to complete it properly. As completion was voluntary, it was also likely that only individuals sufficiently interested in the outcome would start the survey, allowing appropriate time to complete it properly.

### 3.10.3 Validity

Validity refers to the integrity of findings and conclusions (Bryman, 2012). Face validity is concerned with the degree to which a research instrument measures what it intends to measure, in this study, whether the survey accurately measured pension literacy (Bell & Bryman, 2015; Hardesty & Bearden, 2004). This was addressed in two ways:

The first was by applying a rigorous approach to survey development. By inviting experts to validate subject areas and guide question development, the test was more likely to be a valid test of pension knowledge. The second was by applying Cronbach's alpha to the test of pension literacy, it was 0.832 ($n = 568$) which is considered good (Field, 2013).

External validity is the extent to which results are generalizable beyond a particular piece of research (Cohen et al., 2017). This study was based on a cluster sample of 581 individuals living in the North East of England. Due to its' size, this sample had sufficient statistical power (Field, 2013). However, ways in which the sample demographic differed from that of the wider North East population, and was therefore representative of the wider population, were noted and taken into consideration. This is discussed in chapter 7.

## 3.11 Ethics

Research needs to be conducted in an ethical manner. To protect the participants in a study, the researcher should behave honestly and with integrity, giving respect for the rights and dignity of the participants, who should not be harmed as a result of their participation in the study (Denscombe, 2003). Researchers should also gain the consent of participants (Reeves & Harper, 1981). These principles are incorporated into the Northumbria University Ethics Policy (Northumbria University, 2018).

Organisational consent was granted to access the university global email distribution list (Appendix 3). Individual informed consent may be implicit in the action of completing a survey. At the start of the survey, participants were shown a statement that assured them of their anonymity (Appendix 1).

One further ethical consideration was not to give participants the idea that, if they scored well in the test of pension literacy, there was no requirement for them to seek advice. This would be unethical, it could leave individuals disadvantaged if they did not seek advice having been given the impression their pension knowledge was sufficient. The feedback given to participants was worded carefully so that they did not get this impression and all feedback directed them to the 'Pension Wise' website (section 3.5.3).

## 3.12 Limitations

This section summarises the limitations concerning the methods discussed in this chapter. The introduction of GDPR meant the sampling strategy was readdressed. The author had established a network of financial advisors who had offered to distribute the survey to their clients and were unable to do so due to GDPR. In addition to the issues caused by GDPR, websites that the author had planned to use to distribute the survey were unavailable. Because the data collection strategy was readdressed, a significant number of participants were employees of Northumbria University. This included both academic and non-academic staff. However, this led to the sample having a greater number of individuals with higher levels of education and income than would be expected from a random sample.

The final sample contained some groups that were under-represented, therefore, categories had to be collapsed in the logistic regressions due to sparseness of data. In

collapsing categories, data is lost. This was the case for employment status, marital status and income. Although reflective of the North East region, the majority of participants were of White-British ethnicity. Because there was insufficient representation of other ethnicities, the data analysis was unable to include ethnicity as a variable.

## 3.13  Conclusion

This chapter began in section 3.2 by summarising the research questions and related hypotheses informed by the literature reviewed in chapter 2. The study followed a realist ontology and a positivist epistemology; these philosophical principles were explained and justified in section 3.3. A deductive approach tested theories concerning the relationship between pension literacy and both the propensity to seek financial advice and retirement planning. This was achieved by applying a quantitative, empirical approach using a non-experimental design. The construct of pension literacy was operationalised and measured in a sample of individuals over the age of 40, living in the North East region of England.

Based on a review of the empirical literature in section 3.4, the survey method was found the most common way to test financial literacy and considerable emphasis was placed on the questions developed by Lusardi and Mitchell ('the Big 5'). Many academic studies used these questions to test financial literacy and its association with financial behaviour. This study followed this design, using a survey incorporating a test of pension knowledge to collect data.

The process of developing the survey was described in section 3.5, with particular emphasis on the attempts made to maximise face validity. This was achieved by firstly, taking advice from a panel of 20 experts from the financial services industry to validate the question areas for inclusion and secondly, involving a Pensions Advisor to guide detailed question development. Cronbach's alpha established the test of pension knowledge as a valid test of concept as discussed in chapter 2 and represented by the definition and model of pension literacy. As such, additional survey questions to measure confidence, perceived pension knowledge and aspects of financial behaviour were included in the survey.

Despite initial problems caused by the introduction of GDPR, a decision was made to limit data analysis to those respondents living in the North East of England, aged 40

and over. This represented a cluster sample of 581 participants, of sufficient statistical power to enable inferences relating to the region to be drawn. This was covered in section 3.6.

Different methods of scoring financial literacy have been applied in the empirical studies. Following a review of these in section 3.7, the methods used to score pension literacy in this study were explained and justified in section 3.8. Based on the approach used in other empirical studies, participants' actual and perceived pension literacy were combined to form four groups.

The main method of statistical analysis was binary logistic regression. The rationale for this and the logic behind the creation of the predictor and outcome variables was explained. The regressions were conducted in two stages. The objective of this was firstly, to establish the statistically significant predictors by examination of odds ratios and secondly, to create two logistic regression models to establish the relationship between pension literacy and financial behaviour. The approach to this analysis was explained in section 3.9.

Issues regarding replicability, reliability and validity were addressed in section 3.10. By following the steps described earlier in this chapter, this study can be replicated in an alternative context, enabling the measurement of other types of literacy. Possible bias and the measures taken to address it were explained. Ethical approval for the study was confirmed in section 3.11 and ethical concerns were addressed. Limitations concerning the methodology were discussed in section 3.12.

The next three chapters present the findings from the study.

# 4    Results 1 – The Definition and Measurement of Pension Literacy

## 4.1    Introduction

This chapter is the first of three that present the results of the study. The results are ordered according to the themes in the literature review to enable their comparison and synthesis with the relevant literature. This chapter presents the findings in relation to the first theme; the definition of financial literacy, specifically, research questions one 'Can individuals assess their own level of pension literacy accurately?' and four 'How does pension literacy change with age?' It does so by addressing hypotheses one, five and six. The first theme was dealt with separately from the other two, it was judged an understanding of the participants' pension literacy was prerequisite to associating it with their financial behaviour. Therefore, the results relating to this theme are both reported and discussed in this chapter. Chapters 5 and 6 address pension literacy and financial behaviour and incorporate the other two themes.

Section 4.2 gives an overview of the sample, highlighting the most important descriptive statistics in terms of their demographics. The sample comprised 581 individuals living in the North East of England, aged over 40. It was important to determine the extent to which the sample was representative of the North East region. The full analysis of the sample demographic can be seen in Appendix 4.

Section 4.3 reports the participants' performance in the test of pension knowledge. Participants performed fairly well in sections one and two, particularly in areas that required basic financial literacy. However, in section three, on questions about the 2015 Pension Freedoms, they performed less well. The ANOVA showed most, but not all, demographic factors to have a statistically significant association with pension literacy. When pension literacy was deconstructed using PCA, these relationships were found to be limited specifically to certain components of pension literacy.

Section 4.4 reports the participants' perceived pension literacy. The participants were fairly confident about their financial security in retirement, however, they were less confident about making pension choices. They were even less confident about their pension knowledge, which they perceived to be low before having taken the test and even lower after having done so. The ANOVA showed most, but not all, demographic factors to be significantly associated with perceived pension literacy.

Section 4.5 considers the combined measure of pension literacy, formed from the combination of actual and perceived pension literacy into four groups based on comparison of participants' scores to sample means. Chi squared tests determined the extent to which group membership was associated with demographic factors, assessing the demographic characteristics of each group. The purpose of this was ultimately to identify individuals who could be at risk by associating group membership with specific financial behaviours relevant to this study.

Section 4.6 details how Bland-Altman charts and linear regression were used to determine the relationship between actual and perceived pension literacy, more specifically the extent to which perceived literacy was determined by actual literacy. Although around one third of the sample did not correctly perceive the level of their own pension literacy, linear regression showed actual pension literacy as statistically significant in determining perceived pension literacy, even in the presence of control variables.

Section 4.7 discusses the findings and their importance within the existing body of literature and public policy, as well as accepting or rejecting the relevant hypotheses.

Section 4.8 concludes the chapter and addresses the research questions.

## 4.2 Descriptive Statistics of the Sample

The sample was a cluster from the North East region of England, consisting of 581 individuals aged over 40, not yet fully retired. It was important to compare the demographics of the sample to that of the region to identify ways in which they differed. The full analysis of descriptive statistics is shown in Appendix 4. The highlights are briefly covered here.

A higher number of females ($n = 319$) completed the survey than males ($n = 256$)[95]. In the North East, there are marginally more females (51%) than males (49%) between ages 40 and 75 (Office for National Statistics, 2018b)[96]. The sample was largely consistent with the demographic of the region, although the sample had a slightly higher proportion of females (55%). The mean age of the sample was 51.5 years (*SD*

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[95] Six participants chose not to disclose their gender.
[96] . These were the latest statistics available at the time of the study.

= 6.9 years). The median was 51.9 years. Most of the sample (70.2%) were married or in a civil partnership.

The North East has a high proportion of individuals with white ethnicity, both as a whole and in the age range 40-75 (96.6%) (Office for National Statistics, 2018a), this was largely in line with the sample (95% white). However, although representing the ethnicity of the region, the data did not represent non-white ethnicity sufficiently to include ethnicity as a variable in the inferential data analysis.

The sample had high average educational qualifications, 43.7% of participants educated to degree or masters level[97]. There were also far fewer participants (1.4%) with no formal qualifications than is the case for the region which records 26.5% of its residents as having no formal qualifications, based on the latest population census (Office for National Statistics, 2011). The personal incomes of the sample were also higher. The sample mean income was £41,849[98] ($SD$ = £21,845) compared to a regional mean of £26,697 (House of Commons Library, 2018).

Although 'employed full time' represented the largest category in both the sample and the region, a larger percentage of the sample were employed, as opposed to unemployed, than in the regional demographic. The study targeted individuals not fully retired and as such, the sample included fewer retired individuals than in the North East region. Government, health, education, and defence are the biggest employers in the North East (Office for National Statistics, 2011) and this was also borne out in the sample. Most participants were employed in the public sector.

44% of the sample had only DB pensions, 14.1% had only DC pensions and 15.3% had both types. 20.8% of participants did not know their pension type, so could have had either type of pension. When asked about the size of their pension funds, 51.6% were unable to approximate a value. This was perhaps not surprising given the substantial number of participants with DB pensions determined by length of service and salary, as opposed to the accumulation of an investment fund. However, for other

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[97] Due to the data collection methods, there were more academics in the sample than would be expected from a random sample.
[98] To approximate the sample mean, the 'Over £100,000' ($n$ = 9) category was closed off at £120,000. Therefore, whilst not 100% accurate, it gives an approximation of sample mean.

participants this information would have been important to model the potential retirement income to which they may be entitled.

These differences can be partly attributed to the way in which the data was collected and were taken into account when the results were analysed and interpreted.

## 4.3 Actual Pension Literacy

### 4.3.1 Overview of Analysis

The purpose of this section is to give an overview of participants' performance in the test of pension knowledge. The test was broken down into three sections, these were analysed separately and in total. The first objective was to compare participants' performance across the three sections, identifying areas of strength or weakness, thus providing direction for future strategies aimed to improve pension literacy. The second objective was to assess the relationship between demographic factors and pension literacy for each section and in total using one-way analysis of variance (ANOVA). Principal components analysis determined five components relating to different elements of pension literacy (section 3.8). ANOVA was repeated based on demographic factors and each component to see if additional information emerged. Previous research has found that financial literacy is affected by demographic factors[99] and the findings add to this body of research with the focus on pension literacy.

### 4.3.2 Test Score - Descriptive Statistics

Table 17 (below) shows the descriptive statistics for each section of the test and in total, based on unweighted scores. An additional analysis by question breaking down the 'correct', 'incorrect' and 'don't know' answers is shown in Appendix 5.

Table 17 *Descriptive Statistics – Actual Pension Literacy Scores (Absolute Scores)*

| Section | $n$ | $M$ | $SD$ | Mode | Median | Skew | Kurtosis | Min | Max |
|---------|-----|-----|------|------|--------|------|----------|-----|-----|
| 1 | 574 | 3.55 | 1.43 | 5.00 | 4.00 | -0.79 | -0.36 | 0.00 | 5.00 |
| 2 | 575 | 4.67 | 1.95 | 6.00 | 5.00 | -0.45 | -0.37 | 0.00 | 8.00 |
| 3 | 580 | 2.95 | 1.92 | 3.00 | 3.00 | 0.14 | -0.96 | 0.00 | 7.00 |
| Total | 568 | 11.21 | 4.59 | 11.00 | 11.00 | -0.36 | -0.36 | 1.00 | 15.00 |

Note: $N < 581$ due to 'refuse to answer' responses, excluded from this analysis.

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[99] See Table 1 (p.44).

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Participants performed well in section one, basic financial literacy. The most frequently occurring score was five, the maximum marks in this section. The mean score was 3.55 out of five. The distribution shows a negative skew, indicating overall good performance (Figure 13, below). Participants found the question on the effect of inflation (Q2)[100] the easiest and 84% of the sample answered this correctly. The question on risk was the most difficult (Q3), however, despite of this, 63% of participants still answered this question correctly.

Participants found section two about basic pension literacy more difficult than section one. The most frequently occurring score was six out of eight and the mean score was 4.67. A larger number of participants were able to answer questions that relied to some extent on their basic financial literacy. For example, question 11, concerning the effect of inflation on income in retirement and pension pot size, was answered correctly by 82.6% of participants. Only 49.7% of participants were able to conceptualise the size of pension pot required for a given income and less than half knew the basis of advisor charging (47.3%). Overall however, the distribution had a negative skew, indicating good performance in this section (Figure 133).

Participants found the final set of questions the most difficult, shown by the positive skew, indicating that a greater number of participants scored lower marks (Figure 133). Very few participants scored maximum marks of seven[101] and the mean score was 2.95 out of seven. This section had no questions to which basic financial literacy could be applied, all questions tested the specific rules relating to the reforms. Question 14 asked participants about the age the new rules take effect and was answered correctly by the highest number of participants (61.4%). However, only 26% of participants knew the types of pensions accessible under the freedoms and only 13.8% knew the threshold for advice concerning DB to DC transfers.

The totals for each section were added together to give a total out of 20. The distribution of total scores shows a negative skew indicating overall higher than average performance (Figure 133).

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[100] Question references refer to the question numbers of the test of pension knowledge, shown in Appendix 5. The question numbers in the overall survey are different (Appendix 1).
[101] $n = 15$ (Appendix 5)
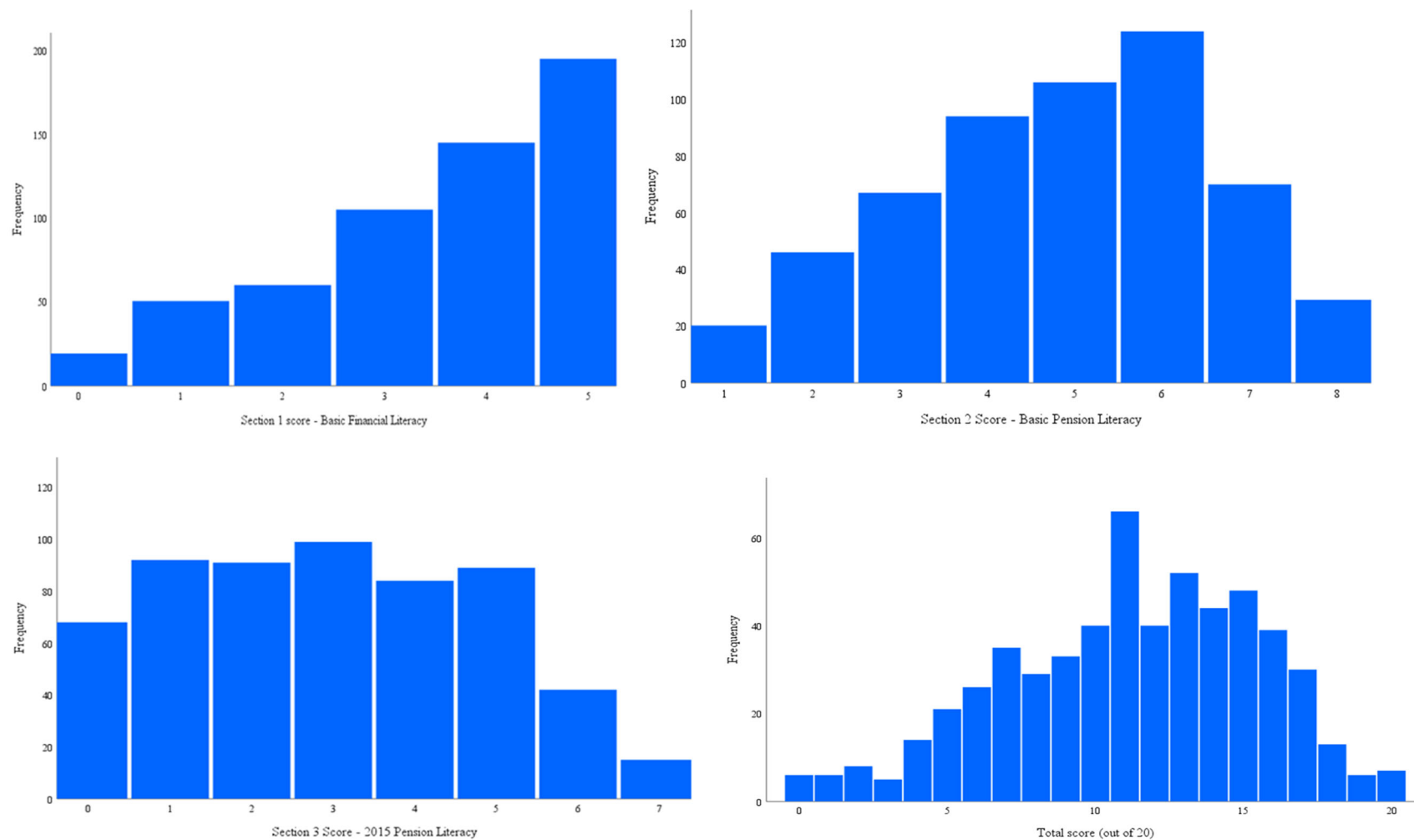
*Figure 13* Histograms to Show Pension Literacy Scores (by Section and in Total)

### 4.3.3 Results of the One-Way Analysis of Variance (ANOVA)

The results of the ANOVA are summarised in Table 18 (below). This shows the demographic factors that showed statistically significant differences in mean absolute scores between categories[102]. There were significant results for most of the demographic factors, indicating that they all had some association with pension literacy. A full breakdown of mean scores and standard deviations by demographic is shown in Table 20 (p.165).

Some demographic factors were significant across all three sections and in total, these were gender, income, pension size and type. Males had higher pension literacy than females and participants with more wealth, specifically higher incomes and larger pension pots, scored better than those with less wealth. Participants with some type of pension scored better than participants who had no pension, or those who had a pension but did not know its type.

Age was significant only in relation to section three and in total, broadly, pension literacy increased with age. Participants with higher qualifications scored better in sections one and two, but not in section three, than participants with fewer qualifications. Participants employed in the private sector scored higher in sections one and three, but not in section two, than those employed in the public sector. Marital and employment status did not show any significant differences across mean scores based on the breakdown of the questions into three sections.

The results of the ANOVA performed on the five components from the PCA are shown in Table 19 (p.164). The significant demographic factors were largely consistent with those above, however, there were differences due to the additional breakdown of pension knowledge. For example, marital status ($p < .10$) and employment status were significant in determining the score for 'advisor charging' and employment status was also significant for 'financial literacy'. This provided additional information that is discussed in more detail in section 4.7.

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[102] When significance is referred to in the text henceforth, the reader can infer statistical significance at the 1% significance level, unless otherwise stated.

Table 18 *Table of ANOVA Results showing the effect of Demographic Factors on Pension Literacy Scores, by Section and in Total.*

| Test Variable | Section 1 – Basic Financial Literacy | | Section 2 – Basic Pension Literacy | | Section 3 – 2015 Pension Freedoms | | Total Pension Literacy | |
|---|---|---|---|---|---|---|---|---|
| | *F* value | *p* value | *F* value | *p* value | *F* value | *p* value | *F* value | *p* value |
| Gender | $F(2,571) = 22.08^{***}$ | <.01 | $F(2,571) = 13.06^{***}$ | <.01 | $F(2,571) = 10.76^{***}$ | <.01 | $F(2,565) = 21.46^{***}$ | <.01 |
| Age | $F(5,568) = 1.64$ | 0.147 | $F(5,569) = 1.41$ | 0.219 | $F(5,574) = 8.96^{***}$ | <.01 | $F(5,562) = 3.75^{***}$ | <.01 |
| Marital Status | $F(5,568) = 0.24$ | 0.945 | $F(5,568) = 0.46$ | 0.803 | $F(5,574) = 1.10$ | 0.360 | $F(5,562) = 0.36$ | 0.876 |
| Pension Type | $F(4,569) = 13.24^{***}$ | <.01 | $F(4,569) = 15.53^{***}$ | <.01 | $F(4,575) = 14.30^{***}$ | <.01 | $F(4,563) = 21.36^{***}$ | <.01 |
| Pension Size | $F(7,566) = 5.39^{***}$ | <.01 | $F(7,566) = 8.87^{***}$ | <.01 | $F(7,572) = 20.84^{***}$ | <.01 | $F(7,560) = 17.83^{***}$ | <.01 |
| Qualifications | $F(6,567) = 12.79^{***}$ | <.01 | $F(6,567) = 4.79^{***}$ | <.01 | $F(6,573) = 1.49$ | 0.178 | $F(6,561) = 4.52^{***}$ | <.01 |
| Income | $F(6,567) = 9.59^{***}$ | <.01 | $F(6,567) = 5.48^{***}$ | <.01 | $F(6,573) = 3.50^{***}$ | <.01 | $F(6,561) = 7.78^{***}$ | <.01 |
| Employment Sector | $F(4,569) = 4.22^{***}$ | <.01 | $F(4,569) = 1.61$ | 0.170 | $F(4,575) = 6.08^{***}$ | <.01 | $F(4,563) = 4.83^{***}$ | <.01 |
| Employment Status | $F(5,568) = 1.47$ | 0.197 | $F(5,568) = 0.82$ | 0.533 | $F(5,574) = 0.89$ | 0.487 | $F(5,562) = 0.96$ | 0.444 |

Note: Each ANOVA tested the null hypothesis that there is no difference in mean score based on the specific variable under examination. *** indicates significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. 'Refuse to answer' and 'prefer not to say' answers are not included.

Table 19 *Summary of Significant Demographic Factors on Component Sco...*

| Variable | C1 Financial Literacy | C2 Pension Literacy | C3 Pension Planning | C4 Advisor Charging | Wit you |
|---|---|---|---|---|---|
| Questions Loading on Components | 1,2,3,4,5,8 11,12 | 7,15,16,17 18,19,20 | 9,10 | 13 | 6,14 |
| Gender | *F (2,565) =* *17.13 \*\*\** | *F* (2,565) = 11.30 \*\*\* | *F* (2,565) = 5.74 \*\*\* | *F* (2,565) = 0.02 | *F* |
| Age | *F (5,562) =* *2.14\** | *F* (5,562) = 6.80\*\*\* | *F* (5,562) = 1.19 | *F* (5,562) = 1.48 | *F* 6 |
| Marital status | *F* (5,562) = 0.36 | *F* (5,562) = 1.15 | *F* (5,562) = 1.01 | *F (5,562) =* *2.22\** | *F* |
| Pension Type | *F (4,563) =* *13.49\*\*\** | *F* (4,563) = 14.82\*\*\* | *F* (4,563) = 2.41\*\* | *F* (4,563) = 0.84 | *F* |
| Pension Size | *F* (7,560) = 12.37\*\*\* | *F (7,560) =* *21.66\*\*\** | *F* (7,560) = 1.81\* | *F* (7,560) = 1.61 | *F* |
| Qualifications | *F (6,561) =* *13.34\*\*\** | *F* (2,561) = 0.81 | *F* (2,561) = 2.42\*\* | *F* (2,561) = 1.61 | *F* |
| Income | *F (2,561) =* *11.85\*\*\** | *F* (6,561) = 3.28\*\*\* | *F* (6,561) = 2.80\*\* | *F* (6,561) = 0.59 | *F* |
| Employment Sector | *F* (4,563) = 3.02\*\* | *F (4,563) =* *4.83\*\*\** | *F (4,563) =* *0.855* | *F* (4,563) = 0.39 | *F* |
| Employment Status | *F (5,562) =* *6.54\*\*\** | *F* (5,562) = 2.30 | *F* (5,562) = 0.76 | *F (5,562) =* *20.08\*\*\** | *F* |

Note: \* Significant at 10% level, \*\* Significant at the 5% level, \*\*\* Signifi...
1% level. In some cases Levene's test was significant indicating a viola...
homogeneity of variance assumption. In these cases, Welch's *F* test offers...
version of the *F* ratio which is robust when this assumption has been viola...
2013). Alternative *F* ratios are reported in these cases (shown in bold).

*Mean Scores and Standard Deviations for Actual Pension Literacy by Demographic (standard deviations in*

| Section 1 Absolute Score (out of 5) M (SD) | Weighted Score M | Section 2 Absolute Score (out of 8) M (SD) | Weighted Score M | Section 3 Absolute Score (out of 7) M (SD) | Weighted Score M | Total Absolute Score (out of 20) M (SD) | Weighted Score M |
|---|---|---|---|---|---|---|---|
| 3.98 (1.31) | 0.43 | 5.12 (1.89) | 0.47 | 3.35 (2.01) | 0.41 | 12.45 (4.26) | 1.31 |
| 3.23 (1.43) | -0.32 | 4.32 (1.91) | -0.33 | 2.64 (1.78) | -0.31 | 10.19 (4.04) | -0.96 |
| 3.36 (1.56) | -0.19 | 4.57 (1.91) | 0.08 | 2.23 (1.79) | -0.71 | 10.16 (3.94) | -0.98 |
| 3.62 (1.41) | 0.074 | 4.45 (2.16) | -0.20 | 2.62 (2.05) | -0.32 | 10.69 (4.75) | -0.45 |
| 3.55 (1.40) | 0.00 | 4.81 (1.94) | 0.16 | 3.29 (1.82) | 0.35 | 11.65 (4.21) | 0.51 |
| 3.48 (1.47) | -0.07 | 4.60 (1.90) | -0.05 | 3.17 (1.77) | 0.23 | 11.25 (4.27) | 0.11 |
| 3.84 (1.25) | 0.29 | 4.91 (1.73) | 0.26 | 3.86 (1.75) | 0.92 | 12.61 (3.84) | 1.47 |
| 4.20 (0.94) | 0.65 | 5.60 (1.45) | 0.95 | 3.40 (2.20) | 0.46 | 13.20 (3.67) | 2.06 |
| 1.50 (1.31) | -2.05 | 3.13 (1.55) | -1.53 | 2.13 (1.96) | -0.82 | 6.76 (4.17) | -4.39 |
| 2.65 (1.60) | -0.90 | 3.91 (1.87) | -0.74 | 2.97 (1.81) | 0.03 | 9.53 (4.53) | -1.61 |
| 3.44 (1.37) | -0.11 | 4.57 (2.03) | -0.08 | 3.30 (1.91) | 0.36 | 11.31 (4.19) | 0.17 |
| 3.63 (1.41) | 0.08 | 4.73 (1.96) | 0.08 | 2.98 (1.95) | 0.03 | 11.34 (4.36) | 0.19 |
| 3.71 (1.34) | 0.16 | 4.61 (1.77) | -0.04 | 3.04 (1.91) | 0.10 | 11.36 (4.18) | 0.22 |
| 4.11 (1.08) | 0.56 | 5.30 (1.98) | 0.65 | 2.68 (1.95) | -0.26 | 12.09 (3.94) | 0.94 |
| 2.75 (1.66) | 0.30 | 4.11 (1.81) | -0.54 | 2.62 (1.76) | -0.32 | 9.48 (4.18) | -0.56 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Income £80-£100k | 13 | 4.23 (0.93) | 0.67 | 5.69 (1.49) | 1.04 | 4.00 (2.35) | 1.06 | 13.92 (3.52) | 2.77 |
| Income >£100k | 16 | 4.38 (0.81) | 0.82 | 5.38 (1.36) | 0.73 | 4.00 (1.83) | 1.06 | 13.76 (2.65) | 2.60 |
| Full time employed | 421 | 3.56 (1.44) | 0.01 | 4.71 (1.98) | 0.06 | 2.90 (1.90) | -0.04 | 11.17 (4.29) | 0.02 |
| Part time employed | 106 | 3.39 (1.43) | -0.16 | 4.58 (1.78) | -0.07 | 2.99 (1.90) | 0.05 | 10.96 (4.14) | -0.18 |
| Unemployed /Homemaker | 5 | 4.80 (0.45) | 1.45 | 5.00 (2.30) | 0.35 | 2.00 (2.00) | -0.94 | 12.00 (3.91) | 0.86 |
| Self employed | 30 | 3.63 (1.52) | 0.08 | 4.23 (2.19) | -0.42 | 3.03 (2.09) | 0.09 | 10.89 (5.01) | -0.24 |
| Retired | 16 | 4.06 (1.18) | 0.51 | 5.25 (1.57) | 0.60 | 3.88 (2.09) | 0.93 | 13.19 (3.71) | 2.05 |
| Single | 76 | 3.51 (1.39) | -0.04 | 4.82 (1.94) | 0.17 | 2.53 (1.84) | -0.42 | 10.86 (4.02) | -0.29 |
| Married/civil partnership | 408 | 3.58 (1.45) | 0.03 | 4.65 (1.95) | 0.00 | 3.05 (1.94) | 0.11 | 11.28 (4.34) | 0.14 |
| Widowed | 15 | 3.27 (1.67) | -0.28 | 4.93 (2.25) | 0.28 | 2.73 (1.87) | -0.21 | 10.93 (4.98) | -0.21 |
| Divorced | 52 | 3.53 (1.41) | -0.02 | 4.46 (1.79) | -0.19 | 2.90 (1.84) | -0.04 | 10.89 (4.01) | -0.25 |
| Separated | 14 | 3.57 (1.09) | 0.00 | 5.14 (2.14) | 0.49 | 3.00 (1.78) | 0.06 | 11.71 (4.68) | 0.55 |
| Pension size under £30k | 60 | 3.10 (1.59) | -0.45 | 4.10 (1.98) | -0.55 | 2.62 (1.80) | -0.32 | 9.82 (4.09) | -1.32 |
| Pension size £30k – £50k | 25 | 3.40 (1.55) | -0.15 | 4.46 (1.82) | -0.19 | 2.29 (1.23) | -0.65 | 10.15 (3.41) | -0.99 |
| Pension size £50k – £100k | 35 | 3.63 (1.26) | 0.08 | 4.46 (1.92) | -0.19 | 2.89 (1.81) | -0.06 | 10.98 (3.97) | -0.17 |
| Pension size £100k – £250k | 45 | 3.87 (1.18) | 0.32 | 5.53 (1.60) | 0.88 | 4.09 (1.83) | 1.15 | 13.49 (3.60) | 2.35 |
| Pension size over £250k | 36 | 4.14 (1.17) | 0.59 | 5.56 (1.40) | 0.91 | 4.44 (1.34) | 1.50 | 14.14 (2.84) | 3.00 |
| Pension size over £500k | 43 | 4.48 (0.63) | 0.93 | 6.14 (1.28) | 1.49 | 4.98 (1.80) | 2.04 | 15.60 (2.70) | 4.45 |
| Pension size – don't know | 300 | 3.39 (1.48) | -0.16 | 4.33 (1.97) | -0.32 | 2.39 (1.71) | -0.56 | 10.11 (4.10) | -1.03 |
| Pension type – defined benefit | 256 | 3.81 (1.27) | 0.26 | 4.89 (1.75) | 0.24 | 3.06 (1.72) | 0.12 | 11.76 (3.73) | 0.61 |
| Pension type – defined contribution | 82 | 3.61 (1.45) | 0.06 | 4.95 (1.81) | 0.30 | 3.41 (2.10) | 0.47 | 11.97 (4.26) | 0.83 |
| Pension type – both DB and DC | 89 | 3.94 (1.26) | 0.39 | 5.43 (1.73) | 0.78 | 3.70 (1.99) | 0.76 | 13.07 (4.10) | 1.93 |
| Pension type - neither | 33 | 2.97 (1.60) | -0.58 | 3.94 (2.30) | -0.71 | 2.42 (1.97) | -0.52 | 9.33 (5.02) | -1.81 |

| | N | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pension type – 'Don't know' | 121 | 2.85 (1.55) | -0.70 | 3.64 (2.05) | -1.01 | 1.98 (1.72) | -0.96 | 8.47 (4.04) | -2.67 |
| Ethnicity - white | 552 | 3.57 (1.44) | 0.02 | 4.71 (1.93) | 0.06 | 2.97 (1.91) | 0.03 | 11.25 (4.26) | 0.12 |
| Ethnicity – mixed multiple ethnic groups | 4 | 4.00 (1.41) | 0.45 | 5.00 (1.41) | 0.35 | 3.5 (1.73) | 0.56 | 12.5 (4.04) | 1.36 |
| Asian – Asian British | 4 | 4.25 (0.50) | 0.70 | 3.25 (1.71) | -1.40 | 2.50 (2.52) | -0.44 | 10.0 (2.94) | -1.14 |
| Black/African/ Caribbean/Black British | 2 | 2.50 (0.71) | -1.05 | 3.00 (1.41) | -1.65 | 2.00 (0) | -0.94 | 7.50 (2.12) | -3.64 |
| Chinese | 2 | 4.00 (0) | 0.45 | 3.50 (3.54) | -1.15 | 2.00 (2.83) | -0.95 | 9.70 (6.36) | -1.65 |
| Arab | 2 | 4.00 (0) | 0.45 | 3.00 (1.41) | -1.17 | 0.50 (0.71) | -2.44 | 7.50 (2.12) | -3.16 |
| Other ethnic group | 5 | 2.00 (1.22) | -1.55 | 4.00 (2.83) | -0.65 | 2.60 (2.07) | 0.00 | 8.60 (5.86) | -2.20 |
| Sector – public | 350 | 3.51 (1.43) | -0.04 | 4.53 (1.99) | -0.12 | 2.72 (1.77) | -0.22 | 10.76 (4.16) | -0.38 |
| Sector - private | 180 | 3.76 (1.38) | 0.21 | 4.95 (1.86) | 0.30 | 3.50 (2.11) | 0.56 | 12.21 (4.41) | 1.07 |
| Sector – not for profit | 28 | 3.62 (1.33) | 0.07 | 4.82 (1.98) | 0.17 | 2.75 (1.97) | -0.19 | 11.19 (4.51) | 0.05 |
| Other sector | 17 | 2.75 (1.53) | -0.80 | 4.11 (1.84) | -0.24 | 2.35 (1.50) | -0.59 | 9.21 (3.48) | -1.63 |

Note: The sample sizes for ethnicity were very small (other than white ethnicity) and so the numbers here should be read with caution although they are presented for completeness. Standard deviations are given for the absolute total mean scores only as they are the same for the weighted scores. 'Prefer not to say' and 'refuse to answer' responses are excluded from the analysis.

## 4.4 Perceived Pension Literacy

### 4.4.1 Overview of Analysis

The purpose of this section is to give an overview of the participants' perceived pension literacy. Questions four, five and six on the survey asked participants about their perceived knowledge and confidence about pensions, based on a 5-point Likert scale. The scores were totalled and in later analysis are referred to as 'perceived pension literacy'. It was important to conduct the ANOVA on each of questions four, five and six separately and in total. Each question measured different aspects of perceived pension literacy represented by individual elements of the pension literacy model, demographic factors may be related to some of these aspects but not others. The results of the ANOVA are summarised in the following sections.

### 4.4.2 Descriptive Statistics

The descriptive statistics relating to questions four, five and six, separately and in total, are shown in Table 21 (below). Additionally, the table shows statistics in relation to question 39 that asked participants to rate their pension knowledge after having completed the test.

Table 21 *Descriptive Statistics – Perceived Pension Literacy*

| Ques | *n* | *M* | *SD* | Mode | Median | Skew | Kurtosis | Min | Max |
|------|-----|-----|------|------|--------|------|----------|-----|-----|
| 4 | 581 | 3.08 | 1.16 | 3.00 | 3.00 | -0.19 | -0.60 | 1 | 5 |
| 5 | 581 | 2.57 | 1.07 | 3.00 | 3.00 | 0.14 | -0.66 | 1 | 5 |
| 6 | 581 | 2.73 | 1.21 | 3.00 | 3.00 | 0.13 | -0.94 | 1 | 5 |
| 4,5,6 | 581 | 8.39 | 3.00 | 9.00 | 9.00 | -0.00 | -0.72 | 3 | 15 |
| 39 | 581 | 2.36 | 1.01 | 3.00 | 2.00 | 0.18 | -0.76 | 1 | 5 |

Question four asked participants to rate their confidence about their financial security in retirement. The mean score was 3.08 out of five. The distribution is negatively skewed indicating the participants had more than average confidence in their financial security in retirement (Figure 144, below).

Question six asked participants to rate their confidence in making choices about their pension. The mean score was 2.73 out of five. The distribution shows a positive skew

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indicating participants were less confident than average about making pension choices (Figure 144).

Question five, was asked twice, once before completing the assessment of pension literacy and once after having done so (Q39). The purpose of this was to see if the participants' perception of their pension knowledge changed after completing the test. Before taking the test, the mean score was 2.57 out of five. There was a positive skew indicating participants rated their pension knowledge below average (Figure 14). The skew for question five was larger than for question six, indicating participants were less confident about their pension knowledge than they were about making pension choices.

After having completed the test, but prior to receiving their score, the participants' mean score fell to 2.36 and the median fell from three to two. The negative skew relating to question 39 was larger than for question five, indicating that the participants' perceived knowledge fell as a result of completing the test (Figure 144). To determine if this was significant, a paired-samples t-test was conducted comparing participants' perceived knowledge before and after taking the test. There was a significant difference in the scores before the test ($M$=2.57, $SD$=1.07) and after ($M$=2.36, $SD$, 1.01). Conditions; $t(580) = 7.54$, $p = <.01$. This confirmed that having attempted the questions, participants rated their knowledge significantly lower than before having done so.

Questions four, five and six were totalled to give a composite measure of perceived pension literacy. The distribution of scores shows a slight negative skew indicating that total perceived pension literacy was rated higher than average (Figure 144).
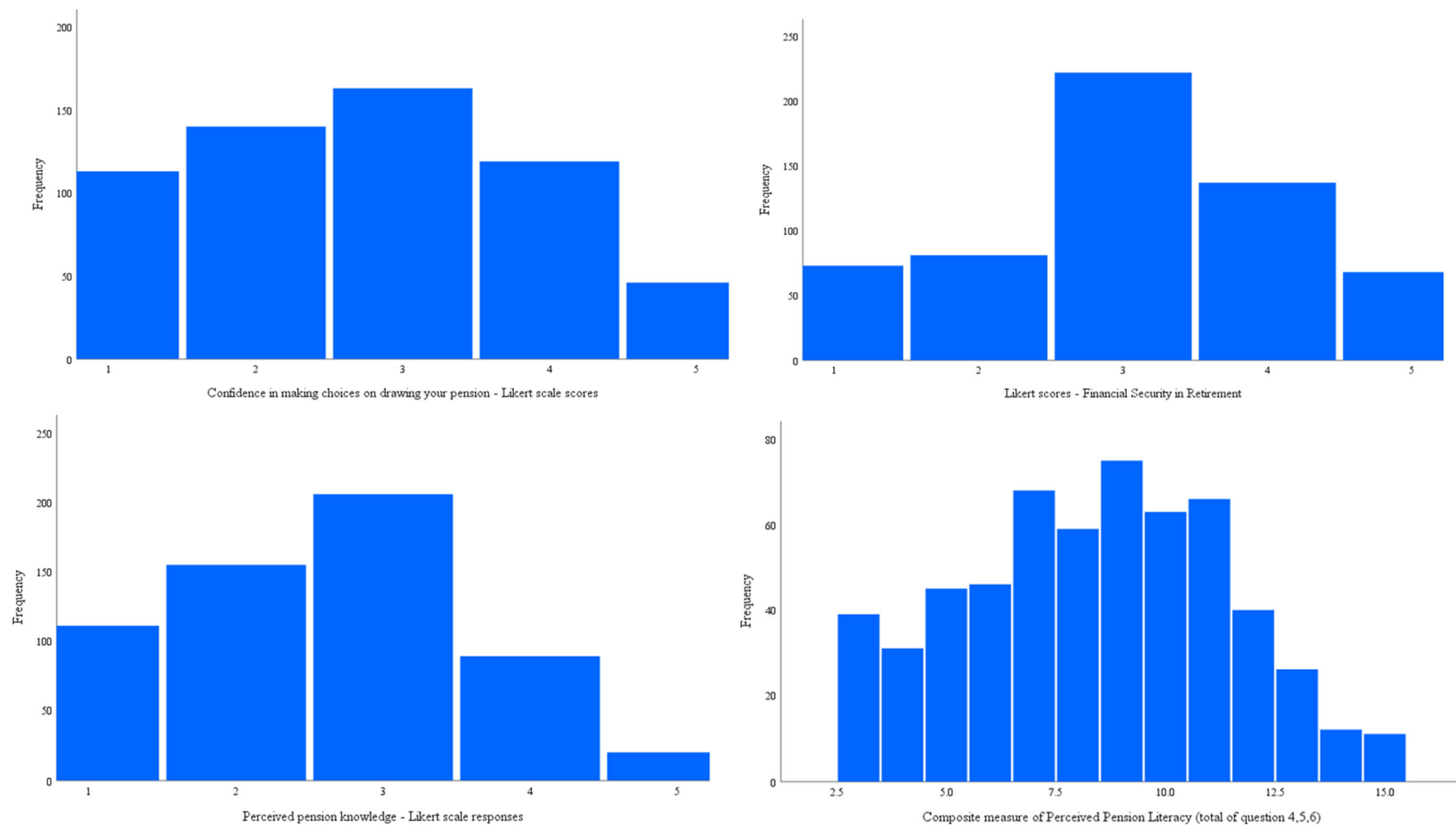
*Figure 14* Histograms to show Perceived Pension Literacy Scores (Separately and in Total)

### 4.4.3   Results of One-Way Analysis of Variance (ANOVA)

The results of the ANOVA are summarised in Table 22 (below). It identifies the demographic factors showing significant differences in mean scores between categories. A full breakdown of mean scores and standard deviations by demographic is shown in Table 23 (p.173). There were significant results in relation to most demographic factors, indicating that they all had some association with perceived pension literacy.

Some demographic factors showed statistical significance across all three questions and in total, these were gender, age, income, pension size and type. As with actual pension knowledge, males scored higher than females. Perceived knowledge and confidence increased with age, income and pension pot size. Finally, participants with pensions of some type, had higher confidence and perceived knowledge than participants who had a pension but did not know its type, or those with no pension.

Marital status was significant in the determination of confidence in financial security, but not in making pension choices or perceived knowledge. Married participants were more confident in their security than unmarried participants. Participants working in the private sector were more confident in making choices and perceived their knowledge to be higher ($p$ <.05) than participants working in the public sector. Employment status was significant for confidence in financial security and making pension choices, but only just significant at the 10% level for perceived knowledge ($p$ = 0.094). Retired participants were more confident than other groups. Finally, educational qualifications were not significant in the outcome of any of the three questions. These findings are discussed in section 4.7.

Table 22 *Table of ANOVA Results showing the effect of Demographic Factors on Perceived Pension Literacy Scores.*

| Test Variable | Question 4 – Confidence in Financial Security | | Question 5 – Perceived Pension Knowledge | | Question 6 – Confidence in making Pension Choices | | Total Perceived Literacy | |
|---|---|---|---|---|---|---|---|---|
| | *F* value | *p* value | *F* value | *p* value | *F* value | *p* value | *F* value | *p* value |
| Gender | $F_{(2,578)} = 13.89$*** | <.01 | $F_{(2,578)} = 23.47$*** | <.01 | $F_{(2,578)} = 25.26$*** | <.01 | $F_{(2,578)} = 27.38$*** | <.01 |
| Age | $F_{(5,575)} = 4.55$*** | <.01 | $F_{(5,575)} = 9.49$*** | <.01 | $F_{(6,574)} = 10.67$*** | <.01 | $F_{(5,575)} = 10.30$*** | <.01 |
| Marital Status | $F_{(5,575)} = 3.17$*** | <.01 | $F_{(5,575)} = 1.43$ | 0.211 | $F_{(5,575)} = 1.76$ | 0.119 | $F_{(5,575)} = 2.44$** | 0.034 |
| Pension Type | $F_{(4,576)} = 11.52$*** | <.01 | $F_{(4,576)} = 38.38$*** | <.01 | $F_{(4,576)} = 23.84$*** | <.01 | $F_{(4,576)} = 30.24$*** | <.01 |
| Pension Size | $F_{(7,573)} = 17.21$*** | <.01 | $F_{(7,573)} = 23.46$*** | <.01 | $F_{(7,573)} = 19.99$*** | <.01 | $F_{(7,573)} = 33.88$*** | <.01 |
| Qualifications | $F_{(6,574)} = 1.72$ | 0.113 | $F_{(6,574)} = 1.33$ | 0.243 | $F_{(6,574)} = 0.65$ | 0.691 | $F_{(6,574)} = 1.34$ | 0.235 |
| Income | $F_{(6,574)} = 6.12$*** | <.01 | $F_{(6,574)} = 4.30$*** | <0.01 | $F_{(6,574)} = 2.83$*** | <.01 | $F_{(6,574)} = 5.52$*** | <.01 |
| Employment Sector | $F_{(4,576)} = 0.85$ | 0.495 | $F_{(4,576)} = 3.13$** | 0.015 | $F_{(4,576)} = 2.89$** | 0.022 | $F_{(5,575)} = 1.76$ | 0.174 |
| Employment Status | $F_{(5,575)} = 3.37$*** | <.01 | $F_{(5,575)} = 1.89$* | 0.094 | $F_{(5,575)} = 4.09$*** | <.01 | $F_{(4,573)} = 3.23$** | 0.012 |

Note: Each ANOVA tested the null hypothesis that there is no difference in mean score based on that specific variable under examination. *** indicates significance at the 1% level, ** significance at the 5% level, * significance at the 10% level. 'Refuse to answer and 'prefer not to say' answers are not included.

Table 23: *Means and Standard Deviations of Scores for Perceived Pension Literacy split by Demographic (standard deviations in parentheses)*

| Variable | n | Question 4 – Confidence in Financial Security in Retirement M (SD) | Question 5 Confidence in Level of Pension Knowledge M (SD) | Question 6 Confidence in Making Choices when Drawing Pension M (SD) | Combined Score Total of questions 4,5 and 6 M (SD) | Question 39 Perceived Knowledge Post Assessment M (SD) |
|---|---|---|---|---|---|---|
| Males | 256 | 3.35 (1.17) | 2.90 (1.04) | 3.12 (1.15) | 9.37 (2.86) | 2.75 (1.00) |
| Females | 319 | 2.88 (1.11) | 2.32 (1.02) | 2.44 (1.17) | 7.63 (2.88) | 2.04 (0.90) |
| Age 40-45 | 134 | 2.80 (1.20) | 2.22 (1.03) | 2.31 (1.15) | 7.32 (2.89) | 1.98 (0.95) |
| Age 46-50 | 118 | 2.94 (1.13) | 2.35 (1.07) | 2.53 (1.24) | 7.81 (3.02) | 2.20 (1.11) |
| Age 51-55 | 141 | 3.09 (1.10) | 2.66 (1.03) | 2.76 (1.15) | 8.51 (2.84) | 2.46 (1.00) |
| Age 56-60 | 116 | 3.33 (1.12) | 2.77 (1.01) | 2.97 (1.13) | 9.06 (2.81) | 2.59 (0.87) |
| Age 61-65 | 57 | 3.32 (1.17) | 3.14 (1.03) | 3.42 (1.13) | 9.88 (2.86) | 2.75 (0.89) |
| Age 66-70 | 15 | 3.73 (1.2) | 3.07 (0.96) | 3.53 (1.19) | 10.3 (2.92) | 2.73 (0.88) |
| No formal | 8 | 3.50 (0.93) | 2.75 (1.28) | 3.00 (1.20) | 9.25 (2.87) | 2.13 (0.35) |
| GCSE | 66 | 2.82 (1.14) | 2.24 (1.02) | 2.52 (1.21) | 7.58 (3.03) | 2.32 (0.98) |
| A level | 77 | 3.12 (1.12) | 2.69 (1.02) | 2.75 (1.15) | 8.56 (2.85) | 2.43 (0.98) |
| Degree | 165 | 3.03 (1.16) | 2.61 (1.11) | 2.70 (1.24) | 8.34 (3.10) | 2.39 (1.03) |
| Masters | 139 | 3.14 (1.11) | 2.60 (1.05) | 2.80 (1.23) | 8.54 (2.92) | 2.37 (1.05) |
| PhD | 115 | 3.23 (1.24) | 2.60(1.07) | 2.82 (1.20) | 8.64 (2.98) | 2.31 (1.00) |
| Income <£20k | 77 | 2.95 (1.10) | 2.30 (0.99) | 2.58 (1.20) | 7.83 (2.91) | 2.10 (0.88) |
| Income £20k-£40k | 208 | 2.88 (1.14) | 2.46 (1.07) | 2.62 (1.19) | 7.96 (2.99) | 2.23 (0.98) |
| Income £40k-£60k | 194 | 3.06 (1.20) | 2.60 (1.04) | 2.72 (1.24) | 8.38 (2.98) | 2.37 (1.00) |
| Income £60-£80k | 49 | 3.59 (1.06) | 2.88 (1.17) | 3.02 (1.11) | 9.49 (2.92) | 2.84 (1.07) |

| | | | | | |
|---|---|---|---|---|---|
| Income £80-£100k | 13 | 3.85 (0.80) | 3.15 (0.90) | 3.15 (1.28) | 10.15 (2.41) | 2.85 (0.90) |
| Income >£100k | 16 | 4.06 (0.68) | 3.38 (0.72) | 3.63 (0.81) | 11.06 (1.81) | 3.19 (0.66) |
| Full time employed | 421 | 3.04 (1.134) | 2.55 (1.19) | 2.68 (1.19) | 8.27 (2.90) | 2.36 (1.01) |
| Part time employed | 106 | 3.11 (1.23) | 2.56 (1.10) | 2.69 (1.26) | 8.36 (3.22) | 2.29 (1.00) |
| Unemployed/not working | 5 | 3.20 (1.30) | 2.80 (1.10) | 3.60 (1.52) | 9.60 (3.78) | 2.20 (1.10) |
| Self employed | 30 | 2.90 (1.16) | 2.47 (1.11) | 2.77 (1.22) | 8.13 (3.16) | 2.27 (0.94) |
| Retired | 16 | 4.06 (0.85) | 3.06 (1.00) | 3.75 (0.93) | 10.88 (2.22) | 2.81 (0.91) |
| Single | 76 | 2.74 (1.23) | 2.36 (1.08) | 2.50 (1.22) | 7.59 (3.01) | 2.24 (0.95) |
| Married/civil partnership | 408 | 3.18 (1.14) | 2.61 (1.08) | 2.80 (1.21) | 8.60 (3.00) | 2.40 (1.03) |
| Widowed | 15 | 3.40 (1.06) | 3.00 (0.85) | 3.13 (1.13) | 9.53 (2.77) | 2.73 (0.70) |
| Divorced | 52 | 2.77 (1.06) | 2.58 (0.92) | 2.56 (1.18) | 7.90 (2.68) | 2.25 (0.88) |
| Separated | 14 | 2.93 (1.39) | 2.29 (0.73) | 2.71 (1.07) | 7.93 (2.67) | 2.21 (1.12) |
| Pension size under £30k | 60 | 2.37 (1.04) | 2.00 (0.96) | 2.12 (1.08) | 6.48 (2.55) | 1.92 (0.83) |
| Pension size £30k – £50k | 25 | 3.40 (0.82) | 2.64 (0.76) | 3.04 (0.98) | 9.08 (2.20) | 2.36 (0.86) |
| Pension size £50k – £100k | 35 | 3.29 (1.05) | 3.00 (0.97) | 3.23 (1.19) | 9.52 (2.90) | 2.63 (0.88) |
| Pension size £100k – £250k | 45 | 3.33 (0.95) | 3.09 (1.02) | 3.11 (1.20) | 9.54 (2.67) | 2.87 (0.94) |
| Pension size over £250k | 36 | 3.89 (0.82) | 3.33 (0.79) | 3.56 (0.88) | 10.78 (1.90) | 3.22 (0.64) |
| Pension size over £500k | 43 | 4.12 (0.93) | 3.58 (0.85) | 3.79 (0.97) | 11.49 (2.14) | 3.40 (0.73) |
| Pension size – don't know | 300 | 2.83 (1.14) | 2.25 (0.97) | 2.38 (1.11) | 7.45 (2.77) | 2.02 (0.91) |
| Pension type – defined benefit | 256 | 3.35 (1.06) | 2.86 (0.94) | 3.04 (1.13) | 9.25 (2.65) | 2.59 (0.90) |
| Pension type – defined contribution | 82 | 2.96 (1.21) | 2.73 (1.03) | 2.84 (1.16) | 8.54 (3.00) | 2.55 (1.07) |
| Pension type – both DB and DC | 89 | 3.23 (1.05) | 2.97 (1.06) | 3.02 (1.17) | 9.21 (2.77) | 2.65 (0.99) |
| Pension type - neither | 33 | 2.85 (1.39) | 2.12 (1.22) | 2.30 (1.13) | 7.27 (3.28) | 2.03 (13.08) |

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| | | | | | |
|---|---|---|---|---|---|
| Pension type – 'Don't know' | 121 | 2.55 (1.14) | 1.69 (0.79) | 1.91 (1.07) | 6.14 (2.55) | 1.62 (0.77) |
| Ethnicity - white | 552 | 3.10 (1.14) | 2.60 (1.06) | 2.75 (1.20) | 8.44 (2.97) | 2.38 (1.00) |
| Ethnicity – mixed multiple | 4 | 2.50 (1.29) | 2.25 (1.50) | 2.00 (1.16) | 6.75 (3.86) | 2.00 (1.16) |
| Asian – Asian British | 4 | 3.00 (1.65) | 2.75 (1.26) | 3.00 (1.63) | 8.75 (4.50) | 2.75 (1.26) |
| Black/African/ Caribbean/Black British | 2 | 2.50 (2.12) | 2.50 (2.12) | 4.00 (1.00) | 9.00 (5.66) | 1.50 (0.71) |
| Chinese | 2 | 5.00 (0) | 2.50 (0.71) | 3.00 (0) | 10.50 (0.71) | 2.50 (0.71) |
| Arab | 2 | 2.00 (1.41) | 1.00 (0) | 1.00 (0) | 4.00 (1.41) | 1.00 (0) |
| Other ethnic group | 5 | 2.60 (1.67) | 1.60 (0.89) | 3.00 (1.58) | 7.20 (3.35) | 1.40 (0.55) |
| Sector – public | 351 | 3.07 (1.14) | 2.49 (1.08) | 2.61 (1.21) | 8.17 (3.02) | 2.23 (0.97) |
| Sector - private | 180 | 3.17 (1.18) | 2.78 (1.03) | 2.98 (1.19) | 8.93 (2.94) | 2.63 (1.04) |
| Sector – not for profit | 28 | 2.82 (1.39) | 2.21 (1.03) | 2.64 (1.28) | 7.68 (3.22) | 2.18 (1.02) |
| Other sector | 17 | 3.00 (1.12) | 2.65 (0.93) | 2.88 (1.22) | 8.53 (2.50) | 2.41 (0.87) |

Note: The sample sizes for ethnicity were very small (other than white ethnicity) and so the numbers here should be read with caution although they are presented for completeness. Standard deviations are given for the absolute total mean scores only. 'Prefer not to say' and 'refuse to answer' responses are excluded from the analysis.

## 4.5 Combined Measure of Pension Literacy

The participants' actual and perceived pension literacy scores were combined together with reference to sample means to form four groups (Figure 155)[103]. Most demographic factors were associated with actual and perceived pension literacy when measured separately. The next stage was to determine the extent to which demographic factors could be attributed to each of the four groups. This was the first stage to identify participants at risk of suboptimal financial behaviours. Covered in chapter 5, the second stage tested for associations between each group and specific financial behaviours using logistic regression. For example, in the literature, overconfident individuals are found to be at risk of making poor financial decisions as they are less likely to seek financial advice (Kramer, 2016). In order to carry out this analysis, chi-squared tests were conducted.
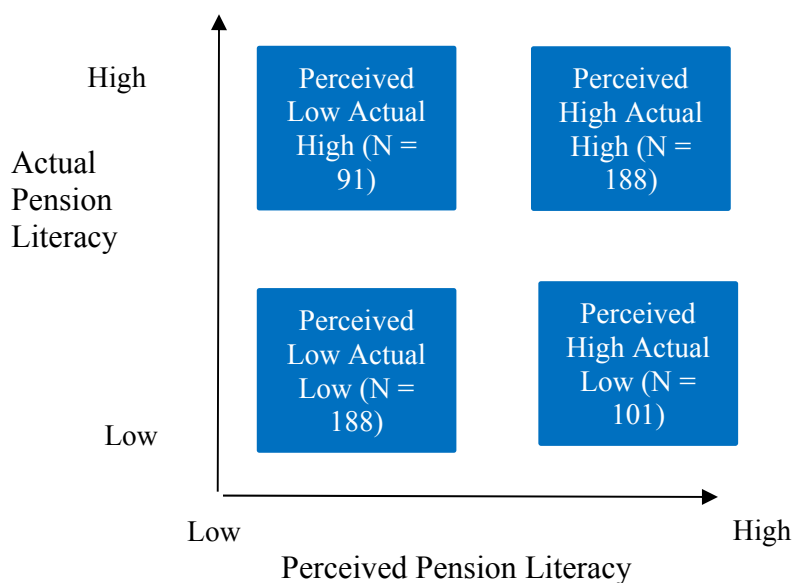


*Figure 15* Participants split into four Groups based on Combined Actual and Perceived Pension Literacy. *Adapted from* 'Financial Literacy, Confidence and Financial Advice Seeking' by Kramer (2016), *Journal of Economic Behaviour and Organisation.*

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[103] The participants were classified into high and low perceived pension literacy based on a mean score of 2.7952. Those scoring above this were classified as high perceived literacy and those below, low perceived literacy. Based on actual weighted mean score of 0.0703, participants were classified high actual pension literacy if they scored above this and low actual pension literacy if they scored below the mean.

The sample were split according to Table 24.

Table 24 *Split of Sample into Combined Pension Literacy Groups*

| Group | Frequency |
|---|---|
| Low Perceived, Low Actual | 188 |
| Low Perceived, High Actual | 91 |
| High Perceived, Low Actual | 101 |
| High Perceived, High Actual | 188 |
| Missing | 13 |
| Total | 581 |

Note: Missing values relate to participants who had refused to answer one or more questions. The analysis in this section therefore, is in relation to a total of 568 participants.

66.2% of participants (376) were able to accurately assess their level of pension literacy insofar they were able to rate their actual pension literacy correctly as either high or low. 17.8% (101) of the sample were overconfident and 16% of the sample were under-confident (91). A full breakdown of group membership and split of high and low pension literacy by demographic is shown in Table 26 (p.179).

The results of the Chi-squared tests are reported in Table 25 (below). This shows the demographic factors significant in determining group membership. All of the variables were significant with the exception of marital status, employment status and educational qualifications. Cramer's V represents the effect size[104]. These results were expected based upon the ANOVA results reported in the previous two sections as the dependent and independent variables were the same. However, a significant Chi-squared statistic purely indicates that at least one group within that variable is significantly more or less likely to belong to one of the four groups, than would be expected by chance. An understanding of this is required in order to draw conclusions which are discussed in section 4.7.

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[104] Cramer's V interpretation >0.25 = very strong, >0.15 Strong, >0.10 Moderate, >0.05 Weak, >0 none or very weak.

Table 25 *Results of Chi-Squared Tests – Demographic Factors and Group Membership*

| Variable | Chi$^2$ Statistic | $p$ value | Cramer's $v$ |
|---|---|---|---|
| Gender | $x^2 (3,568) = 54.70$ | <.01 | 0.312 |
| Age | $x^2 (15,568) = 48.03$ | <.01 | 0.168 |
| Marital Status | $x^2 (6,553) = 6.00$ | 0.423 | N/A |
| Pension Type | $x^2 (12,568) = 88.84$ | <.01 | 0.228 |
| Pension Size | $x^2 (18,531) = 159.90$ | <.01 | 0.317 |
| Qualifications | $x^2 (15,558) = 19.57$ | 0.189 | N/A |
| Income | $x^2 (15,568) = 52.89$ | <.01 | 0.180 |
| Employment Sector | $x^2 (9,564) = 33.20$ | <.01 | 0.140 |
| Employment Status | $x^2 (12,565) = 17.21$ | 0.142 | N/A |

Note: 'Prefer not to say' and 'refuse to answer' responses are excluded.

Table 26 *Distribution of Participants across the four Combined Pension Literacy Groups split by Demographic*

| Variable | n | High Actual % | Low Actual % | High Perceived % | Low Perceived % | Low Perceived Low (n and %) | Low Perceived High Actual (n and %) | High Perceived Low Actual (n and %) | High Perceived High Actual (n and %) |
|---|---|---|---|---|---|---|---|---|---|
| Males | 252 | 62.3 | 37.7 | 65.6 | 34.4 | 51 (20.2) | 35 (13.9) | 44 (17.5) | 122 (48.4) |
| Females | 311 | 38.9 | 61.1 | 38.6 | 61.4 | 135 (43.4) | 55 (17.7) | 55 (17.7) | 66 (21.2) |
| Age 40-45 | 127 | 36.2 | 63.8 | 37.3 | 62.7 | 59 (46.4) | 19 (15.0) | 22 (17.3) | 27 (21.3) |
| Age 46-50 | 116 | 40.5 | 59.5 | 40.7 | 59.3 | 51 (44.0) | 18 (15.5) | 18 (15.5) | 29 (25.0) |
| Age 51-55 | 139 | 56.8 | 43.2 | 53.2 | 46.8 | 34 (24.5) | 31 (22.3) | 26 (18.7) | 48 (34.5) |
| Age 56-60 | 115 | 51.3 | 48.7 | 58.6 | 41.4 | 33 (28.7) | 14 (12.2) | 23 (20.0) | 45 (39.1) |
| Age 61-65 | 56 | 67.9 | 32.1 | 70.2 | 29.8 | 10 (17.9 ) | 7 (12.5) | 8 (14.3) | 31 (55.4) |
| Age 66-70 | 11 | 72.7 | 27.3 | 72.7 | 27.3 | 1 (9.1) | 2 (18.2) | 2 (18.)2 | 6 (54.5) |
| Age over 70 | 4 | 50.0 | 50.0 | 100.0 | 0.00 | 0 (0) | 0 (0) | 2 (50.0) | 2 (50.0) |
| No formal qualifications | 8 | 12.5 | 87.5 | 62.5 | 37.5 | 3 (37.5) | 0 (0) | 4 (50.0) | 1 (12.5) |
| GCSE | 64 | 37.5 | 62.5 | 45.5 | 54.5 | 26 (40.6) | 8 (12.5) | 14 (21.9) | 16 (25.0) |
| A level | 77 | 48.1 | 51.9 | 50.6 | 49.4 | 27 (35.1) | 11 (14.3) | 13 (16.9) | 26 (33.7) |
| Undergraduate degree | 162 | 52.5 | 47.5 | 49.7 | 50.3 | 54 (33.3) | 27 (16.7) | 23 (14.2) | 58 (35.8) |
| Master's degree | 134 | 46.3 | 53.7 | 53.2 | 46.8 | 44 (32.8) | 19 (14.2) | 28 (20.9) | 43 (32.1) |
| PhD | 113 | 60.2 | 39.8 | 51.3 | 48.7 | 29 (25.7) | 25 (22.1) | 16 (14.2) | 43 (38.0) |
| Income <20k | 75 | 34.7 | 65.3 | 48.1 | 51.9 | 30 (40.0) | 8 (10.7) | 19 (25.3) | 18 (24.0) |
| Income £20k-£40k | 203 | 41.5 | 58.5 | 46.2 | 53.8 | 79 (38.6) | 30 (14.6) | 41 (20.0) | 55 (26.8) |
| Income £40k-£60k | 186 | 52.7 | 47.3 | 47.4 | 52.6 | 57 (30.6) | 41 (22.0) | 31 (16.7) | 57 (30.7) |
| Income £60-£80k | 49 | 69.4 | 30.6 | 63.3 | 36.7 | 12 (24.5) | 6 (12.2) | 3 (6.1) | 28 (57.2) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Income £80-£100k | 13 | 76.9 | 23.1 | 69.2 | 30.8 | 1 (7.7) | 3 (23.1) | 2 (15.4) | 7 (53.8) |
| Income >£100k | 16 | 81.3 | 18.7 | 93.8 | 6.2 | 1 (6.3) | 0 (0) | 2 (12.5) | 13 (81.2) |
| Full time employed | 409 | 49.1 | 50.9 | 48.5 | 51.5 | 142 (34.7) | 67 (16.4) | 66 (16.1) | 134 (32.8) |
| Part time employed | 105 | 44.8 | 55.2 | 50.5 | 49.5 | 34 (32.4) | 18 (17.1) | 24 (22.9) | 29 (27.6) |
| Unemployed/Homemaker | 5 | 75.0 | 25.0 | 0.0 | 100.0 | 0 (0) | 1 (20.0) | 1 (20.0) | 3 (60.0) |
| Self employed | 30 | 46.7 | 53.3 | 75.0 | 25.0 | 11 (36.7) | 4 (13.3) | 5 (16.7) | 10 (33.3) |
| Retired | 16 | 75.0 | 25.0 | 100.0 | 0 | 1 (6.3) | 1 (6.3) | 3 (18.8) | 11 (68.6) |
| Sector – public | 348 | 44.3 | 55.7 | 47.0 | 53.0 | 128 (36.8) | 56 (16.0) | 66 (19.0) | 98 (28.2) |
| Sector – private | 174 | 62.6 | 37.4 | 60.6 | 39.4 | 40 (23.0) | 26 (14.9) | 25 (14.4) | 83 (47.7) |
| Sector – not for profit | 26 | 50.0 | 50.0 | 35.7 | 64.3 | 10 (38.5) | 7 (26.9) | 3 (11.5) | 6 (23.1) |
| Sector other sector | 16 | 25.0 | 75.0 | 46.2 | 53.8 | 7 (43.8) | 2 (12.5) | 6 (37.5) | 1 (6.2) |
| Pension size <£30k | 59 | 44.1 | 55.9 | 25.0 | 75.0 | 28 (47.5) | 16 (27.1) | 5 (8.5) | 10 (16.9) |
| Pension size £30k-£50k | 23 | 39.1 | 60.9 | 64.0 | 36.0 | 5 ( 21.7) | 3 (13.0) | 9 (39.2) | 6 (26.1) |
| Pension size £50k-£100k | 35 | 42.9 | 57.1 | 71.4 | 28.6 | 7 (20.0) | 3 (8.6) | 13 (37.1) | 12 (34.3) |
| Pension size £100k-£250k | 45 | 75.6 | 24.4 | 55.6 | 44.4 | 6 (13.4) | 14 (31.1) | 5 (11.1) | 20 (44.4) |
| Pension size >£250k | 35 | 80.0 | 20.0 | 91.7 | 8.3 | 0 (0) | 3 (8.6) | 7 (20.0) | 25 (71.4) |
| Pension size >£500k | 42 | 92.9 | 7.1 | 93.0 | 7.0 | 0 (0) | 3 (7.1) | 3 (7.1) | 36 (85.8) |
| Pension size – don't know | 292 | 36.6 | 63.4 | 37.0 | 63.0 | 135 (46.3) | 47 (16.1) | 50 (17.1) | 60 (20.5) |
| Pension Type – DB only | 253 | 56.1 | 43.9 | 62.1 | 37.9 | 58 (22.9) | 39 (15.4) | 53 (21.0) | 103 (40.7) |
| Pension Type – DC only | 77 | 57.1 | 42.9 | 54.9 | 45.1 | 18 (23.3) | 15 (19.5) | 15 (19.5) | 29 (37.7) |
| Pension Type – Both DB/DC | 88 | 62.5 | 37.5 | 60.0 | 40.0 | 21 (23.9) | 14 (15.9) | 12 (13.6) | 41 (46.6) |
| Pension Type - Neither | 32 | 33.3 | 66.7 | 36.4 | 63.6 | 15 (46.9) | 5 (15.5) | 6 (18.8) | 6 (18.8) |
| Pension Type – Don't know | 118 | 22.9 | 77.1 | 19.8 | 80.2 | 76 (64.4) | 18 (15.3) | 15 (12.7) | 9 (7.6) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Marital status – single; | 76 | 44.7 | 55.3 | 40.8 | 51.2 | 29 (38.2) | 16 (21.1) | 13 (17.1) | 18 (23.6) |
| Marital status – married | 398 | 50.0 | 50.0 | 52.5 | 47.5 | 129 (32.4) | 57 (14.3) | 70 (17.6) | 142 (35.7) |
| Marital status – widowed | 15 | 53.3 | 46.7 | 80.0 | 20.0 | 2 (13.3) | 1 (6.7) | 5 (33.3) | 7 (46.7) |
| Marital status – divorced | 51 | 41.2 | 58.8 | 42.3 | 57.7 | 21 (41.2) | 9 (17.6) | 9 (17.6) | 12 (23.6) |
| Marital status – separated | 13 | 76.9 | 23.1 | 42.9 | 57.1 | 3 (23.0) | 5 (38.5) | 0 (0) | 5 (38.5) |
| Ethnicity – white British | 540 | 49.6 | 50.4 | 50.7 | 49.3 | 177 (32.8) | 87 (16.1) | 95 (17.6) | 181 (33.5) |
| Ethnicity – mixed ethnic | 4 | 75.0 | 25.0 | 50.0 | 50.0 | 1 (25.0) | 1 (25.0) | 0 (0) | 2 (50.0) |
| Ethnicity – Asian | 4 | 25.0 | 75.0 | 75.0 | 25.0 | 1 (25.0) | 0 (0) | 2 (50.0) | 1 (25.0) |
| Ethnicity – Black | 2 | 0 | 100.0 | 50.0 | 50.0 | 1 (50.0) | 0 (0) | 1 (50.0) | 0 (0) |
| Ethnicity – Chinese | 2 | 50.0 | 50.0 | 100.0 | 0 (0) | 0 (0) | 0 (0) | 1 (50.0) | 1 (50.0) |
| Ethnicity - Arab | 2 | 0 | 100.0 | 0 | 100.0 | 2 (100.0) | 0 (0) | 0 (0) | 0 (0) |
| Ethnicity - Other | 5 | 60.0 | 40.0 | 40.0 | 60.0 | 1 (20.0) | 2 (40.0) | 1 (20.0) | 1 (20.0) |

Note: 'Refuse to answer and 'Prefer not to say' responses are excluded.

## 4.6    The Relationship between Perceived and Actual Pension Literacy

### 4.6.1    Overview of Analysis

The final stage of the data analysis in relation to this theme was to establish the relationship between actual and perceived pension literacy, allowing research question one to be addressed. In the previous section, 66% of the sample were able to correctly identify their own level of pension literacy as either high or low when scores were compared to sample means. To more accurately[105] assess the relationship between the sample's actual and perceived pension literacy, a number of approaches were initially employed.

Following the approach of DeZwaan, Lee and Chardon (2017), a scatterplot was produced showing the relationship between actual and perceived pension literacy. A line was drawn representing when actual and perceived pension literacy were equal, this represented appropriate perceived pension literacy. The areas above and below the line represented over, and under, confidence respectively. However, a simple scatterplot did not provide much useful information, as most responses did not fall on the line and it was hard to assess the extent of over, or under, confidence. The Pearson's correlation between actual and perceived pension literacy was 0.48, significant at the 1% level ($n = 568$, $p < .01$). However, high positive correlation between two quantitative measures may not indicate a high level of agreement (Bland & Altman, 1986).

Therefore, a Bland-Altman plot was used to examine this relationship supported by linear regression.

### 4.6.2    Bland-Altman Plot

The Bland Altman plot is used to evaluate the agreement between two sets of measurement scales (Bland & Altman, 1986), here actual and perceived pension literacy. The plot shows the mean of the actual and perceived percentage scores (x axis), plotted against the difference between the perceived and actual percentage scores (y axis)[106].

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[105] For example, an individual was classified as high literacy if their score was above the sample mean. However, this classification does not consider the scale to which the score was over the sample mean.

[106] Percentage scores were used to make the measurement scales comparable.

Bland Altman suggested conducting a one sample t test to test the null hypothesis that there is no statistical difference between the mean difference of perceived and actual pension literacy and zero. This provides an initial indication of the level of agreement between the two measurement scales. The test was conducted and the result was non-significant, meaning that the null hypothesis cannot be rejected ($t$ (568) = -0.04, $p$ = 0.969). This indicated that actual and perceived literacy were not significantly different to each other. This was expected given that 66% of participants were able to correctly assess whether they had high or low pension literacy.

To examine this relationship in more detail, the plot shown in Figure 166 (below) was produced. The mean of the differences between the two measures (represented by the red line on the chart) was -0.0352. This represents under-confidence bias (actual literacy was very slightly higher than perceived literacy) and is very close to zero. This shows that on average, individuals rated their pension literacy accurately. The blue lines represent the range of differences between perceived and actual percentage scores expected to occur 95% of the time. The data points below 0 on the Y axis represent under-confidence and those above, overconfidence. In order to assess whether there was any statistically significant difference in the number of data points above and below the mean line, a simple linear regression was performed. This was to test the null hypothesis that the $\beta$ coefficient was zero. The percentage differences between scores were the dependent variables and the means of percentage actual and perceived literacy scores were the independent variables. The results showed evidence of proportional bias at the 10% significance level ($\beta$ = -0.086, $t$ (567) = 1.73, $p$ = 0.084). This meant there were slightly more data points below the line than above, indicating an under-confidence bias. Upon inspection of the plot, there were more data points above the line at lower values of the mean. This indicates that participants had a tendency to overestimate their perceived ability when their actual scores were lower, which was also statistically more likely. There were also a number of data cases above and below the 95% confidence intervals representing more extreme cases of over, and under, confidence.
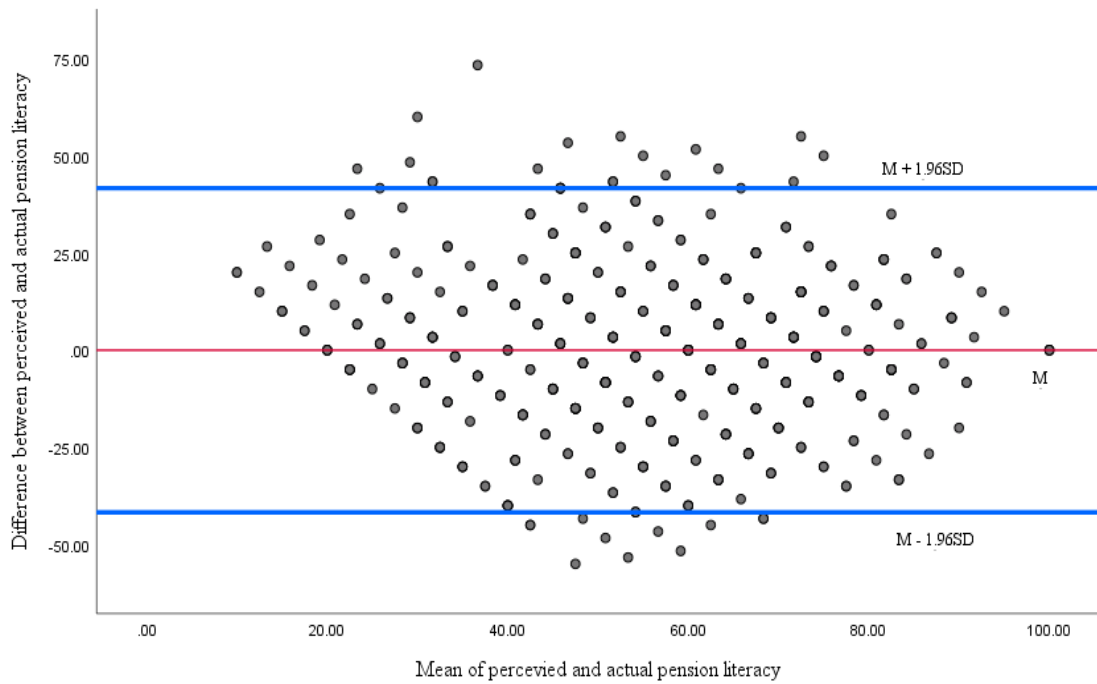
*Figure 16* Bland Altman Plot of Perceived and Actual Pension Literacy

### 4.6.3 Linear Regression

Finally, to further test the relationship between actual and perceived pension literacy in the presence of control variables, a linear regression was performed to assess the significance of actual pension literacy on perceived pension literacy. The six control variables (section 3.9.5) were included in the model, represented as dummy variables.

The following equation represents the general form of the regression:

$$\text{PER\_TOT} = \alpha + \beta\,(\text{ACT\_TOT}) + \beta\,(\text{GEN}) + \beta\,(\text{AGE}) + \beta\,(\text{INC}) + \beta\,(\text{ES}) + \beta\,(\text{PS}) + \beta\,(\text{MS})$$

Actual pension literacy was significant at the 1% significance level ($\beta = 0.276$, $t\,(563) = 9.67$, $p < .01$, CI 0.22, 0.33). Therefore, it was concluded there was a relationship between perceived and actual pension literacy, as actual pension literacy increased, so did perceived pension literacy. This supported the analysis of the Bland-Altman plot, the pearson correlation and the descriptive statistics.

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## 4.7 Discussion of Results

### 4.7.1 Overview of Section

This section discusses the results and their contribution to the current base of literature and public policy research. It was decided to deal with issues in this chapter separately from those in the two chapters that follow. An understanding of the sample's pension literacy was judged to be prerequisite to associating it with their financial behaviour. The hypotheses in relation to research questions one 'Can individuals assess their own level of pension literacy accurately?' and four 'How does pension literacy change with age?' are addressed in this section.

Sections 4.7.2 to 4.7.4 discuss the findings in relation to actual and perceived pension literacy, separately and combined. The sections that follow examine the relationship between demographic factors and pension literacy, including each component derived from the breakdown of pension literacy. The relationship between actual and perceived pension literacy is discussed in section 4.7.15.

### 4.7.2 Actual Pension Literacy

Previous studies have found that financial literacy and specifically pension literacy worldwide is low (Christelis et al., 2005; Karaa & Kugu, 2016; Kiliyanni & Sivaraman, 2016; Lusardi & Mitchell, 2011d; Money Advice Service, 2015). Individuals in the U.K struggle to understand pensions sufficiently well enough to make effective plans for retirement (The Personal Finance Research Center, 2017).

In the test of pension knowledge, the mean score for actual pension literacy based on absolute scores was 11.21 out of 20 ($n = 568$)[107]. A greater number of participants scored higher, rather than lower, than this (Figure 133, p.161). The participants' responses to the basic financial literacy questions indicated a higher standard (71% correct) than seen in other studies using similar questions (Alessie et al., 2011; Lusardi, 2015; Lusardi & Mitchell, 2011c, 2011d; Mitchell & Lusardi, 2011). The question on diversification of risk proved the hardest to answer, nonetheless 63% of the sample were still able to answer this correctly (Appendix 5). The sample included

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[107] The weighted mean score was 0.0703, which took into account question difficulty, this indicates a performance just over half. Participants were awarded a minus score for an incorrect answer and a positive score for a correct answer. The full scoring system was explained in section 3.8. Absolute scores are discussed here as these are easier to conceptualise without changing the meaning. 568 is lower than total respondents (581) due to 13 responses where participants had refused to answer one or more question.

a high proportion of participants with above average educational achievement due to the manner in which the data was collected. This probably explains this result.

The participants found the section on basic pension literacy more difficult to answer than section one (Appendix 5). Participants found it hard to conceptualise how much of their pre-retirement income they would need in retirement (37.2% correct) or estimate the size of pension fund they would need to realise a given income in retirement (49.7% correct). These types of considerations have been found as challenging to the U.K public in other retirement studies (The Personal Finance Research Center, 2017). The questions in which participants performed well, tended to be those to which basic financial literacy could be applied. For example, question 11, concerning the effect of inflation on retirement income (82.6% correct) and question 12, concerning portfolio composition and risk (69.5% correct). This highlights the importance of financial literacy, also found to be important in the decision to seek advice, discussed later in this thesis. In question 13, 236 participants (41.5%) believed financial advisors are paid on a commission basis. This is concerning given that lack of trust has been cited as a reason why individuals may not seek financial advice (Brancati et al., 2017; Georgarakos & Inderst, 2011; The Personal Finance Research Center, 2017). The public may be less likely to seek advice if they perceive the advisor is trying to sell them something. This suggests that efforts are required to correct public perception about this.

Participants found the final section on the 2015 Pension Freedoms the most difficult (Appendix 5). The question on the threshold for financial advice (Q20) was answered correctly by only 13.8% of participants. This question concerned DB to DC transfers. The sample included 114 participants with DB pensions only, some of whom were members of unfunded public sector pension schemes[108]. Unfunded schemes do not permit their members to transfer their pension to a DC scheme, therefore, these questions would not be directly relevant, which could explain this result. Only 26% of participants knew the types of pension that could be accessed under the pension freedoms (Q15). This is important knowledge for all pension members to have. It would enable them to clarify their own position regarding pension transfers and the

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[108] The Teacher's pension scheme and the NHS pension scheme are examples of unfunded public sector schemes. The sample contained academics from Northumbria University, some of which are members of the Teacher's pension scheme.

ability to access their savings, even those with non-transferrable pensions. The question in section three answered correctly by the largest percentage of participants was question 14, concerning the age at which pension funds can be accessed under the new rules. The fact that so many participants knew this suggests that the 'Pension Wise' campaign and media advertising in the period following the reforms had some effect.

Summary of Key Findings:

- Participants had good basic financial literacy and did well on questions where this could be applied. They did less well on the section about the pension reforms.
- Participants found it hard to conceptualise how much income they would need in retirement.
- Just over 40% of participants thought that Financial Advisors are paid via commission.

### 4.7.3   Perceived Pension Literacy

In line with other studies, three questions about confidence and perceived knowledge were combined to form a composite measure of perceived pension literacy (Allgood & Walstad, 2016; Asaad, 2015). It was also interesting to examine the responses to these questions individually as perceived knowledge and confidence represented different elements of the pension literacy model. Question four asked participants to assess confidence in their financial security. The mean score of 3.08 out of five was a higher than average score showing a negative skew (Figure 144, p.170). Participants with DB pensions had the most confidence in their financial security, their pensions are based on salary and length of service and are therefore easier to forecast. 114 participants had only DB pensions and 47 participants had both DB and DC pensions in the sample, so this result was not unexpected.

However, participants were less confident about making pension choices. The mean response to question six was 2.73 out of five, still above average. However, there were more participants who were less, rather than more confident (Figure 14). DB pension scheme members have fewer pension choices to make than those with DC pension schemes. At retirement, they are not required to choose from a range of financial

pension products. However, DB scheme members still have important choices to make about when to retire and how much of their pension entitlement to draw as a tax-free lump sum.

Finally, participants were asked to assess their own knowledge of pensions. Although the mean of 2.57 out of five was just above half, a greater number of participants judged their knowledge to be lower, rather than higher than this (Figure 144). Having completed the test, when asked to reassess, participants judged their knowledge to be significantly lower than before having done so. The mean score for question 39 was 2.36 and the median score fell from three (Q5), to two (Q39).

Summary of Key Findings:

> - DB pension scheme members were most confident about their retirement security.
> - Participants were less confident than this about making pension choices and were even less confident about their level of pension knowledge.

### 4.7.4   Combined Pension Literacy

Actual and perceived scores were combined to form four groups in line with other studies (Asaad, 2015; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Robb et al., 2012). 66% of the sample was split evenly between low perceived, low actual and high perceived, high actual groups. These participants were able to correctly assess their own pension literacy as high or low, which is encouraging, although there was still scope for under, and over, confidence within both of these groups[109]. However, a third of participants were either over, or under, confident in that they perceived their pension literacy to be either higher or lower than it was. This has been found in the literature to be negatively associated with financial behaviour (Gentile, Linciano, & Soccorso, 2016; Porto & Xiao, 2016). This is explored further in chapters 5 and 6.

Summary of Key Findings:

> - Two thirds of participants were assigned to either the low actual, low perceived or the high actual, high perceived group. They correctly perceived their pension literacy as either high or low compared to sample means.

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[109] The disparity between their percentage actual and perceived scores could still be substantial.

> - A third of participants were either under, or over, confident.

4.7.5    Gender

There are global differences between the financial literacy of males and females (Bucher-Koenen et al., 2016; Hasler & Lusardi, 2017). Based on the ANOVA, males had significantly higher basic financial and pension literacy than females and better knowledge of the 2015 Pension Freedoms. This supports the majority of findings arising from financial literacy literature and public policy research (Alessie et al., 2011; Balloch et al., 2015; Lusardi & Mitchell, 2013; Lusardi et al., 2014). Women have longer life expectancies than men and some may reach retirement with smaller pensions because of taking career breaks to have children. If women have lower financial skills, this could put their security at risk post retirement, particularly if they are single (see section 4.7.13). Regrettably, the literature has yet to identify reasons why the gender knowledge gap exists (Bucher-Koenen et al., 2016).

This phenomena was also apparent in respect of the participants' perceived pension literacy. Males were more confident in their financial security, their pension choices and in their pension knowledge, than females. Confidence may be required to access appropriate advice and guidance. If females lack the confidence to seek advice about their pensions, this is concerning, especially if their pension literacy skills are lower than males. However, females were seen to be more likely to seek advice than males in this study, discussed in chapter 6.

Using the combined pension literacy measure, a significant interaction was found between group membership and gender, Cramer's V indicated a large effect size (Kim, 2017). The low perceived, low actual group had more females and the high perceived, high actual group more males, than would be expected by chance. This reflected the above and was expected. The absence of significant differences between males and females in the other two groups suggested that gender was not a factor in determining under, or over, confidence. This contrasts with the findings of Lusardi and Mitchell (2011d) who found a greater number of males were overconfident compared to females, however, agrees with more recent findings of DeZwaan et al (2017) who found no difference. Research has shown females to be more likely to perceive their knowledge accurately and as such, more likely to benefit from education programmes (Bucher-Koenen et al., 2016). 65% of females compared with 69% of males were able

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to identify their pension literacy accurately, contradicting Bucher-Koenen et al (2016). However, the difference was small and non-significant.

Summary of Key Findings:

> - Males scored higher in all three sections of the test than females.
> - Males were more confident in their financial security, in making pension choices and perceived their pension knowledge to be higher than females.

### 4.7.6 Age

Research question four asked 'How does pension literacy change with age? The financial literacy literature does not agree on this. Some studies have found older individuals to have poor financial literacy (Lusardi, 2012; Lusardi et al., 2014; Money Advice Service, 2015) that declines even more after the age of 60 (Finke et al., 2017). Other studies show that financial literacy gets better with age (Taylor, 2009; Xiao et al., 2015), but declines after aged 70 (Korniotis & Kumar, 2009). This study found both actual and perceived pension literacy increased with age[110].

Figure 177 (below) shows the means plot of actual scores by age group. An upward trend can be observed, showing a dip for the 56-60 age group, for which there did not appear to be a logical explanation. The linear trend was tested in ANOVA and found to be significant ($F$ (5,562) = 10.47, $p$ <.01).

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[110] The age range in this study was narrower than other studies as it only included individuals aged over 40.
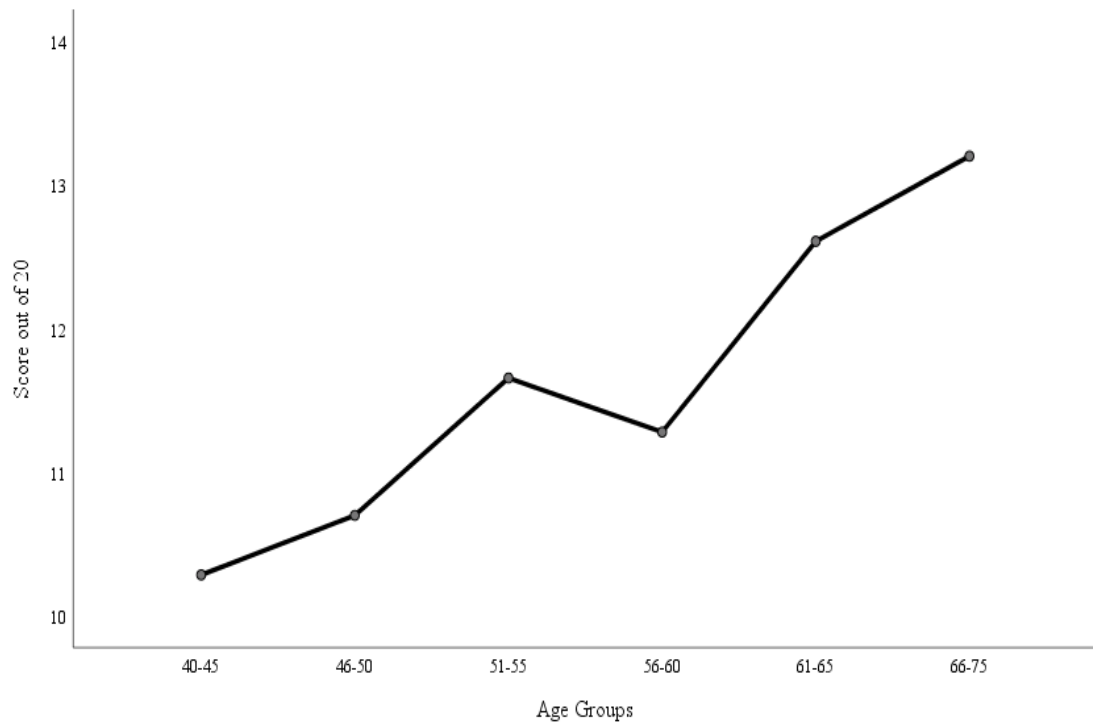
Figure 17 *Means Plot of Actual Pension Literacy Scores by Age Group*

When age was analysed over the three sections of the test, the differences between age groups were significant only in relation to section three, relating to the 2015 Pension Freedoms. Here, participants aged 40-45 scored significantly lower than older age groups. This is not surprising, this age group are some way off having to make decummulation choices and therefore, these questions are not relevant to them in the short to medium term.

These findings enabled the null hypothesis, there is no relationship between actual pension literacy and age, to be rejected in favour of alternative hypothesis five:

$H_5$ There is a relationship between actual pension literacy and age.

Figure 188 (below) shows the means plot of perceived pension literacy scores by age. These also showed an observable upward trend. The linear trend was tested in ANOVA and found to be significant ($F(5,575) = 27.11$, $p < .01$).

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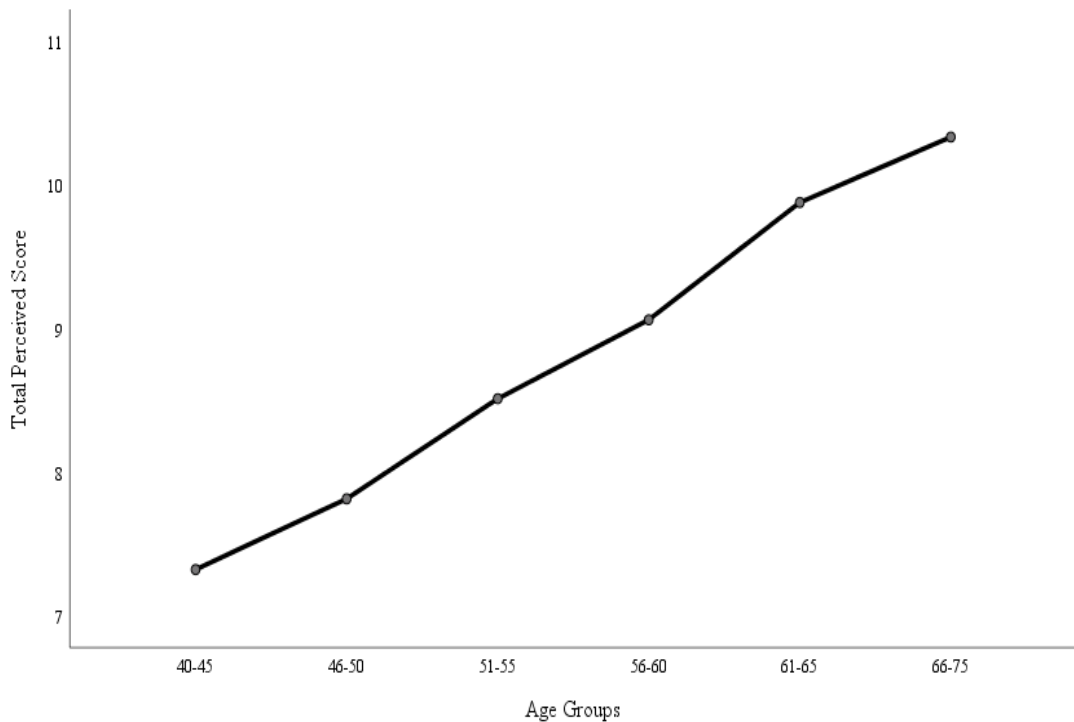
Figure 18 *Means Plot of Perceived Pension Literacy Scores by Age Group*

In order to evaluate perceived pension literacy in more detail, ANOVA was conducted on each of questions four, five and six separately. Linear upward trends were significant for all three questions[111]. These findings enabled the null hypothesis, there is no relationship between perceived pension literacy and age, to be rejected in favour of alternative hypothesis six:

$H_6$ There is a relationship between perceived pension literacy and age.

In further support of this, Chi-squared tests showed the low perceived, low actual group had significantly more participants aged 40-45 and 46-50, compared with older age groups than would be expected by chance, with the opposite applying in relation to the high perceived, high actual group. There was no difference however, in group membership based on age for the other two groups. This suggests that age was not a factor in determining under, or over, confidence, contradicting Xiao et al (2016), who found that the propensity to be overconfident increased with age.

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[111] Question 4 - confidence in financial security ($F_{(4,576)} = 1176.23$, $p < .01$). Question 5 perceived pension knowledge ($F_{(4,576)} = 1248.49$, $p < .01$). Question 6 – confidence in pension choices ($F_{(4,576)} = 2131.42$, $p < .01$).

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Summary of Key Findings:

> - There was an upward trend in actual pension literacy with age.
> - Differences in scores between participants aged 40-45 and older age groups were only statistically significant in relation to knowledge of the Pension Freedoms.
> - Confidence in retirement security and confidence in making pension choices, in addition to perceived pension knowledge increased with age.

### 4.7.7   Income

Financial literacy has been related to income in the literature and individuals with higher incomes have been found to have higher levels of financial literacy (Calvet et al., 2007; Klapper et al., 2011; Van Rooij et al., 2011a). A general inspection of Table 20 (p.165) shows as participants' incomes increased, so too did their actual pension literacy scores. This was supported by the ANOVA, confirming an upward linear trend ($F$ (6,574) = 17.82, $p$ <.01). Participants earning less than £20,000 per annum scored significantly lower than participants earning over £100,000 per annum. However, only these two group means were significantly different from each other, despite the upward trend.

Perhaps not surprisingly, participants with higher incomes were significantly more confident in their financial security in retirement, had higher perceived pension knowledge and were more confident about making pension choices, all scores showing an upward linear trend with income[112]. Participants with high incomes are able to save more into a pension than those with low incomes. They may also have alternative resources such as equity or other investments to support them in retirement. The mean composite perceived literacy score for participants earning less than £20,000 per annum was 7.83 compared to 11.06 for participants earning over £100,000.

The high perceived, high actual group had significantly more than expected participants with incomes above £60,000, than participants with income below this. However, income was not significant in determining under, or over, confidence.

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[112] Confidence in security (Q4) $F$ (6,574) = 21.48, $p$ <.01. Perceived knowledge (Q5) $F$ (6,574) = 15.00, $p$ <.01. Confidence in choices (Q6) $F$ (6,574) = 9.76, $p$ <.01

There was a chance income and educational achievement were related, which could have explained why pension literacy improved with income levels. Educational achievement and pension pot size are also related to financial literacy in the literature and are discussed below (Collins, 2012; Lusardi & Mitchell, 2007c; Money Advice Service, 2014).

Summary of Key Findings:

- As participants' incomes increased, so did their actual pension literacy scores.
- Participants with incomes less than £20,000 per annum, scored significantly lower than those with incomes greater than £100,000 per annum.
- Participants with higher incomes were more confident in their retirement security and in their ability to make pension choices. They also perceived their pension knowledge to be higher than those with lower incomes.

### 4.7.8 Level of Education

Individuals with higher educational qualifications have been found to have better financial literacy (Calvet et al., 2007; Klapper et al., 2011; Van Rooij et al., 2011a). The scores for sections one and two seemed to support this. However, education level was not associated with the scores for section three. Participants were less able to apply their general education to this section, whereas basic financial literacy and numeracy skills could help score well in sections one and two.

The ANOVA indicated that education was not a factor in determining confidence in financial security, confidence in making choices or perceived knowledge. This was quite unexpected. Although not statistically significant, it was interesting to note that participants with no formal qualifications had the highest perceived literacy compared with other groups, to which one could apply alternative interpretations. It could support the findings of Allgood and Walstad (2016), who found that individuals who rate their knowledge the highest, know the least. Alternatively, it could suggest that pension knowledge is completely unconnected to educational qualifications. The results would appear to support the former premise as this group had poor actual pension literacy (6.76 out of 20). Further evidence in support of this theory is discussed later in this section.

Summary of Key Findings:

> - Participants with higher educational qualifications scored higher on sections one and two however, did not know more in relation to the Pension Freedoms.
> - Level of education was not associated with either aspect of confidence or perceived pension knowledge.

### 4.7.9 Pension Type

There was little in the literature relating to the financial literacy of members of different types of pension scheme. In one recent study, individuals who were members of DC schemes showed greater financial literacy than those who were members of DB schemes (Li et al., 2019). 121 participants (21.3%) were unable to identify the type of pension of which they were a member, which in itself suggests a lack of engagement with pensions.

The ANOVA results suggested that pension literacy improved as a result of being a member of any type of pension scheme. Experience of 401(k) schemes in the U.S has been associated with improved financial literacy (Finke et al., 2017). In all sections and in total, the scores of participants who were members of either DB or DC pension schemes (or both), scored better than participants who had neither type of pension, or did not know their pension type. Participants who were members of both DB and DC schemes scored the highest. Members of DB schemes are not required to make many choices in respect of their pensions during the accumulation phase. In contrast, some DC pensions require active decisions about risk exposure during accumulation, in addition to further choices upon and into retirement[113]. It has been argued that experience impacts pension literacy and DC scheme members self-educate to help them make better pension choices (Li et al., 2019). This suggests an experiential approach to pension literacy. This has been suggested in relation to financial literacy and other aspects of personal finance (Clark et al., 2015).

In considering confidence in financial security, participants who were members of DB schemes and those who were members of both DB and DC schemes, were significantly more confident in their retirement security than participants who had a pension but did

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[113] Not all DC pension members will make active decisions. For example, those who are auto-enrolled into a DC pension by their employer will remain largely passive participants.

not know its type. As stated before, the latter group have a pension and as such, some retirement security. Therefore, this group may just lack knowledge of terminology regarding pension types. There was no statistical difference between the other categories. DB scheme members could have more reason to be confident about their retirement security, their pensions are based on length of service and salary. It was surprising however, there was no statistical difference in confidence in financial security between participants with and without pensions. It could be that participants with no pension provision had other sources of income upon which to rely, such as property, investment income or partners with sufficient wealth to support them in retirement (The Personal Finance Research Center, 2017).

DB and DC scheme members were both significantly more confident in making pension choices and perceived their pension knowledge to be significantly higher than participants with no pension and those who did not know the type. This suggests that being a member of a pension scheme makes one more confident in ones' own knowledge to make pension choices.

Chi-squared tests returned a significant interaction between group membership and pension type, supporting the above. The low perceived, low actual group had fewer than expected DB and DC scheme members (and those with both) whereas, the high perceived, high actual group had more than would be expected by chance. For participants with no pension and those who did not know the type, the opposite applied. Pension type was not significant in the determination of over, or under, confidence.

Summary of Key Findings:

> - Members of either DB or DC schemes (or both) scored higher in all three sections than those who were not members of a pension scheme or those who belonged to a scheme, but did not know its type.
> - Members of DB schemes and members of both DB and DC schemes were more confident in their retirement security. DB and DC scheme members were more confident in making choices and perceived their knowledge to be higher than those with no pension and those who had a pension but did not know the type.

- There was no statistical difference in confidence in financial security between participants with and without pensions.

### 4.7.10 Pension Size

Financial literacy has been associated with increased wealth in the literature (Calvet et al., 2007; Hung, Meijer, et al., 2009; Klapper et al., 2011; Van Rooij et al., 2011a). There was an observable trend between actual pension literacy scores and pension pot size (Table 20, p.165) and an upward linear trend was confirmed ($F$ (7,573) = 13.99, $p$ <.01). Participants with pension pots less than £30,000 and participants who did not know the size of their pension, scored significantly lower than those with pots over £500,000, in all sections and in total.

Not surprisingly, participants with large pension pots had significantly more confidence in their financial security, in making pension choices and perceived their knowledge to be higher than participants who had small pots[114].

Chi-squared tests confirmed more than expected participants with small pots and those who did not know the size of their pension were assigned to the low actual, low perceived group. More than expected participants with pots over £250,000 had high actual and perceived pension literacy. However, there were more than expected participants with pot sizes between £30,000 and £100,000 in the high perceived, low actual group, suggesting this group were overconfident.

Summary of Key Findings:

- An upward trend was confirmed between pension pot size and actual pension literacy.
- Participants with pot sizes greater than £500,000 scored better in all three sections than those with pot sizes less than £30,000 and those who did not know the size of their pension pot.
- Participants with large pots were more confident in their retirement security, and in making pension choices. They also perceived their pension knowledge to be higher than those with smaller pots.

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[114] Trend analysis in ANOVA was significant for all three questions. Confidence in security (Q4) $F$ (7,573) = 17.56, $p$ <.01. Perceived knowledge (Q5) $F$ (7,573) = 19.80, $p$<.01. Confidence in choices (Q6) $F$ (7,573) = 13.69, $p$ <.01.

### 4.7.11 Employment Status

Perhaps not surprisingly, retired participants had the highest level of pension literacy. ANOVA however, did not show any significant effect of employment status on pension literacy. Previous findings have found employed individuals to have higher financial literacy than those who are not employed (Agnew, Bateman, & Thorp, 2013). However, this study did not find this to be the case

Retired participants were significantly more confident in their financial security in retirement than all other categories. One would expect to be the case if these participants are living comfortably within their retirement income. This group was also significantly more confident in making retirement choices, but did not perceive their knowledge to be higher than other groups.

Chi-squared tests confirmed a non-significant interaction between group membership and employment status. However, most retired participants were in the high perceived, high actual group.[115]

Summary of Key Findings:

> - Retired participants had the highest level of pension literacy. They were more confident in their retirement security and in making choices, but did not perceive their pension knowledge to be high.
> - There was no difference in actual or perceived pension literacy based on other categories of employment status.

### 4.7.12 Employment Sector

There was a significant difference in pension literacy scores based on employment sector in relation to section three only. Participants working in the public sector scored lower than those working in the private sector. Public sector pensions have in the past been predominantly DB schemes[116] and many are non-transferrable. Members of these

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[115] The number of retired individuals in the survey was very small and are they were likely also to be working. The survey requested respondents who had not fully retired to complete the survey. However, there is no way of knowing whether this group had fully retired or not. Later statistical tests collapsed this category with other 'not working' participants.

[116] Due to the pensions crisis some public sector organisations now offer their employees DC pensions only. However, it is likely that the participants in the survey aged over 40 would still be members of DB schemes if they work in the public sector.

will not require much of the knowledge tested in section three[117]. However, this is not the case for participants working in the private sector, who are more likely to be members of DC pension schemes, either those provided by their employer or private pensions. Knowledge of the Pension Freedoms is relevant to this group. Many public sector organisations have closed their DB schemes and now offer employees DC schemes Therefore, knowledge of the Pension Freedoms will be relevant to savers in the future working in the public sector.

Participants working in the private sector were significantly more confident about making choices in retirement than participants working in the public sector. They also perceived their knowledge of pensions to be significantly higher. It suggests their experience with DC pensions has led to increased confidence about them.

Chi-squared tests found a significant interaction between group membership and employment sector. There were more than expected participants working in the public sector in the low perceived, low actual group and fewer in the high perceived, high actual group than would be expected by chance. The reverse was true for participants working in the private sector. It also suggested employment sector was not important in the determination of under, or over, confidence.

Summary of Key Findings:

> - Participants working in the private sector scored higher than those working in the public sector only in relation to section three. They were more confident at making pension choices and perceived their pension knowledge as higher.

### 4.7.13  Marital Status

Even though it has been found in the literature there is a positive relationship between financial literacy and family size (Balloch et al., 2015), less has been found concerning marital status and financial literacy.

In this study, marital status was not significant in determining actual pension literacy. However, married participants were more confident in their retirement security than

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[117] Some public sector employees may have DC schemes in addition to their DB scheme from a previous employment or a private pension.

unmarried participants. This is not surprising given that married couples will probably have more than one income upon which to rely in retirement.

Summary of Key Findings:

- Married participants were more confident in their retirement security than unmarried participants. Marital status was not associated with actual pension literacy.

4.7.14 Categories of Actual Pension Literacy (PCA)

Pension literacy was broken down using principal components analysis (Lusardi & Mitchell, 2013). This was helpful in two ways. Firstly, to identify those specific areas of pension knowledge that differed significantly within each demographic variable (Table 19, p.164). Secondly, to assess which component had the best capacity to distinguish between different levels of pension literacy based on the demographics in the study. The five components were 'financial literacy', 'basic pension literacy' 'pension planning' 'advisor charging' and 'withdrawing your pension'. Not all of them were found to show significant differences in mean scores between groups in respect of all demographic factors. However, pension type, pension size and income did indicate significant differences in scores in relation to all five components excluding 'advisor charging'. These differences reflected the same trends discussed in the previous sections.

Males scored significantly higher than females in 'financial literacy', 'basic pension literacy' and 'pension planning', but not in 'advisor charging' or 'withdrawing your pension'. Score differences related to age were significant for all components apart from 'advisor charging' and 'pension planning'. Employment sector was only significant in the determination of 'financial literacy' and 'basic pension literacy' scores and education was significant for 'financial literacy', 'pension planning' and 'withdrawing your pension' but not 'basic pension literacy'. The only factors indicating significant differences in scores for 'advisor charging' were employment status and marital status. 'Financial literacy' was also significant for employment status.

The main point to take from this is that differences in pension literacy based on demographic factors are related to certain aspects of pension literacy. Significant

differences relating to the highest number of demographic variables were found in relation to components one, 'financial literacy' and two 'basic pension literacy', showing these questions to have good capacity to differentiate. This finding supports the quantity of studies that have used the 'Big 5', upon which some of the questions in section one (and component one) were adapted (Lusardi & Mitchell, 2011d). Other studies have also validated these questions (Paiella, 2016). The questions relating to financial literacy were also most important in driving the decision to seek financial advice (discussed in chapter 6). Therefore, future tests of pension literacy should include questions such as these.

Summary of Key Findings:

- The questions relating to the components 'financial literacy' and 'basic pension literacy' had the best capacity to differentiate between participants.

4.7.15 <u>The Relationship between Actual and Perceived Pension Literacy</u>

A considerable number of studies show that actual and perceived financial literacy are not indicative of each other (Allgood & Walstad, 2016; Asaad, 2015; Carlson et al., 2009; Dunning et al., 2003; Kiliyanni & Sivaraman, 2016; Kramer, 2016; Olejnek & Bialowas, 2015; Parker et al., 2012; Radecki & Jaccard, 1995). In this study, there was a strong positive correlation between actual and perceived pension literacy ($r = 0.476$, $p < .01$) contradicting previous studies that found a weak correlation (Kramer, 2016; Parker et al., 2012). However, despite the use of correlation to measure the relationship between these two variables (Agnew et al., 2011; Parker et al., 2012), a high level of correlation between two quantitative measures may not indicate that there is agreement between them (Bland & Altman, 1986).

Therefore, following the approach by De Zwaan et al (2017), this study used Bland-Altman charts and linear regression to explore the relationship between actual and perceived literacy. Results found the presence of a statistically significant under-confidence bias in the sample, although this was small in size. However, the distribution of differences between perceived and actual pension literacy followed a normal distribution, indicating a large proportion of participants were able to accurately assess their own pension literacy. This was supported in that 66% of participants were classified as either low perceived, low actual or high perceived, high

actual and reflects other studies that followed a similar approach (De Zwaan et al., 2017; Kramer, 2016). However, some participants were under-confident to the extent of a 55% difference in actual and perceived percentage scores and overconfident to the extent of 73.33%. This is concerning as both can negatively influence financial behaviour (Robb et al., 2012). Some participants in low actual, low perceived or high actual, high perceived groups also displayed some degree of under or over confidence[118].

The Bland-Altman chart indicated the participants who had a tendency to overestimate their ability, were those whose actual scores were lower. This supports previous findings that suggest such individuals suffer a dual burden, in that not only do they have poor literacy, they also lack the ability to recognise it (Allgood & Walstad, 2016; Kruger & Dunning, 1996).

Linear regression tested whether actual pension literacy was significant in the determination of perceived pension literacy in the presence of control variables and was found to be significant at the 1% level.

However, this was not the case for the whole sample and around a third of participants may either lack the confidence to ask for help or advice (Porto & Xiao, 2016) or display overconfident behaviours (McCannon, Asaad, & Wilson, 2016). This study supports the recommendations made by other academics, in that education attempts should focus on improving individuals' ability to self-assess more accurately (Allgood & Walstad, 2016; Kramer, 2016). In the context of pension literacy, this could take the form of offering individuals tests of knowledge, such as this one, enabling them to assess their knowledge and readjust their self-assessments in the light of their results, as they were seen to do in this study. This is discussed in more detail in chapter 7.

From the above findings, the null hypothesis, there is no relationship between actual and perceived pension literacy, was rejected in favour of alternative hypothesis one:

> $H_1$ There is a relationship between individuals' actual and perceived pension literacy.

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[118] For example, an individual could score 2% for actual pension literacy and 49% for perceived pension literacy based on a mean of 50% and still be considered low perceived, low actual.

Summary of Key Findings:

> - Actual pension literacy was a statistically significant determinant of perceived pension literacy, supporting a positive correlation between the two.
> - Although 66% of participants correctly perceived their actual pension literacy as high or low, some participants were under-confident to the extent of 55% and others were overconfident to the extent of 73.33%
> - The sample as a whole showed a significant but small under-confidence bias.
> - Participants who overestimated their knowledge, were those who scored the lowest.

The following section concludes the chapter and addresses research questions one and four.

## 4.8   Chapter Conclusions

The chapter began by reviewing the performance of the participants in relation to the test of pension knowledge. They performed well in sections one and two, but less well in section three. It suggests there is still work to do on educating the public. This is being addressed in the U.K by the Financial Capability Strategy (Money Advice Service, 2015).

The components of 'financial literacy' and 'basic pension literacy' were best able to differentiate the mean scores across demographic factors. This highlights the importance of including questions such as these in any test aimed to differentiate pension literacy. It also provided additional validation of Lusardi and Mitchell's financial literacy questions, used in numerous studies worldwide[119].

Participants were more confident about their financial security in retirement, possibly because of the large number of DB pension scheme members, than they were about their pension knowledge or their ability to make pension choices. Participants rated their pension knowledge as significantly lower after having completed the test than before having done so. This suggests that individuals' self-assessments of their own knowledge can be improved by administering tests such as the one in this study. In

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[119] See section 3.4.2 for a review of these.

doing so, individuals would gain awareness of the areas in which they need help, in other words, making them aware of what they do and do not know.

There were significant differences in actual and perceived pension literacy based on demographic factors. Males had higher pension literacy, and also perceived it to be higher, than females. Indicators of wealth, such as income and pension size, were associated with increased actual and perceived pension literacy. Education level was found to be associated with actual pension literacy, with participants possessing higher qualifications, having higher pension literacy. However, participants with no formal qualifications perceived their knowledge to be the highest. This is concerning as it suggests, in line with other studies, that those who perceive their knowledge to be high, know the least (Allgood & Walstad, 2016), resulting in an overconfidence bias and potentially poor financial behaviour (Kramer, 2016). Participants employed in the private sector had better pension literacy than participants employed in the public sector and also perceived this to be the case. These findings contribute to the bank of evidence that shows the groups at risk of making poor pension choices, through lack of pension literacy, lack of financial confidence, or both.

Being a member of a pension scheme contributes to both actual and perceived pension literacy, supporting other studies (Yang, Burr, & Miller, 2017). A greater number of individuals now engage with pensions through workplace pensions, which may go some way to addressing poor pension literacy. However, half of U.K citizens are still not actively paying into a pension fund (The Personal Finance Research Center, 2017). The research questions posed at the start of the chapter can now be addressed.

Research question four asked 'How does pension literacy change with age? Actual pension literacy showed a significant upward trend with age. However, only the section relating to the Pension Freedoms indicated significant differences in mean scores between age groups. As individuals near retirement, it can be argued, they make themselves aware of the pension rules in place at that particular point in time relevant to themselves. As pension legislation is not static, it is unlikely individuals will invest the time and effort to find out about rules that do not affect them and may change before they are required to make pension choices.

Older participants were significantly more confident in their retirement security, making pension choices and also perceived their knowledge to be higher. This alludes

to an experiential approach to pension literacy and suggests that knowledge and confidence is gained as one gets older. It is also the case that as one nears retirement, there is less uncertainty about ones financial future in retirement. Over half (55%) of participants over 60 were allocated to the high perceived, high actual group, compared to 15% allocated to the low perceived, low actual group. Older participants were also more able to assess their own pension literacy correctly as only 13% were under-confident and 17% were overconfident.

Research question one asked 'Can individuals assess their own level of pension literacy accurately? This study found that actual pension literacy was significant in the determination of perceived pension literacy in the presence of control variables. This suggests that most individuals are able to assess their pension literacy fairly accurately. 66% of participants correctly assessed themselves to have pension literacy above or below the sample mean. However, although there was enough evidence to reject the null hypothesis and support an association between actual and perceived pension literacy, around a third of participants were either under, or over, confident. The sample as a whole displayed under, rather than over, confidence bias when examined using a Bland-Altman plot. These findings were concerning as under, and over, confidence have been seen to be negatively associated with financial behaviour, particularly the propensity to consult a financial advisor or plan for retirement.

The relationship between pension literacy and financial behaviour is the subject of the next two chapters. The first of these presents the analysis of data and the second provides a discussion of the results. The conclusions drawn from this chapter and the two that follow are brought together in the final chapter of the thesis.

# 5   Results 2 – Pension Literacy and Financial Behaviour – Data Analysis

## 5.1   Introduction

The previous chapter reported the sample's pension literacy and the extent to which actual and perceived literacy were reflective of each other. It was felt that it was important to do this prior to making associations concerning pension literacy and financial behaviour. This chapter addresses the remaining two themes from chapter 2, those of pension literacy and financial advice and pension literacy and retirement planning. The research questions relating to them were both addressed using logistic regression in order to accept or reject the associated hypotheses. Therefore, it was logical to bring them together in this way. Chapter 5 reports the results from the data analysis and chapter 6 discusses them in the light of the literature and policy studies reviewed in chapter 2.

Section 5.2 starts the chapter by presenting some descriptive statistics from the survey concerning financial advice and retirement planning. Participants had consulted a wide range of sources of advice and guidance about their pensions. However, only 14.3% of participants indicated they had already, or were likely to, consult 'Pension Wise' and less than a quarter of participants intended to seek advice from an independent financial advisor (IFA)[120]. However, some participants changed their mind about consulting an IFA after having completed the test of pension knowledge. Chi-squared tests revealed being a member of a pension scheme was statistically significant in both determining whether participants intended to seek advice and whether they had planned for retirement. Participants who had engaged in one or both types of these financial behaviours had better pension literacy than participants who had not.

To explore the relationship between pension literacy and both types of financial behaviour, an initial set of logistic regressions was carried out using the main predictors of actual and perceived pension literacy. These were repeated with the addition of the control variables. The results of these are summarised in section 5.3.

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[120] Note that question two and question seven were worded differently. Question two asked whether participants had already consulted, or were likely to, consult a source of advice or guidance, as opposed to question seven that asked participants if they were intending to pay for independent financial advice prior to making choices about their pension. The statistics relating to IFAs referred to here are from question seven.

The main objective of this analysis was to examine the relationship between both pension literacy and demographic factors and financial behaviour through the interpretation of odds ratios. Both actual and perceived pension literacy were statistically significant in determining whether participants intended to seek financial advice. However, only perceived pension literacy was significant in determining whether participants had engaged in retirement planning[121].

Informed by these initial results, section 5.4 describes the results of the next stage of the analysis. This was to build two logistic regression models enabling the probability to be determined of a given individual seeking financial advice or planning for retirement, based on a set of predictor variables[122]. The models were evaluated and found to be a good fit of the data. When tested, using data other than that used to build the model, the retirement planning model performed better than the financial advice seeking model.

## 5.2   Descriptive Statistics

### 5.2.1   Overview of Analysis

This section presents some descriptive statistics concerning the two types of financial behaviour that are the focus of the study; seeking financial advice and planning for retirement. The responses to each of the survey questions that asked participants about these are presented first, followed by an analysis of the participants' pension literacy, distinguishing between participants that did, and did not, engage in each type of financial behaviour.

### 5.2.2   Sources of Pension Advice and Guidance

Table 27 (below) shows the sources of advice and guidance participants had already, or were likely to, consult in relation to their pension. The largest number of participants (44.9%) had, or were likely to, consult an IFA about their pension. Despite the government's media campaign[123], only 14.3% of participants cited 'Pension Wise'.

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[121] Actual pension literacy was not significant in retirement planning when measured as a continuous variable. However, other data analysis found it to have an effect when combined with perceived pension literacy and measured as a categorical variable in the four groups. This is covered later in the chapter.

[122] The models in section 5.4 calculate the logit transformed probability as a linear relationship with the predictor variables. However, the probability can be determined by simple arithmetic operations.

[123] FT Advisor reported that the government spent £17.8m on advertising the 'Pension Wise' brand between 2014 and 2017 (Espadinha, 2017).

Around 40% of participants had accessed advice from their pension provider. However, 14.5% of participants had either not consulted any of the listed sources or indicated that they did not know which sources they would be likely to consult. There were no obvious trends in terms of gender.

Table 27 *Sources of Pension Advice and Guidance by Gender*

| Source | Male | Female | Prefer not to say | Total | % of Sample |
|---|---|---|---|---|---|
| Pension Wise | 45 | 38 | 0 | 83 | 14.3 |
| Independent Financial Advisor (IFA) | 120 | 140 | 1 | 261 | 44.9 |
| Pension Provider | 111 | 116 | 3 | 230 | 39.6 |
| Internet Sources | 84 | 76 | 1 | 161 | 27.7 |
| Government Publications | 83 | 76 | 1 | 160 | 27.5 |
| Friends and Family | 67 | 104 | 2 | 173 | 29.8 |
| Employer | 79 | 87 | 1 | 167 | 28.7 |
| None of the above or I do not know | 35 | 47 | 2 | 84 | 14.5 |

### 5.2.3    Intention to Seek Independent Financial Advice

Table 28 (below) shows the responses to question seven in the survey 'Do you intend to pay for independent professional financial advice prior to making your pension choices?' split by pension type. The participants were asked this twice, once before completing the test and again at the end of the survey (Q40). The final question was worded such to ask participants if, having completed the test, they had changed their mind about seeking advice. Only 23.1% of participants intended to seek advice prior to completing the test, compared with 40.3% who did not intend to seek advice and 36.6% who did not know. The percentage of participants expressing their intention to seek advice was lower than indicated in question two (Table 27, above). However, question seven was purely about the intention to seek advice, as opposed to also having had already done so, which may account for this difference.

In order to assess whether the type of pension was associated with the intention to seek advice prior to completing the test, a chi-square test of independence was performed comparing the frequency of participants who intended to seek financial advice, those who did not and those who did not know. A significant interaction was found ($x^2$ (8, 581) = 34.49, $p$ <.01), indicating a relationship between seeking advice and pension type. Cramer's V was reported as 0.172, a small effect size (Cohen, 1988). A higher

number of DB pension scheme members did not intend to seek advice and a higher number of DC scheme members did intend to seek advice. The possible reasons for this are discussed in chapter 6.

Table 28 *Intention to seek Financial Advice by Pension Type (Q7)*

| Response | Defined Benefit | Defined Contribution | Both | Neither | Don't know | Total | % of Sample |
|---|---|---|---|---|---|---|---|
| Yes | 56 | 30 | 25 | 8 | 15 | 134 | 23.1 |
| No | 122 | 26 | 32 | 14 | 40 | 234 | 40.3 |
| Don't know | 78 | 26 | 32 | 11 | 66 | 213 | 36.6 |
| Total | 256 | 82 | 89 | 33 | 121 | 581 | 100 |

Table 29 (below) shows the participants' intention to seek advice after they had completed the test, but before receiving their score (Q40). 39.2% of participants indicated their decision had changed as a result of taking the test, implying their perceived pension literacy had an impact on their decision.

Table 29 *Decision to seek Advice after having completed Test by Pension Type (Q40)*

| Response | Defined Benefit | Defined Contribution | Both | Neither | Don't know | Total | % of Sample |
|---|---|---|---|---|---|---|---|
| Yes | 90 | 26 | 36 | 15 | 61 | 228 | 39.2 |
| No | 98 | 32 | 23 | 12 | 17 | 182 | 31.3 |
| Don't know | 67 | 24 | 30 | 5 | 42 | 168 | 28.9 |
| Refuse to answer | 1 | 0 | 0 | 1 | 1 | 3 | 0.6 |
| Total | 256 | 82 | 89 | 33 | 121 | 581 | 100 |

Table 30 (below) shows the combination of answers to questions seven and 40. Of the 234 participants who had originally indicated they did not intend to seek advice, 60 (25.6%) changed their mind after having completed the test. However, 112 (47.9%) said it would not have an impact on their original decision and 60 (25.6%) did not know whether it would have an impact. Of the 134 participants who originally indicated they did intend to seek advice, 67 (50%) said that completing the test would impact this, 51 (38.1%) said it would have no impact and the remainder (11.9%) changed their mind from 'yes' to 'don't know'. Of the 213 participants who originally stated they did not know whether they would seek advice, 101 (47.4%) said that taking the test would impact their decision which implies that, although it is unknown whether they would or would not be likely to seek advice, their perceived pension

literacy had an impact on their decision. However, 92 participants (43.2%) did not know whether the test had an impact on their decision and 19 (8.9%) indicated that they still did not know whether they would seek advice after having completed the test. These results are discussed in chapter 6.

Table 30 *Combination of Answers to Questions 7 and 40*

| | | Will your decision change as a result of having completed the test? (Q40) | | | | |
|---|---|---|---|---|---|---|
| | | Yes it will have an impact | No it will not have an impact | I don't know | Refuse to answer | Total |
| Do you intend to seek financial advice? (Q7) | Yes | 67 | 51 | 16 | 0 | 134 |
| | No | 60 | 112 | 60 | 2 | 234 |
| | Don't know | 101 | 19 | 92 | 1 | 213 |
| | Total | 228 | 182 | 168 | 3 | 581 |

### 5.2.4    Pension Literacy and the Intention to Seek Financial Advice

Table 31 (below) shows the mean actual and perceived pension literacy scores and standard deviations of the sample, split between participants who intended to seek advice and participants who did not, compared to the sample as a whole. For all variables excluding perceived pension literacy, participants who intended to seek advice had higher mean scores than participants who did not intend to seek advice.

Table 31 *Pension Literacy and the Intention to Seek Financial Advice*

| Variable Name (label) | $n$ | $M$ | $SD$ | Min | Max |
|---|---|---|---|---|---|
| Actual Pension Literacy (ACT_TOT) | | | | | |
| -    Overall sample | 568 | 0.07 | 4.29 | -11.14 | 8.86 |
| -    Seek advice | 132 | 1.36 | 3.90 | -9.14 | 8.86 |
| -    Do not seek advice | 227 | 0.21 | 4.32 | -11.14 | 8.86 |
| Perceived Pension Literacy (PER_TOT) | | | | | |
| -    Overall sample | 581 | 8.39 | 3.00 | 3 | 15 |
| -    Seek advice | 134 | 8.92 | 2.88 | 3 | 14 |
| -    Do not seek advice | 234 | 9.16 | 3.06 | 3 | 15 |
| Component 1 _ Financial Literacy (C1_FL) | | | | | |
| -    Overall sample | 568 | 0.00 | 1.00 | -2.67 | 1.36 |
| -    Seek advice | 132 | 0.23 | 0.88 | -2.34 | 1.31 |
| -    Do not seek advice | 227 | -0.03 | 1.00 | -2.67 | 1.36 |
| Component 2 – Pension Literacy (C2_PL) | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| - Overall sample | 568 | 0.00 | 1.00 | -2.03 | 2.19 |
| - Seek advice | 132 | 0.27 | 1.02 | -1.97 | 2.19 |
| - Do not seek advice | 227 | 0.08 | 0.97 | -1.74 | 1.78 |
| Component 3 – Pension Planning (C3_PP) | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -2.32 | 1.93 |
| - Seek advice | 132 | 0.10 | 0.88 | -1.63 | 1.83 |
| - Do not seek advice | 227 | 0.01 | 1.05 | -2.32 | 1.90 |
| Component 4 – Advisor Charging (C4_AC) | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -1.68 | 1.96 |
| - Seek advice | 132 | 0.07 | 0.97 | -1.37 | 1.74 |
| - Do not seek advice | 227 | -0.01 | 1.04 | -1.68 | 1.97 |
| Component 5 – Withdrawing your pension (C5_WP) | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -2.09 | 2.07 |
| - Seek advice | 132 | 0.09 | 1.02 | -2.00 | 1.67 |
| - Do not seek advice | 227 | -0.01 | 1.04 | -2.09 | 2.07 |

Note: The means and standard deviations for the whole sample are shown, including the 'don't know' responses to allow comparisons to be made.

5.2.5   Planning for Retirement

Question three asked participants 'Have you ever tried to work out how much income you will need in retirement?' Answering 'yes' to this question represented a positive retirement planning behaviour and was used to proxy retirement planning (Lusardi & Mitchell, 2011b).

Table 32 (below) shows the results by pension type. A chi-square test of independence was conducted comparing the frequency of participants who had and had not tried to work out how much income they will need in retirement. A significant interaction was found ($x^2$ (4, 581) = 39.11, $p$ <.01). Cramer's V was reported as 0.259, a large effect size (Cohen, 1988). Participants who were members of DB or DC pension schemes, or both, were significantly more likely to have planned for retirement than not planned. However, this was reversed for participants with no pension and for participants who did not know their pension type.

Table 32 *Planning for Retirement by Pension Type*

| Response | Defined Benefit | Defined Contribution | Both | Neither | Don't know | Total | % |
|---|---|---|---|---|---|---|---|
| Yes | 136 | 45 | 46 | 9 | 28 | 264 | 45.4 |
| No | 120 | 37 | 43 | 24 | 93 | 317 | 54.6 |
| Total | 256 | 82 | 89 | 33 | 121 | 581 | 100 |

### 5.2.6   Pension Literacy and Planning for Retirement

Table 33 (below) shows the mean scores and standard deviations of the sample split between participants who had tried to work out their income in retirement and participants who had not, compared to the sample as a whole. For all variables, participants who had planned for retirement scored higher than participants who had not.

Table 33 *Pension Literacy and Planning for Retirement*

| Variable Name (label) | *n* | *M* | *SD* | Min | Max |
|---|---|---|---|---|---|
| **Actual Pension Literacy (ACT_TOT)** | | | | | |
| - Overall sample | 568 | 0.07 | 4.29 | -11.14 | 8.86 |
| - Plan for retirement | 259 | 1.34 | 4.05 | -11.14 | 8.86 |
| - Do not plan | 309 | -1.00 | 4.19 | -11.14 | 8.86 |
| **Perceived Pension Literacy (PER_TOT)** | | | | | |
| - Overall sample | 581 | 8.39 | 3.00 | 3 | 15 |
| - Plan for retirement | 264 | 9.68 | 2.77 | 3 | 15 |
| - Do not plan | 317 | 7.31 | 2.75 | 3 | 15 |
| **Component 1 _ Financial Literacy (C1_FL)** | | | | | |
| - Overall sample | 568 | 0.000 | 1.00 | -2.67 | 1.36 |
| - Plan for retirement | 259 | 0.22 | 0.89 | -2.54 | 1.36 |
| - Do not plan | 309 | -0.18 | 1.05 | -2.67 | 1.28 |
| **Component 2 – Pension Literacy (C2_PL)** | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -2.03 | 2.19 |
| - Plan for retirement | 259 | 0.28 | 1.01 | -1.82 | 2.19 |
| - Do not plan | 309 | -0.23 | 0.93 | -2.03 | 1.92 |
| **Component 3 – Pension Planning (C3_PP)** | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -2.32 | 1.93 |
| - Plan for retirement | 259 | 0.05 | 0.97 | -1.96 | 1.93 |
| - Do not plan | 309 | -0.04 | 1.03 | -2.32 | 1.90 |
| **Component 4 – Advisor Charging (C4_AC)** | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -1.68 | 1.97 |
| - Plan for retirement | 259 | 0.05 | 0.99 | -1.47 | 1.97 |
| - Do not plan | 309 | -0.04 | 1.01 | -1.68 | 1.83 |
| **Component 5 – Withdrawing your pension (C5_WP)** | | | | | |
| - Overall sample | 568 | 0.00 | 1.00 | -2.09 | 2.07 |
| - Plan for retirement | 259 | 1.32 | 0.10 | -2.07 | 1.93 |
| - Do not plan | 309 | -0.11 | 1.01 | -2.09 | 2.07 |

Note: The means and standard deviations for the whole sample are shown, including the 'don't know' responses to allow comparisons to be made.

Having reviewed some descriptive statistics, the next section presents the results of the logistic regressions.

## 5.3    Stage One Logistic Regressions

### 5.3.1    Overview of Analysis

This section summarises the results from the stage one logistic regressions. The full results from each set of regressions are tabulated and presented in Appendices 6 to 9. They are signposted in Table 36 (p.217) which also serves as a reminder of the regressions performed. The purpose of stage one was exploratory. The aim was to examine the odds ratios and $\beta$ coefficients to understand the associations between both pension literacy and demographic factors and the two types of financial behaviour; seeking financial advice and planning for retirement. The results are discussed in chapter 6 and presented in the following sections.

### 5.3.2    Main Predictor Variables

The regressions were carried out in two steps, the first using only the main predictors of pension literacy and the second with the addition of the control variables. This section summarises the results from the regressions with only the main predictors of actual and perceived pension literacy. Ten sets of regressions were conducted, one for each outcome variable representing each type of financial behaviour[124] .Each set consisted of three individual regressions. The first used actual pension literacy (ACT_TOT) and perceived pension literacy (PER_TOT) as the only predictor variables; the second replaced actual pension literacy with the five components from the PCA (C1_FL, C2_PL, C3_PP, C4_AC, and C5_WP). The final regression used the four groups representing the combination of perceived and actual pension literacy (LOWP_HIGHA, HIGHP_LOWA and HIGHP_HIGH A), with the low perceived, low actual group as the omitted group (LOWP_LOWA).

The odds ratios shown in Tables 58 to 66 and Table 76 (Appendices 6 and 8), explain how a movement of one standard deviation above or below the mean value of the predictor variable is associated with the likelihood of that financial behaviour occurring. More specifically, the likelihood of seeking advice from a particular source of advice or guidance or the likelihood of planning for retirement. All of the

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[124] See section 3.9 in chapter 3. The ten outcome variables represented retirement planning (Q3), financial advice seeking (Q7) and the eight sources of advice and guidance (Q2).

continuous variables were standardised for ease of interpretation, the means and standard deviations are shown in Table 34 (below) for reference[125].

Table 34 *Means and Standard Deviations for Continuous Predictor Variables*

| Predictor Variable | *M* | *SD* |
|---|---|---|
| Total weighted actual pension literacy (ACT_TOT) | 0.07 | 4.29 |
| Total perceived pension literacy (PER_TOT) | 8.39 | 3.00 |
| All component factor scores (C1_FL, C2_PL, C3_PP, C4_AC, C5_WP) | 0.00 | 1.00 |

Table 35 (below) summarises the statistical significance of each predictor variable from the stage one regressions[126]. Actual and perceived ($p < .05$) pension literacy were both significant in determining whether participants intended to seek advice from an IFA (Table 58, Appendix 6) and whether participants had planned for retirement (Table 76, Appendix 8)[127]. Actual pension literacy only was significant for the other sources of guidance (Tables 60 to 64, Appendix 6)[128] with the exception of friends and family (Table 65, Appendix 6), where perceived literacy only was significant ($p < .10$). Neither actual nor perceived pension literacy was significant in determining whether participants had sought guidance from employers (Table 66, Appendix 6).

Different components of pension literacy were significant in determining whether participants had sought advice from different sources of advice or guidance. Only 'basic pension literacy' (C2_PL) was significant ($p < .05$) in planning for retirement (Table 76) and only 'financial literacy' (C1_FL) was significant ($p < .05$) in the intention to seek advice (Table 58). The significance of actual or perceived pension literacy (or both) in relation to each outcome variable was mostly reflected in which combined groups showing significance[129]. These results are discussed in chapter 6.

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[125] So for example, the odds ratio for perceived pension literacy represents the change in odds of that financial behaviour as a result of an increase or decrease in the total perceived literacy score measured by three Likert scale points.

[126] Significance when referred to in text refers to statistical significance at the 1% level, unless otherwise stated.

[127] Actual literacy $p < .05$

[128] All at 1% level with exception of Pension Provider which was significant at the 5% level.

[129] For example, for 'Pension Wise' actual literacy only was significant. Therefore, the groups that were significantly different from the low actual, low perceived group. Both had high actual literacy.

Table 35 *Summary of Significant Predictors from Stage One Logistic Regressions with Main Predictors only – Pension Literacy and Financial Behaviour*

| Question | Actual Literacy | Perceived Literacy | Groups (significance indicated) | Components (significance indicated) |
|---|---|---|---|---|
| Do you intend to seek financial advice? (Q7) | ✓*** | ✓** | None | C1** |
| Any advice at all (Q2) | ✗ | ✓*** | High P, Low A*** <br> High P, High A*** | C1* <br> C4*** <br> C5*** |
| Pension Wise (Q2) | ✓*** | ✗ | Low P, High A** <br> High P, High A*** | C2*** <br> C3** <br> C5** |
| IFA (Q2) | ✓*** | ✓* | High P, High A*** | C1*** <br> C5* |
| Pension Provider (Q2) | ✓** | ✗ | Low P, High A** <br> High P, Low A*** <br> High P, High A*** | C1** <br> C5** |
| Internet Sources (Q2) | ✓*** | ✗ | High P, High A*** | C1*** <br> C3* <br> C4** |
| Government Sources (Q2) | ✓*** | ✗ | High P, High A*** | C2** <br> C4* |
| Friends and Family (Q2) | ✗ | ✓* | None | C1** <br> C2* <br> C3* |
| Employers (Q2) | ✗ | ✗ | None | None |
| Have you ever tried to work out your income in retirement? (Q3) | ✓** | ✓*** | High P, Low A*** <br> High P, High A*** <br> Low P, High A* | C2** |

Note: ✓ = significant, ✗ non-significant. * Significance at 10% level, ** 5%, *** 1%. C1 = Financial literacy, C2 = Pension literacy, C3 Pension Planning, C4 Advisor charging, C5 Withdrawing your pension. Question seven in the survey asked participants 'Do you intend to pay for independent financial advice prior to making a decision about your pension? Only the participants answering a definite 'yes' or 'no' were included in the analysis for this outcome variable ($n = 359$). The 'don't know' answers were coded as missing data ($n = 209$). For question two and three, all of the sample were included ($N = 581$).

### 5.3.3   Addition of Control Predictor Variables

The next stage was to repeat the regressions with the addition of the control variables, hence, a further 10 sets of regressions were conducted. The full results are tabulated and are available in Appendices 7 and 9. The control variables were age, gender,

employment status, pension pot size, marital status and income. Table 37 (p.218) summarises the statistical significance of the predictor variables.

Actual and perceived pension literacy remained significant in determining the intention to seek financial advice (Table 67, Appendix 7)[130]. For other sources of guidance, only actual literacy was significant (Tables 68, 69 and 71, 72 and 73. Appendix 7)[131] with the exception of IFA (Table 70, Appendix 7), friends and family and employers (Tables 74 and 75, Appendix 7), where neither was significant. Only perceived pension literacy was significant in planning for retirement (Table 77, Appendix 9).

In considering the two main outcome variables; the intention to seek financial advice and planning for retirement[132]; gender ($p < .05$), employment status, income ($p < .05$), and pension pot size ($p < .05$) were all significant predictor variables in the intention to seek financial advice (Table 67). Only, age, income ($p < .05$) and pension pot size ($p < .05$) were significant in planning for retirement (Table 77). The component of 'financial literacy' (C1_FL) only was significant ($p < .10$) in the intention to seek advice (Table 67), whereas, none were significant in planning for retirement (Table 77), reflecting the non-significance of actual literacy. The significance of the combined groups mostly reflected the significance of actual and perceived literacy. However, none of the groups were significant in the intention to seek financial advice (Table 67). The significant variables were noted for the stage two regressions. These results are discussed in chapter 6.

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[130] At 5% and 1% levels respectfully.

[131] All $p < .05$ apart from Government Sources where $p < 0.1$.

[132] These are main outcome variables insofar as these two variables are progressed to the stage two regressions in able to construct models. The other outcome variables are purely of interest in order to interpret the odds ratios but are discussed in chapter 6 where significant. The study is predominantly about seeking financial advice and retirement planning.

Table 36 *Summary of Logistic Regressions – Pension Literacy and Financial Behaviour*

| Predictor variables | Intention to seek advice (Q7) | Pension Wise (Q2) | IFA (Q2) | Pension Provider (Q2) | Internet Sources (Q2) | Govn't Sources (Q2) | Friends And family (Q2) | Employer (Q2) | Any advice at all | Planning for Retirement (Q3) |
|---|---|---|---|---|---|---|---|---|---|---|
| Set 1 – Groups | T.58 | T.60 | T.61 | T.62 | T.63 | T.64 | T.65 | T.66 | T.59 | T.76 |
| Set 2 - Weighted and Perceived | T.58 | T.60 | T.61 | T.62 | T.63 | T.64 | T.65 | T.66 | T.59 | T.76 |
| Set 3 - Components and Perceived | T.58 | T.60 | T.61 | T.62 | T.63 | T.64 | T.65 | T.66 | T.59 | T.76 |
| Set 1 – Groups + Control variables | T.67 | T.69 | T.70 | T.71 | T.72 | T.73 | T.74 | T.75 | T.68 | T.77 |
| Set 2 - Weighted and Perceived + Control variables | T.67 | T.69 | T.70 | T.71 | T.72 | T.73 | T.74 | T.75 | T.68 | T.77 |
| Set 3 - Components and Perceived + controls | T.67 | T.69 | T.70 | T.71 | T.72 | T.73 | T.74 | T.75 | T.68 | T.77 |

Note: The tables are located in Appendices 6 to 9. T = table

Table 37 *Summary of Significant Predictors from Stage One Logistic Regressions with Control Variables*

| Question | Actual Literacy | Perceived Literacy | Groups | Components | Gender | Age | Marital status | Emp't status | Income | Pot size |
|---|---|---|---|---|---|---|---|---|---|---|
| Do you intend to seek financial advice? (Q7) | ✓** | ✓*** | None | C1* | ✓** | ✗ | ✗ | ✓*** | ✓** | ✓** |
| Any advice at all (Q2) | ✗ | ✓* | High P, Low A*** High P, High A** | C1* C4** C5 ** | ✗ | ✓* | ✓*** | ✗ | ✓*** | ✗ |
| Pension Wise (Q2) | ✓** | ✗ | Low P, High A** High P, High A** | C2*** C3*** | ✗ | ✓*** | ✗ | ✗ | ✗ | ✗ |
| IFA (Q2) | ✗ | ✗ | None | C1* | ✓* | ✓** | ✗ | ✓*** | ✓*** | ✓*** |
| Pension Provider (Q2) | ✓** | ✗ | Low P, High A** High P, Low A** High P, High A*** | C1** | ✗ | ✓* | ✗ | ✗ | ✓** | ✓** |
| Internet Sources (Q2) | ✓** | ✗ | High P, High A*** | C1** | ✗ | ✓** | ✓** | ✗ | ✓* | ✗ |
| Government Sources (Q2) | ✓* | ✗ | High P, High A* | C2* | ✗ | ✓** | ✓* | ✗ | ✓* | ✗ |
| Friends and Family (Q2) | ✗ | ✗ | None | None | ✓** | ✓*** | ✗ | ✗ | ✓** | ✗ |
| Employers (Q2) | ✗ | ✗ | None | None | ✗ | ✗ | ✗ | ✓** | ✓** | ✓*** |
| Have you ever tried to work out your income in retirement? (Q3) | ✗ | ✓*** | High P, Low A** High P, High A*** | None | ✗ | ✓*** | ✗ | ✗ | ✓** | ✓** |

Note: ✓ = significant, ✗ non-significant. * Significance at 10% level, ** 5%, *** 1%. C1 = Financial literacy, C2 = Pension literacy, C3 Pension Planning, C4 Advisor charging, C5 Withdrawing your pension.

### 5.4 Stage Two Logistic Regressions

#### 5.4.1 Overview of Analysis

The objective of the stage two regressions was to build two separate logistic regression models to explain the odds of engaging in the two main outcome variables; seeking financial advice and planning for retirement, given a set of predictor variables. The approach to build the models was the same for each, the detail of which is provided in Appendix 10. A summary of the process is provided below. The logistic regressions were based on the outcome variables (FA_O) 'Do you intend to pay for independent professional financial advice prior to making your pension choices?'[133] and (RP) 'Have you ever tried to work out your income in retirement?

#### 5.4.2 Evaluating Alternative Regression Models

The models were built hierarchically using the results from the stage one regressions to inform the order in which the variables were entered.

Each model, resulting from the addition of each additional block of variables, was evaluated in terms of overall model evaluation, statistical tests of individual predictors and goodness of fit statistics (Peng et al., 2002).

A model is said to provide a better fit to the data when there is a significant improvement over the intercept-only model (Peng et al., 2002). This was measured by a chi-squared statistic that indicated whether the overall improvement to the model deviance was significant. Individual model parameters were tested using the Wald statistic, the ratio of the estimated parameter slope over its standard error (Field, 2013).

Goodness of fit statistics assessed how well the model fitted the data. The Hosmer-Lemeshow (H-L) test was used to assess goodness of fit. An insignificant result indicated that the model fitted the data well. This test has been criticised as lacking statistical power (Peng & Tak-Shing, 2002), however, it is widely recognised and used with other indicators, was valid to include in the model selection criteria (Field, 2013). In addition, two descriptive measures of goodness of fit were evaluated. These were both variations to $R^2$ used in ordinary least squares regression (OLS) and were the Cox and Snell's $R^2$ and Nagelkerke $R^2$. The latter was preferred as the former never reaches

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[133] As for stage one, only participants that had answered a definite 'yes' or 'no' were included in the analysis.

the theoretical maximum of one. Conceptually, although they differ in OLS $R^2$, they can be interpreted in a similar way.

In this study, binary logistic regression predicted the logit of an individual intending to seek advice in relation to their pension or engaging in retirement planning. The logit is the natural log of the odds (probability /1-probability) and was transformed into a probability scale to give a predicted result of applying the model. Predicted probabilities were then validated against actual outcomes to determine if low probabilities (<0.5) were associated with not seeking advice (or retirement planning) and high probabilities (>0.5) were associated with seeking advice (or retirement planning). A 2 x 2 classification table assessed the percentage of correct classifications generated by the model in relation to the sample data. Improvement to the classification rate indicated a better model.

All of these indicators were inspected to assess each model and to choose the best to fit the data. Only the significant predictors were included in the final models, with one exception. In the planning for retirement model, actual pension literacy lost significance upon addition of the control variables. However, this was a main variable of interest and its removal did not impact the $\beta$ coefficients of the other variables. Therefore, it was retained in the model (Hosmer & Lemeshow, 2013).

### 5.4.3 Final Models

The final models are shown at the end of this section in Table 40 (p.225) and 41 (p.226). They are represented by equations 5 and 6[134]:

Predicted logit (FA_O = 1) = 0.260+ 0.072 (ACT_TOT) + -0.158 (PER_TOT) + -0.731 (GEN) + 1.182 (PS1) + 0.151 (PS2) + 0.281 (PS3) + 0.832 (PS4) + 1.495 (PS5) + -0.496 (PS6) + -0.004 (ES1) + -0.144 (ES2) + 1.476 (ES3) + 0.358 (INC1) + 0.910 (INC2) + 1.315 (INC3)

$$(5)$$

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[134] Equations 5 and 6 calculate the logit. This can be converted to odds by exp $^{(logit)}$. The probability is then calculated by odds/ (1+ odds).

Predicted logit (RP = 1) = -2.825+ 0.010 (ACT_TOT) + 0.169 (PER_TOT) + 0.365 (PS1) + 0.048 (PS2) + 0.772 (PS3) +1.639 (PS4) + 1.301 (PS5) + -0.285 (PS6) + 0.629 (INC1) + 1.006 (INC2) + 0.990 (INC3) + -0.440 (AGE1) + 0.412 (AGE2) + 0.513 (AGE3) + 1.713 (AGE4) + 1.226 (AGE5)

(6)

### 5.4.4   Model Evaluation

This section describes the various ways in which the final models were evaluated. In addition to the overall model evaluations, goodness of fit statistics and significance of individual predictors, in order to test the models, it was helpful to demonstrate the relationship between the characteristics in the data and the predicted outcomes based on the models (Field, 2013; Peng & Tak-Shing, 2002). In relation to the sample data, the software package generated a classification table. This showed, based upon the entire sample, the model's success in predicting the correct classification as to whether participants will intend to seek advice or plan for retirement. This table is most useful when classification is the main goal of the analysis, which it was here (Hosmer & Lemeshow, 2013).

Table 38 (below) shows the classification table for the seeking financial advice model (Equation 5).

Table 38 *Classification Table – Seeking Financial Advice*

|  |  | Predicted | | |
|---|---|---|---|---|
|  |  | No | Yes | % Correct |
| Observed | No | 182 | 24 | 88.3 |
|  | Yes | 61 | 55 | 47.4 |
|  | Overall % |  |  | 73.6 |

The table shows the overall correct classification rate was 73.6%. However, the model was much better at predicting when participants will not seek advice (88.3%) than it was predicting when they will (47.4%). Given the nature of the advice gap, one could argue that to identify individuals who will not seek advice is of more importance than predicting those who will, these individuals may be at greater risk of engaging in poor financial behaviour.

Table 39 (below) shows the classification table for the planning for retirement model (Equation 6).

Table 39 *Classification Table – Planning for Retirement*

|  |  | Predicted | | |
|---|---|---|---|---|
|  |  | No | Yes | % Correct |
| Observed | No | 239 | 51 | 82.4 |
|  | Yes | 91 | 136 | 59.9 |
|  | Overall % |  |  | 72.5 |

The table shows the overall correct classification rate was 72.5%. The model was much better at predicting when participants had not planned (82.4%) than it was at predicting when participants had planned (59.9%), although the model's performance relating to the latter is still better than a 50/50 chance. Identification of individuals less likely to plan for their retirement is important so that interventions can be appropriately targeted to help them.

For a model to be truly reliable, the confidence intervals relating to the odds ratios should not cross one. This way one can have confidence in the direction of the relationship between the predictor and outcome variables (Field, 2013). Examination of the output for the financial advice model (Table 40, below) showed that for the main variables of interest, actual and perceived pension literacy, it could be stated with confidence that an increase in perceived pension literacy caused a decrease in the probability of seeking advice 95% of the time. The confidence interval for actual pension literacy was observed to cross one. However, the lower boundary was very close to one (0.998), therefore, it could be stated with reasonable confidence that as actual pension literacy increased, so did the probability of seeking advice (Hosmer & Lemeshow, 2013). For the other significant predictor variables, only the confidence interval for employment status crossed one, this was also very wide, therefore, care was taken in interpreting the odds ratios relating to this variable. The confidence intervals of a number of other non-significant variables did cross one and this may have contributed to the misclassification rate of the model. This was acknowledged as a weakness of the model and is discussed further in chapter 6.

For the retirement planning model (Table 41, below), for the main predictors, actual and perceived pension literacy, it could be stated with confidence that an increase in perceived literacy caused an increase in planning for retirement 95% of the time. The lower boundary of the confidence interval for actual literacy was very close to one (0.953), therefore, it could be stated with reasonable confidence that as actual pension literacy increased, so did the probability of retirement planning. However, on addition of the control variables, actual pension literacy lost statistical significance and the $\beta$ coefficient was also very small, meaning that actual pension literacy had a very minor impact on the computed odds. For income, only INC1 crossed one, however, the lower interval boundary was also very close to one (0.959). For pension pot size, both significant variables (PS4 and PS5) did not cross one. However, the other categories relating to pension pot size did cross one, which limited the reliability that was placed on the odds ratios in relation to these variables, although the $\beta$ coefficients were small. The same was true of age. The significant age group 66-75 (AGE5) did cross one, but had a lower interval boundary fairly close to one (0.817). These were weaknesses of the model, as too was the significance of the constant term. This indicated that there was still a significant amount of variance not accounted for by this model.

The residuals of both models were examined. These statistics identified individual cases that may have influenced the models. All of these statistics were satisfactory. Details of the tests and results can be seen in Appendix 10.

Finally, the assumptions relating to logistic regression were tested. The two continuous predictors (ACT_TOT and PER_TOT) were required to be linearly related to the log of the relevant outcome variable. This was tested for both models and neither had violated this assumption[135]. The models were tested for multi-collinearity between variables and none was found[136].

### 5.4.5 Testing the Models (Out of Sample Testing)

The final models were tested using data other than that used to build them (Field, 2013; Peng et al., 2002). In the data collection phase of the study, initially, 760 responses

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[135] This was tested by creating interaction terms in the regression between the continuous variables and their log. If an interaction was significant, the assumption of linearity of the logit has been violated. This was not the case.
[136] Tolerance values of less than 0.1 and VIF values of greater than 10 indicate a problem (Field, 2013). All tolerance values were greater than 0.7 and VIF were greater than one and less than two.

were collected from all over the U.K. However, only respondents over the age of 40 living in the North East of England were included in the final sample. Therefore, the remaining valid cases were used to test the models ($N = 77$). This was less than ideal due to the differences in demographic characteristics. However, it represents an illustration of how the models could be applied in practice, whilst acknowledging the limitations of the analysis.

The retirement planning model had a better success rate than did the model for seeking financial advice. The retirement planning model was able to correctly predict whether individuals had tried to work out their income in retirement in 74% of cases. In 10.4% of cases, the model predicted that individuals had planned for retirement, when they had not and in 15.6% of cases, it predicted that individuals had not planned for retirement, when they had.

For the financial advice seeking model the success rate was only 36.6%[137]. In 50.7% of cases, the model predicted that individuals intended to seek advice, when they did not. In 12.7% of cases, the model predicted that individuals did not intend to seek advice, when they did. This was very likely due to the difference in age demographic. The test cases included a significant number of individuals under aged 40, many of whom would be some years off making pension decisions requiring financial advice.

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[137] The number of cases included in this analysis was only 71 as the 'don't know' answers were excluded on the basis that these cannot be classified one way or another.

Table 40 *Seeking Financial Advice –Variables in the Model*

| Variable (β) | β | SE | Wald | p value | Exp (β) Odds Ratio | 95% CI for Exp (β) Lower | 95% CI for Exp (β) Upper |
|---|---|---|---|---|---|---|---|
| Perceived pension literacy (PER_TOT) | -0.158*** | 0.054 | 8.438 | 0.004 | 0.854 | 0.768 | 0.950 |
| Actual Pension literacy (ACT_TOT) | 0.072* | 0.038 | 3.613 | 0.057 | 1.075 | 0.998 | 1.157 |
| Gender - male | -0.731** | 0.294 | 6.202 | 0.013 | 0.481 | 0.271 | 0.856 |
| Income £20,000 - £40,00 (INC1) | 0.358 | 0.464 | 0.597 | 0.440 | 1.431 | 0.576 | 3.553 |
| Income £40,000 - £60,000 (INC2) | 0.910* | 0.497 | 3.359 | 0.067 | 2.486 | 0.939 | 6.581 |
| Income >£60,000 (INC3) | 1.315** | 0.570 | 5.315 | 0.021 | 3.723 | 1.218 | 11.382 |
| Employed full time (ES1) | -0.004 | 0.734 | 0.000 | 0.996 | 0.996 | 0.236 | 4.204 |
| Employed part time (ES2) | -0.144 | 0.762 | 0.036 | 0.850 | 0.866 | 0.195 | 3.856 |
| Self-employed (ES3) | 1.476* | 0.891 | 2.744 | 0.098 | 4.376 | 0.763 | 25.101 |
| Pension pot size £30,000 - £50,000 (PS1) | 1.182 | 0.737 | 2.572 | 0.109 | 3.261 | 0.769 | 13.824 |
| Pension pot size £50,000 - £100,000 (PS2) | 0.151 | 0.614 | 0.061 | 0.805 | 1.163 | 0.349 | 3.872 |
| Pension pot size £100,000 - £250,000 (PS3) | 0.281 | 0.568 | 0.245 | 0.620 | 1.325 | 0.435 | 4.029 |
| Pension pot size – over £250,000 (PS4) | 0.832 | 0.621 | 1.792 | 0.181 | 2.297 | 0.680 | 7.762 |
| Pension pot size – over £500,000 (PS5) | 1.495** | 0.626 | 5.694 | 0.017 | 4.458 | 1.306 | 15.218 |
| Pension pot size – Don't know (PS6) | -0.496 | 0.436 | 1.296 | 0.255 | 0.609 | 0.259 | 1.431 |
| Constant | 0.260 | 0.903 | 0.083 | 0.774 | 1.297 | | |

Note: The omitted groups were female, income < £20,000, employment status not working (homemaker, unemployed or retired), pension pot size under £30,000. * Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level.

Table 41 *Retirement Planning – Variables in the Model*

| Variable (β) | β | SE | Wald | p value | Exp (β) Odds Ratio | 95% CI for Exp (β) Lower | 95% CI for Exp (β) Upper |
|---|---|---|---|---|---|---|---|
| Perceived pension literacy (PER_TOT) | 0.169*** | 0.043 | 15.548 | 0.000 | 1.164 | 1.089 | 1.288 |
| Actual Pension literacy (ACT_TOT) | 0.010 | 0.029 | 0.107 | 0.744 | 1.010 | 0.953 | 1.069 |
| Income £20,000 - £40,00 (INC1) | 0.629* | 0.342 | 3.382 | 0.066 | 1.876 | 0.959 | 3.666 |
| Income £40,000 - £60,000 (INC2) | 1.006*** | 0.359 | 7.855 | 0.005 | 2.735 | 1.353 | 5.528 |
| Income >£60,000 (INC3) | 0.990** | 0.435 | 5.191 | 0.023 | 2.691 | 1.148 | 6.308 |
| Age 46 - 50 (AGE1) | -0.440 | 0.330 | 1.786 | 0.181 | 0.644 | 0.337 | 1.228 |
| Age 51- 55 (AGE2) | 0.412 | 0.298 | 1.915 | 0.166 | 1.510 | 0.842 | 2.707 |
| Age 56 – 60 (AGE3) | 0.513 | 0.323 | 2.514 | 0.113 | 1.670 | 0.886 | 3.148 |
| Age 61-65 (AGE4) | 1.713*** | 0.425 | 16.265 | 0.000 | 5.544 | 2.412 | 12.743 |
| Age 66-75 (AGE5) | 1.226* | 0.729 | 2.830 | 0.093 | 3.407 | 0.817 | 14.214 |
| Pension pot size £30,000 - £50,000 (PS1) | 0.365 | 0.558 | 0.428 | 0.513 | 1.440 | 0.483 | 4.300 |
| Pension pot size £50,000 - £100,000 (PS2) | 0.048 | 0.508 | 0.009 | 0.924 | 1.049 | 0.388 | 2.840 |
| Pension pot size £100,000 - £250,000 (PS3) | 0.772 | 0.486 | 2.524 | 0.112 | 2.164 | 0.835 | 5.611 |
| Pension pot size – over £250,000 (PS4) | 1.639*** | 0.626 | 6.859 | 0.009 | 5.149 | 1.510 | 17.553 |
| Pension pot size – over £500,000 (PS5) | 1.301** | 0.610 | 4.546 | 0.033 | 3.675 | 1.111 | 12.156 |
| Pension pot size – Don't know (PS6) | -0.285 | 0.357 | 0.634 | 0.426 | 0.752 | 0.374 | 1.515 |
| Constant | -2.825*** | 0.544 | 27.013 | 0.000 | 0.059 | | |

Note: The omitted groups were age 40-45, income < £20,000, pension pot size under £30,000. * Significance at 10% level, ** Significance at 5% level, *** Significance at 1% level.

## 5.5  Conclusion

This chapter presented the results from the logistic regression analysis. This was performed in order to address research questions two, three and five concerning pension literacy and financial behaviour, specifically, seeking financial advice and planning for retirement.

The chapter began in section 5.2 by presenting descriptive statistics in relation to seeking financial advice and planning for retirement. Participants had engaged with a wide range of sources of advice and guidance, however, only 23% of the sample stated they intended to seek advice from an independent financial advisor and only 14.3% had, or were likely to, seek guidance from 'Pension Wise'. Actual pension literacy was higher for participants who had engaged with the two financial behaviours than for participants who had not. A large proportion of participants still had to make up their mind about seeking advice, and for some, completing the test had an impact on this.

Section 5.3 presented the results of the stage one regressions. These were first performed with only the main predictors of actual and perceived pension literacy, then repeated with the addition of control variables. Perceived and actual pension literacy were both statistically significant in determining the participants' intention to seek advice. However, only perceived pension literacy was significant in determining whether they had engaged in retirement planning. Actual pension literacy was broken down into five components by application of principal components analysis. This provided additional information about which specific components of pension literacy were significant in both the intention to seek advice and in planning for retirement.

Section 5.4 presented the results of the stage two regressions, informed by the results from stage one. The aim was to build two logistic regression models based on questions seven 'Do you intend to pay for professional financial advice in relation to your pension choices?' and three 'Have you ever tried to work out your income in retirement? The model building process was summarised and the final models presented. These were evaluated and then tested using data other than that used to build the models. The retirement planning model performed better than the model to seek financial advice. In particular, the latter model failed to correctly predict when individuals did not intend to seek advice. The limitations were acknowledged in terms

of the age demographic of the test cases, which was likely a reason for its poor performance. It did however, provide an illustration of how the model could be used in practice.

The next chapter discusses the results and their contribution to the current academic and policy literature base.

# 6 Results 3 - Pension Literacy and Financial Behaviour - Discussion of Results

## 6.1 Introduction

The purpose of this chapter is to discuss the results from chapter 5 in the context of the existing academic and public policy research. It addresses the remaining research questions and provides justification for acceptance or rejection of the associated hypotheses. Concerning pension literacy and seeking financial advice, this chapter addresses research questions two 'What is the relationship between pension literacy and the propensity to seek financial advice in relation to pensions?' and three 'Are pension literacy and financial advice seeking complements to, or substitutes for, each other? In relation to pension literacy and retirement planning, this chapter addresses research question five 'What is the relationship between pension literacy and retirement planning?

The discussion of findings in this thesis distinguishes between those results relating to the definition and measurement of pension literacy (chapter 4) and pension literacy and financial behaviour (chapter 5). The rationale for this approach was that an understanding of the sample's pension literacy was judged to be prerequisite to its association with financial behaviour. To recap, the sample had fairly good financial and basic pension literacy but did not perceive this to be so. Participants were however, fairly confident in their financial security in retirement. Pension literacy improved with age and was associated with various other demographic factors including gender, wealth and employment sector. Most participants were able to assess their own pension literacy fairly accurately, however, as a whole, there was evidence of under, rather than over, confidence bias. There were clear associations between group membership and demographic factors in relation to the low perceived, low actual and the high perceived, high actual groups. However, there were no clear profiles of under, or over, confident participants based on the ANOVA performed on the demographics included in this study. Examination of a Bland-Altman chart however, did indicate that participants who tended to overestimate their own pension literacy, were those whose pension literacy was the lowest.

Section 6.2 discusses the important findings from the descriptive statistics. Sections 6.3 to 6.5 discuss the relationship between actual and perceived pension literacy and

the intention to seek advice and plan for retirement[138]. Section 6.6 discusses the relationship between various demographic factors and both of these types of financial behaviour.

The free pension guidance provided under the government's guidance guarantee is 'Pension Wise' (Financial Conduct Authority, 2015a). This is discussed separately in section 6.7 and other forms of guidance are covered in section 6.8. Section 6.9 concludes the chapter and addresses the research questions.

## 6.2 Descriptive Statistics

### 6.2.1 Seeking Financial Advice

There is consensus in the literature that seeking financial advice is desirable (Blanchett & Kaplan, 2013; Porto & Xiao, 2016). In the U.K, many individuals require advice about their retirement choices since the introduction of the Pension Freedoms (Financial Conduct Authority, 2016a). The results of this study found that five years since the reforms, individuals are consulting with a wide range of sources of advice and guidance. However, only 23% of participants intended to seek financial advice about their pension, 40% did not intend to seek advice, and 37% did not yet know. Half of participants who did not yet know were aged 40-50, probably too young to decide about advice, as they have yet to make decummulation choices about their pension. Policy makers still have time to persuade this group about the benefits of seeking advice. The introduction of 'wake up packs' will go some way to achieve this as it will provide a time appropriate trigger[139].

When the sample were asked to select the sources of advice and guidance they had already, or were likely to, consult, 44% of participants selected an independent financial advisor. There was therefore a disparity between the responses to questions two and seven, which may have been attributed to the wording of the questions; question two was worded to include previous consultations with an advisor, whereas

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[138]For simplicity, the set two regressions (Table 15) using the total actual weighted score (ACT_TOT) and the total perceived score (PER_TOT) as the predictors of actual and perceived pension literacy are referred to. Reference is made to the combined groups (set one) and the five components of pension literacy (set three) only where useful. The $\beta$ coefficients and odds ratios for the predictor variables differ slightly between each set. The full results can be seen in the results tables in Appendices 6 to 9.

[139] Wake up packs were discussed in the introduction. They are to be issued to some individuals at age 50.

question three asked solely about participants' intention to seek advice in the future in relation to their pension choices. In their review, the Personal Finance Research Centre (2017) found 34% of pre-retired individuals they surveyed had consulted with financial advisors[140], This represents an approximate average of the responses to questions two and seven, so would seem to suggest that the results of this study were largely in line with their findings.

Chi-squared tests revealed a significant difference in the intention to seek advice based on pension type. Of the participants who did not intend to seek advice, 52% were members of DB pension schemes. This group would only require financial advice when transferring to a DC scheme to take advantage of the flexibilities, such as to access cash. Some of these participants were members of the 'Teachers Pension Scheme' which is unfunded and does not permit such pension transfers. However, 63% of participants who were members of only DC schemes, 72% of participants who were members of both DB and DC schemes and 88% of participants who did not know the type of pension to which they were a member, either did not intend to seek advice or did not know whether they would seek advice or not. This is concerning as it is likely that these groups will require financial advice to make effective choices about how to draw their pension in the most effective way (Financial Conduct Authority, 2015b).

There are many reasons why individuals do not seek advice and other studies have found lack of trust and cost to be important, as well as lack of financial capability and a low perception of value to be gained (Brancati et al., 2017; The Personal Finance Research Center, 2017; Van Dalen et al., 2016). It was therefore interesting to find out whether having completed the test of pension knowledge, this had an impact on the participants' intention to seek advice. The participants were asked about their intention to seek advice a second time prior to being given their scores. Their response was therefore, wholly based on their perception of how they had performed in the test. Only 25.6% of the 234 participants who had originally stated they did not intend to seek advice, indicated that completing the test had changed their mind. 47.9% stated it would not have an impact, which may suggest that factors, such as those mentioned

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[140] The data upon which this was based was Gfk 'At Retirement consumer research – Exploring changes in the retirement landscape - a report produced for the FCA', 2014.

above, may have driven their decision, not their pension literacy. However, alternatively, it could relate to those DB scheme members referred to above, who do not require advice, regardless of having completed the test.

Of the 134 participants who had originally intended to seek advice, 50% stated they had changed their mind after having completed the test, however, it was not possible to say how. These participants may, after taking the test, have perceived their knowledge to be poor and thus no longer felt confident enough to seek advice. Alternatively, this group may have perceived their knowledge to be sufficiently good and, therefore, felt financial advice was not required. This latter explanation suggests overconfidence bias, discussed later in this section[141]. Of the 213 participants who did not know whether they would seek advice, 47.4% said that the test would impact their decision. This implies that, although it is not known whether they changed their mind to 'yes' or 'no', it can be claimed that their perceived pension literacy had an impact on their revised response. This was supported by the logistic regression results discussed below.

To explore the relationship between pension literacy and financial advice, a preliminary analysis of pension literacy scores was performed. This distinguished between participants who did and who did not intend to seek financial advice compared to the sample as a whole. Studies have shown financial capability to be linked with the decision to seek financial advice (Brancati et al., 2017; Robb et al., 2012). Participants who intended to seek advice ($n = 134$) had better pension literacy ($M = 1.37$, $SD = 3.90$) than participants who did not ($n = 234$, $M = 0.21$, $SD = 4.32$) [142]. This held true for all of the five components of pension literacy determined through principal components analysis. However, this was reversed for perceived pension literacy. Participants who intended to seek advice scored lower ($M = 8.92$, $SD = 2.89$) than participants who did not intend to seek advice ($M = 9.16$, $SD = 3.06$). These relationships are explored further in the following sections.

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[141] In order to prevent this reaction the participants were provided with a message and web link after receiving their score directing them to the Pension Wise website. Their feedback was worded in such a way so as not to leave them with the impression that they did not need further advice.
[142] This analysis was based on weighted scores.

Participants had, or were likely to, consult a wide range of sources of advice and guidance about their pensions. Despite the Governments' media campaign (Espadinha, 2017) and the guidance guarantee (Financial Conduct Authority, 2015b), only 14.3% of participants cited 'Pension Wise'. 39.6% of participants cited their pension provider and 28.7% cited their employer, the most likely source of guidance for DB, employer funded, pension scheme members. Some participants cited informal sources of guidance such as the internet (27.7%) and friends and family (29.8%). 14.5% of participants had not consulted any of the listed sources. This is broadly in line with other research that found 18% of pre-retirees had not consulted any sources of pension advice or guidance[143] (The Personal Finance Research Center, 2017). These results on the whole are quite encouraging, the majority of participants had, or were likely to, consult at least one source of advice or guidance. However, there is no assurance that individuals are using the most appropriate guidance sources for their needs and some individuals that need financial advice, are not seeking it for various reasons (Financial Conduct Authority, 2016a). The next section discusses the descriptive statistics concerning retirement planning.

## 6.2.2   Retirement Planning

There are many factors that influence retirement planning and decision making, the literature in relation to this is expansive (Corsini & Spataro, 2015). This study used a simple proxy to represent retirement planning. This was whether or not participants had attempted to work out their income in retirement. Individuals who calculate how much income they need for retirement, are more likely to actively contribute to a pension and reach retirement with more wealth than those who do not (Lusardi & Mitchell, 2011c). Recent research found many individuals unable to conceptualise their income in retirement (The Personal Finance Research Center, 2017).

45.4% of participants had attempted to work out their income in retirement. Whether participants were members of a pension scheme had a significant association with planning, the effect size, as reported by Cramer's V, was large. There was a significant difference between participants who were members of a pension of some type and

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[143] The data upon which this was based was Gfk 'At Retirement consumer research – Exploring changes in the retirement landscape- a report produced for the FCA, 2014.It shows also that, based on this data, the situation has changed very little since 2014.

participants with either no pension, or those who were members of a scheme, but did not know its type. Perhaps not unexpectedly, only 27% of participants who were not members of DC or DB pension schemes had tried to work out their income in retirement and only 23% of participants who did not know their pension type had tried to do so. However, 53% of participants who were members of some type of pension had planned for retirement. Given the sample was aged over 40, it is concerning some participants had not considered how they would manage financially in retirement, especially those that may have little or no pension provision. However, some individuals may be content to know their pension 'is there' without attempting to work out the income they will receive from it. Other research found that 12m individuals in the U.K are not making adequate provision for their retirement (The Personal Finance Research Center, 2017). Consequently, it may be tempting for those with little provision to 'bury their head in the sand'. It is possible that individuals may expect to rely on non-pension income in retirement, such as housing equity, making them less reliant on pension income (Lusardi & Mitchell, 2007c). Nonetheless, attempting to work out one's income in retirement is still an important element of retirement planning.

To explore the relationship between pension literacy and retirement planning, a preliminary analysis of pension literacy scores was performed. This distinguished between participants who had and who had not planned for retirement, compared to the sample as a whole. The mean actual pension literacy score of participants who did plan for retirement ($n = 259$) was higher ($M = 1.34$, $SD = 4.05$) than for those who did not ($n = 309$, $M = -1.00$, $SD = 4.19$)[144]. The same held true for all five components of pension literacy. Participants who had engaged in retirement planning perceived their pension literacy to be higher ($M = 9.68$, $SD = 2.77$) than those who had not ($M = 7.31$, $SD = 2.75$). These relationships are explored further in the following sections.

Summary of Key Findings:

> - Less than one quarter of participants intended to seek financial advice. However, a higher percentage indicated they were either likely to do so, or had already done so. Only 14.3% of participants had consulted 'Pension Wise'

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[144] Based on weighted scores

- 37% of participants had yet to decide whether to seek advice, there is still time to persuade this group about the benefits of seeking advice.
- Being a member of a pension scheme was statistically significant in the intention to seek advice.
- 25.6% of participants who did not intend to seek advice, changed their mind having completed the test of pension literacy. However, 47.9% said it would have no impact, suggesting this group either, do not need advice, or other factors are driving their decision. For 50% of participants who were undecided about seeking advice, completing the test had an impact on their decision, although it was not possible to say how.
- Participants who intended to seek advice had better actual pension literacy than those who did not.
- Participants who did not intend to seek advice had higher perceived pension literacy than those who did.
- 54.6% of participants had not tried to work out their retirement income.
- Being a member of a pension scheme was statistically significant in retirement planning.
- Participants who engaged in retirement planning had higher actual pension literacy and also perceived it to be higher than those who had not.

## 6.3   Actual Pension Literacy and Financial Behaviour

### 6.3.1   Seeking Financial Advice

There is a debate in the literature as to whether financial literacy and financial advice are complements to, or substitutes for, each other. The results of this study supported the majority of financial literacy studies (Calcagno & Monticone, 2015; Collins, 2012; Gentile, Linciano, & Soccorso, 2016; Robb et al., 2012; Seay et al., 2016) and found that actual pension literacy and financial advice seeking were complementary, in that participants with higher pension literacy were more likely to seek financial advice. Even after the addition of the six control variables in the stage one regressions, actual pension literacy remained a significant predictor of the intention to seek financial advice at the 5% significance level, supporting the descriptive analysis above. One standard deviation increase in weighted pension literacy score increased the likelihood

of seeking advice by 1.4 times (Table 67, Appendix 7)[145]. In the final stage two regression model, actual pension literacy reduced to a 10% significance level[146]. Overall, this suggests that to seek advice, pension literacy is required and individuals who need advice the most, those who lack pension literacy, are less likely to seek it. This supports the body of literature with similar findings (Calcagno & Monticone, 2015; De Zwaan et al., 2017). Policy makers need to engage with these individuals to make them aware of the value of financial advice. One way to do this, could be to increase basic financial literacy, as explained below.

Unique to this study, actual pension literacy was broken down into five components based on principal components analysis. This provided additional information about the specific elements of pension literacy significant in the decision to seek advice. In stage one regressions, both before and after addition of the control variables, only the component representing 'financial literacy' was significant in the decision to seek advice. A one standard deviation increase in the 'financial literacy' score increased the likelihood of seeking advice by around 1.4 times (Table 67)[147]. This suggests that knowledge about basic financial concepts, such as the time value of money, compound interest and inflation, is sufficient to appreciate the value of seeking advice. Specific knowledge about pensions is less important[148]. A low perception of the value to be gained has been cited as a reason for not seeking advice in the literature (Allgood & Walstad, 2016; Wei et al., 2016). It also suggests, that if individuals are able to understand the advice provided by advisors, they are more likely to pay to obtain it (Bucher-Koenen & Koenen, 2015). Financial literacy may be helpful to understand financial advice, however, studies have shown that financially literate individuals tend not to follow it because they have the ability to consider alternative choices (Stolper, 2015). This study did not examine this empirically, however, it is a further consideration for policy makers.

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[145] It is acknowledged that this is actually the intention to seek advice as per the wording of question seven. However, for ease of reference, seeking advice will be referred to here.
[146] The final model did not use standardised scores, therefore, the odds ratio represents the increase in odds of seeking advice caused by an increment of 1 unit in the actual weighted score. In the final logistic regression model, this odds ratio was 1.075. Standardised scores were used in stage one regressions for ease of interpretation.
[147] The scores for the components were also weighted to take into account question difficulty.
[148] None of the pension specific components were significant when tested.

These findings enabled hypothesis two to be addressed. In the final logistic regression model, actual pension literacy was significant in the intention to seek advice at the 10% level. As seen in chapter 5, the lower confidence interval boundary relating to the odds ratio was 0.002 away from one, therefore, it could be stated with confidence that, as pension literacy increased, so did the propensity to seek advice. Therefore, there was enough evidence to reject the null hypothesis, there is no relationship between actual pension literacy and seeking pension advice, in favour of alternative hypothesis two:

$H_2$ There is a relationship between individuals' actual pension literacy and seeking pension advice.

6.3.2   Retirement Planning

An evidence review, conducted on behalf of the Money Advice Service, reported that 22m working individuals stated they did not know enough about pensions to plan for their retirement (The Personal Finance Research Center, 2017). The stage one regressions, including only the main predictors of pension literacy, found actual pension literacy to be significant in retirement planning. This supports the descriptive statistics. A one standard deviation in actual pension literacy increased the likelihood of retirement planning by 1.3 times (Table 76, Appendix 8). The component of 'basic pension literacy' only was significant, indicating that basic pension knowledge, as opposed to financial literacy, is required for retirement planning. A one standard deviation increase in 'basic pension literacy' score increased the likelihood of planning for retirement by 1.2 times (Table 76).

However, when the control variables were added to the regression, actual pension literacy lost significance, so did the component of 'basic pension literacy' (Table 77, Appendix 9). Financial literacy has been linked with retirement planning in the literature and the majority of studies worldwide have found financial literacy to be positively associated with retirement planning (Alessie et al., 2011; Bucher-Koenen & Lusardi, 2011; Lusardi & Mitchell, 2011d; Ricci & Caratelli, 2015; Sekita, 2011). Therefore, this result was unexpected. However, Crossan et al (2011) found no association between financial literacy and retirement planning in New Zealand and this study seems to support this, contradicting the majority of literature. Crossan et al (2011) surmised their findings could be attributed to the dominant public sector

pension provision in New Zealand. The U.K also has a state pension and benefits system which could alleviate the perception of the need to plan for retirement for some individuals. The composition of the sample, particularly the large proportion of DB scheme members, could also have had an impact on this result. This group, as argued, may be content to know their pension 'is there' when they retire. However, the results in relation to perceived pension literacy did not suggest this was wholly the case and these are discussed in the following section.

These findings were sufficient for hypothesis seven to be addressed. In the absence of control variables, actual pension literacy was significant in planning for retirement at the 5% level. However, in the presence of control variables, actual pension literacy lost significance. In addition, when actual pension literacy was replaced with the five components of pension literacy, none were significant in the presence of control variables. Therefore, the null hypothesis, there is no relationship between actual pension literacy and retirement planning could not be rejected, there was insufficient evidence to support the alternative hypothesis seven:

> *H7* There is a relationship between individuals' actual pension literacy and retirement planning.

Summary of Key Findings:

> - Actual pension literacy was statistically significant in the intention to seek advice in the presence of control variables. As actual pension literacy increased, so too did the propensity to seek advice.
> - Findings support a complementary relationship between actual pension literacy and the intention to seek financial advice.
> - Individuals who lacked actual pension literacy were less likely to seek financial advice.
> - Only the component of 'financial literacy' was statistically significant in the intention to seek financial advice. Individuals with better financial literacy were more likely to seek advice.
> - Knowledge about basic financial concepts such as the time value of money, inflation and compound interest may have been sufficient to appreciate the value of seeking advice.

- Actual pension literacy was not statistically significant in determining whether participants had tried to calculate their income in retirement when tested in the presence of control variables. However, the composition of the sample may have influenced this finding.

The next section considers perceived pension literacy and financial behaviour.

## 6.4 Perceived Pension Literacy and Financial Behaviour

### 6.4.1 Seeking Financial Advice

Most individuals do not have the opportunity to measure their own financial literacy, therefore, they are more likely to base their decisions on their perceived not their actual knowledge (Allgood & Walstad, 2016). This theory can be applied to pension literacy and the decision to seek financial advice. Some studies have found individuals with high perceived financial literacy to be less likely to seek advice (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016). However, others have found this group to be more likely to seek advice (Allgood & Walstad, 2016; Moulton et al., 2013; Seay et al., 2016). This study was able to contribute to the debate. Even after the addition of control variables, perceived literacy was a significant predictor of the intention to seek advice at the 1% level. A one standard deviation increase in perceived literacy score, decreased the likelihood of seeking advice by approximately 0.6 times (Table 67)[149]. This indicates that perceived pension literacy is a substitute for financial advice and supports the findings of other studies (Gentile, Linciano, & Soccorso, 2016; Porto & Xiao, 2016). Individuals who perceive their pension literacy to be high, may not perceive the need to seek financial advice because they believe they possess sufficient pension knowledge to make decisions without it (Allgood & Walstad, 2016; Kramer, 2016).

These findings enabled hypothesis three to be addressed. In the final logistic regression model, perceived pension literacy was statistically significant in the intention to seek financial advice at the 1% level. The confidence interval did not cross one, thus, it could be stated with 95% confidence that as perceived literacy increased, the propensity to seek financial advice decreased. Therefore, the null hypothesis, there is

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[149] The final model, not based on standardised values shows the odds ratio of 0.854. An increase in Likert score by 1, decreases the likelihood of seeking advice by 0.854.

no relationship between perceived pension literacy and seeking pension advice, was rejected in favour of alternative hypothesis three:

> *H₃* There is a relationship between individuals' perceived pension literacy and seeking pension advice.

### 6.4.2   Retirement Planning

Before and after addition of control variables, perceived pension literacy was statistically significant in retirement planning at the 1% level. A one standard deviation increase in perceived pension literacy score, increased the likelihood of planning for retirement by 1.9 times (Table 77, Appendix 9)[150]. This suggests when participants perceived their pension literacy as good, they were more likely to plan for retirement, despite their actual pension literacy. Other studies have found planning for retirement and pension decisions are associated with perceived financial literacy (Olejnek & Bialowas, 2015) and confidence (Parker et al., 2012). Individuals are rarely able to assess their own pension knowledge and therefore, it is more likely they will make the decision to plan for retirement based on their perceived pension literacy (Allgood & Walstad, 2016), which in this study included both basic pension knowledge and the confidence to make pension choices.

These findings enabled hypothesis eight to be addressed. Perceived pension literacy was statistically significant in planning for retirement at the 1% level, both before and after addition of control variables. The confidence interval did not cross one, thus, it could be stated with 95% confidence that as perceived pension literacy increased, so too did the propensity to plan for retirement. Therefore, the null hypothesis, there is no relationship between perceived pension literacy and retirement planning, was rejected in favour of alternative hypothesis eight:

> *H₈* There is a relationship between individuals' perceived pension literacy and retirement planning.

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[150] The final model that did not use standardised values showed an odds ratio of 1.164. This means for 1 point increase in total perceived literacy score, the likelihood of planning for retirement increases by 1.164.

Summary of Key Findings:

> - Perceived pension literacy was statistically significant in the intention to seek advice in the presence of control variables. However, the higher perceived pension literacy, the lower the propensity to seek advice.
> - Findings suggested that perceived pension literacy is a substitute for seeking financial advice.
> - Perceived pension literacy was statistically significant in planning for retirement. Individuals with higher perceived pension literacy were more likely to plan for retirement.

The next section considers the combined measure of pension literacy and financial behaviour.

## 6.5 Combined Pension Literacy and Financial Behaviour

### 6.5.1 Seeking Financial Advice

Studies have combined actual and perceived financial literacy to form four groups (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Ramalho & Forte, 2018; Robb et al., 2012). This study followed this approach based on sample means. These groups replaced the separate measures of perceived and actual pension literacy in the stage one regressions, with the low perceived, low actual group serving as the omitted group. None of the groups were statistically significant in the intention to seek advice. This was unexpected, given that both actual and perceived pension literacy, when measured separately, were significant.

In considering the propensity to seek advice, other studies have found significant differences between such groups, particularly in relation to overconfident individuals, who they have found to be less likely to seek advice (Finke et al., 2011; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016; Porto & Xiao, 2016). However, Allgood and Walstad (2016) found the complete opposite, in that overconfident individuals were more likely to seek advice.

Although the majority of participants (66%) were able to accurately assess their own pension literacy, 33% were either under-confident (low perceived, high actual) or overconfident (high perceived, low actual). Therefore, it was useful to examine the odds ratios relating to these groups, despite their lack of statistical significance. The

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overconfident group was 0.6 times as likely to seek advice as the low perceived, low actual group (Table 67). This is concerning, this group lacks the pension literacy to make effective pension decisions, however, perceive their pension knowledge as good. Individuals with poor knowledge have been shown most likely to overestimate their knowledge (Kruger & Dunning, 1996). This was also found in this study (chapter 4), although it is also statistically more likely. If overconfident individuals are unwilling to seek advice, they may be at greater risk of making poor retirement choices. Overconfidence has been associated with under-diversification and poor performing investment portfolios (Mihaylov et al., 2015). This is a risk for individuals with DC pensions particularly.

The odds ratios suggested that the other three groups all had a similar propensity to seek advice (Table 67). Other studies have found under-confidence to be related to advice seeking (Porto & Xiao, 2016) in that under-confident individuals lack confidence to seek advice (De Zwaan et al., 2017). The sample as a whole displayed a small under-confidence bias (chapter 4). However, no significant relationship was found between under-confidence and seeking advice based on the regressions.

These findings enabled hypothesis four to be addressed. Because none of the combined groups were statistically significant in the intention to seek advice, there was insufficient evidence to reject the null hypothesis that there is no relationship between individuals' combined actual and perceived pension literacy and seeking advice. The alternative hypothesis four could not be supported:

> $H_4$ There is a relationship between individuals' combined actual and perceived pension literacy and seeking pension advice.

### 6.5.2   Retirement Planning

Combined actual and perceived pension literacy was statistically significant in retirement planning, with both the high perceived, low actual and the high perceived, high actual groups significantly more likely to plan for retirement than the low perceived, low actual group (Table 77). This could have been attributed to the statistical significance of perceived pension literacy, discussed below. Research from Canada found that sufficient knowledge on its own was insufficient for desirable financial behaviour, such as retirement planning, to occur as confidence was required to act on it (Hui et al., 2016). Overconfidence however, has been found to have

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detrimental effects on planning for retirement (Allgood & Walstad, 2016; Hui et al., 2016; Kramer, 2016). The findings did not support this, the overconfident group (high perceived, low actual) were nearly twice as likely to have planned for retirement as the low perceived, low actual group (Table 77). Parker et al (2012) argued that to be confident is more important than to be appropriately confident, where actual and perceived financial literacy are the same. These results support this suggesting that, when planning for retirement, perceived literacy and confidence compensate for lack of pension knowledge (Hui et al., 2016).

Under-confident individuals have been shown to under-save for retirement and to hold portfolios that perform less well than individuals who are confident or overconfident (Parker et al., 2012). The odds ratio attributed to the under-confident group (low perceived, high actual) implied this group were nearly equally as likely to plan for retirement as the low perceived, low actual group. The high perceived, high actual group was 2.5 times as likely to plan as the low perceived, low actual group (Table 77). This supports the descriptive statistics showing participants with high actual and high perceived pension literacy more likely to plan for retirement. However, only a relationship between perceived pension literacy and retirement planning was confirmed in the logistic regressions.

These findings allowed hypothesis nine to be addressed. When actual and perceived pension literacy were combined to form four groups based on sample means, both the high perceived, low actual and the high perceived, high actual groups were statistically significant at the 5% and 1% levels respectively. However, this could have been purely attributed to the significance of perceived pension literacy. In order to better understand the contribution made by actual pension literacy, specifically, to test if there was a significant difference between the low perceived, low actual group and the low perceived, high actual group, a chi squared test of independence was performed. This compared the frequency of participants who had planned for retirement and participants who had not, between these two groups. A significant interaction was found at the 10% level ($x^2$ (1, 289) = 3.07, $p$ = 0.080). Cramer's V was reported as 0.104, a small effect size (Cohen, 1988). The test was repeated, comparing the high perceived, low actual and the high perceived, high actual groups. A significant interaction was found at the 1% level ($x^2$ (1, 279) = 9.02, $p$ <.01). Cramer's V was reported as 0.177, a small effect size. These results implied that although actual

pension literacy was not significant when measured as a continuous variable, it was when used to categorise participants into high and low pension literacy and when combined with perceived pension literacy. Therefore, the null hypothesis, there is no relationship between combined actual and perceived pension literacy and retirement planning, was rejected in favour of alternative hypothesis nine:

> $H_9$ There is a relationship between individuals' combination of actual and perceived pension literacy and retirement planning

Summary of Key Findings:

- None of the groups representing combined actual and perceived pension literacy were statistically significant in the intention to seek financial advice.
- Overconfident participants were 0.6 times as likely to seek advice as participants with low perceived, low actual pension literacy.
- The high perceived, low actual and the high perceived, high actual groups were both significantly more likely to have planned for retirement than the low perceived, low actual group.
- The overconfident group was twice as likely to have planned for retirement as the low perceived, low actual group. This suggests when planning for retirement, perceived literacy and confidence can compensate for lack of knowledge.
- The high perceived, high actual group were 2.5 times more likely to have planned for retirement as the low perceived, low actual group.
- Although not statistically significant in retirement planning as a continuous variable, actual pension literacy, when used to categorise participants into high and low literacy and combined with perceived pension literacy, was significant in retirement planning. This was established based on Chi-squared testing.

The next section considers demographic factors and financial behaviour

## 6.6   Demographic Factors and Financial Behaviour

### 6.6.1   Seeking Financial Advice

Various demographic factors were associated with seeking advice. The findings were mainly reflective of those studies discussed in chapter 2 and are reviewed in this section[151].

Females have been found more likely to seek advice than males (Finke et al., 2011; Guiso & Jappelli, 2007). Brancati et al (2017) found only females with high financial literacy were more likely to seek advice than males, reversed when their financial literacy was low (Finke et al., 2011; Guiso & Jappelli, 2007). In this study females were twice as likely to seek advice as males (Table 67)[152]. There was no evidence of a difference in the propensity to seek advice between males and females with high and low pension literacy.

Other studies have found age to be significant in seeking advice, with the propensity to seek advice increasing with age (Bluethgen et al., 2008; Hackethal et al., 2012). Age was not found a significant predictor of advice seeking in this study. Only individuals aged over 40 were included in the study, potentially an insufficient age range to highlight significant differences.

Other studies have found as personal incomes increase, so too does the propensity to seek advice (Bluethgen et al., 2008; Brancati et al., 2017; Collins, 2012; Jappelli & Padula, 2013). The findings of this study support this. Compared to participants with income less than £20,000 per annum, participants with incomes between £20,000 and £40,000 were 1.4 times as likely to seek advice, participants with incomes £40,000 to £60,000 were 2.4 times as likely, and participants with incomes over £60,000 were 3.6 times as likely (Table 67). Individuals with higher incomes can afford financial advice and cost has been identified as a factor in the decision to seek advice (Van Dalen et al., 2016). Individuals with higher incomes are potentially able to accrue larger

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[151] The odds ratios referred to in this section were generated from the stage one regressions to be consistent with those referred to in the previous sections. However, the final model, has slightly different odds ratios and $\beta$ coefficients as it includes only the significant predictors. However, these differences do not change the interpretations.
[152] The final model was stated in terms of males and the odds of males seeking advice compared to females was 0.481.

amounts of wealth, giving them an incentive to manage it well. This includes the ability to accrue large pension pots, also a factor in the intention to seek advice.

Pension pot size was statistically significant in the intention to seek advice (Table 67). This supports other studies (Bluethgen et al., 2008; Brancati et al., 2017; Jappelli & Padula, 2013). Participants with pots over £500,000 were nearly five times more likely to seek advice than participants with pots under £30,000 and the associated odds ratios increased as pension pot size increased. Participants with pots between £30,000 and £50,000 were three times as likely to seek advice as participants with pots under £30,000. £30,000 is the threshold at which financial advice is required in relation to DB to DC transfers. Participants who did not know the size of their pension pot were 0.6 times as likely to seek advice as participants with pots under £30,000. This could suggest a disengagement with pensions, which is concerning. Alternatively, these participants could be DB scheme members, unlikely to know the size of their pensions as they are normally equated with a transfer value[153]. These individuals may not need financial advice.

Employment status was significant in the decision to seek advice. Fewer studies have examined employment status in relation to financial advice seeking. This study found, supporting the findings of Brancati et al (2017), that self-employed participants were nearly five times more likely to seek advice than participants who were employed full time (Table 67)[154]. Self-employed individuals are obliged to set up their own DC pensions therefore, they are more likely to seek advice.

Some studies found that being married increases the propensity to seek advice (Hung & Yoong, 2010) and others, that it decreases it (Halko et al., 2012). The findings of this study were not able to contribute to this debate, in that marital status was not a significant predictor of advice seeking. However, the odds ratios indicated that participants identifying as single, were around 1.5 times as likely to seek advice as married participants and widowed, divorced or separated participants were 1.2 times as likely (Table 67). Married couples may have two personal pensions upon which to rely in older age, in addition to two state pensions. They also have each other with

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[153] A transfer value is assigned to a DB scheme to indicate the value that would be transferred to another pension fund if the pension were to be transferred (for example due to a change of employment).

[154] In the final regression model the omitted category was changed to 'not working'.

whom to discuss their pension choices. Individuals on their own may be more inclined to seek reassurance from an advisor, as they only have their own pension upon which to rely.

### 6.6.2   Retirement Planning

Fewer studies have examined the direct effect of demographics on retirement planning. A greater number have linked demographic factors to financial literacy, then in turn linked it to retirement planning (Alessie et al., 2011; Bucher-Koenen & Lusardi, 2011; Lusardi & Mitchell, 2011b, 2011c, 2011d). The importance of these studies was discussed in chapter 4, therefore, this section only refers to studies concerning demographic factors and retirement planning.

Age was significant in retirement planning. Participants aged 61-65 were just over six times as likely to have planned than those aged 40-45, participants aged 66-75 were six times as likely. This was expected, older participants were near retirement or semi-retired and hence were more likely to have thought about their retirement income. Projections of retirement income become more realistic as one gets older, becoming easier to make accurate forecasts relating to income and expenditure. Age has been found a predictor of retirement planning in other research (Lusardi & Mitchell, 2011c; Petkoska & Earl, 2009; Van Rooij et al., 2011b).

Participants possessing greater wealth were more likely to have planned for retirement. Participants with pension pot sizes over £250,000 were just over five times as likely to have planned for retirement as participants with pots under £30,000, participants with pot sizes over £500,000 were nearly four times as likely. Additionally, participants with incomes between £40,000 and £60,000 were 2.4 times as likely to have planned for retirement as participants with incomes under £20,000, participants with incomes over £60,000 were around 2.3 times as likely (Table 77). Research has shown individuals who plan for retirement to be more likely to reach it with greater wealth, however, less research has been done to establish if the relationship exists in the other direction (Lusardi & Mitchell, 2007a; Van Rooij et al., 2011b). Less wealthy individuals may have greater need to plan to ensure they will have sufficient resources to support themselves in retirement. Individuals have cited in-affordability as a reason for lack of retirement planning in other studies, as well as lack of ability to assess

unknown factors such as potential care costs and their own longevity (The Personal Finance Research Center, 2017).

Age, income and pension pot size were the only statistically significant variables associated with the propensity to engage in retirement planning. However, it was useful to briefly examine the odds ratios in relation to gender, employment status and marital status (Table 77). Females were approximately 1.4 times as likely to have planned for retirement as males. This contradicts previous studies that found females less likely to plan (Petkoska & Earl, 2009; Richardson, 2008). Participants who were self-employed were 1.7 times as likely to have planned for retirement as employed participants. However, participants who were part-time employed were only 0.6 times as likely. It may be that part-time employees do not have substantial pensions, therefore, intend to rely mainly on the state pension or a partner's pension. Participants who were not working were 0.4 times as likely to plan as full-time employed participants. This group included unemployed participants and homemakers who may intend to rely on the state pension or other sources of income in retirement, therefore, making them less likely to have planned at this time[155].

Summary of Key Findings:

- Gender, income, pension pot size and employment status were statistically significant in the intention to seek financial advice.
- Marital status and age were not statistically significant in the intention to seek advice.
- Females were twice as likely to seek advice as males.
- As personal income increased, so too did the propensity to seek financial advice.
- Participants with larger pension pots were more likely to seek advice. Participants with pots between £30,000 and £50,000 were three times as likely to seek advice as those who had pots below this value.
- Self-employed participants were nearly five times as likely to seek advice as full-time employed participants.

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[155] It should be noted that the survey only captured the current employment status which may or may not be reflective of what it would normally be.

- Age, pension pot size and income were statistically significant in retirement planning.
- Gender, employment status and marital status were not statistically significant in retirement planning.
- Participants with larger pension pots and higher incomes were more likely to have planned for retirement.
- Older individuals were more likely to have planned for retirement.

The next two sections consider other sources of advice and guidance, starting with 'Pension Wise'.

## 6.7   Other Sources of Advice and Guidance – 'Pension Wise'

The stage one regressions were conducted for each source of advice and guidance. 'Pension Wise' is discussed separately as this is the free guidance offered to the public (Financial Conduct Authority, 2015a).

14.3% of participants stated they had, or were likely to, consult 'Pension Wise'. Actual pension literacy was significant in seeking guidance from this source. One standard deviation increase in participants' score increased the likelihood of seeking guidance by nearly 1.6 times (Table 69, Appendix 7). Both components of 'basic pension literacy' and 'pension planning' were significant predictors. One standard deviation increase in 'basic pension literacy' score increased the likelihood of seeking guidance by 1.6 times and for 'pension planning' increased likelihood also by 1.6 times (Table 69). This suggests some basic pension knowledge is important to seek guidance from 'Pension Wise'. Providing individuals with opportunities to self-educate may increase uptake of the service in the U.K from recently cited levels of 20% (The Personal Finance Research Center, 2017) [156].

Perceived pension literacy was not significant in seeking guidance from 'Pension Wise'. However, the decrease in likelihood of seeking guidance for one standard deviation increase in perceived score was just under 0.9 (Table 69). As perceived pension knowledge increased the propensity to seek guidance from 'Pension Wise'

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[156] This was from data collected by the FCA and included in this evidence review. Only 20% of those exercising options under the freedoms used Pension Wise.

decreased, presumably participants thought they knew enough already. However, the effect was small.

The low perceived, high actual group was 2.8 times as likely to seek guidance from 'Pension Wise' as the low perceived, low actual group, reflecting the significance of actual literacy. The high perceived, high actual group was three times as likely (Table 69).

Age was statistically significant and participants aged 51-55 were 2.5 times as likely to seek guidance as those aged 40-45, participants aged 56-60 were 4.6 times as likely and participants aged 61-65 were three times as likely (Table 69) [157]. These results reflected that these groups were actively making pension decisions.

Summary of Key Findings:

- Only 14.3% of participants had already, or were likely, to use 'Pension Wise'.
- Actual pension literacy was statistically significant in seeking guidance from 'Pension Wise'. As actual pension literacy increased, so too did the propensity to seek guidance.
- The components of 'basic pension literacy' and 'pension planning' were statistically significant. This suggests some knowledge of pensions is required to engage with 'Pension Wise'.
- Perceived pension literacy was not statistically significant in seeking guidance form 'Pension Wise'.
- The high actual, low perceived and high actual, high perceived groups were both about three times as likely to seek guidance from 'Pension Wise' than the low perceived, low actual group. These effects were statistically significant.
- Age was statistically significant, older participants were more likely to engage with 'Pension Wise' than younger participants.

## 6.8 Other Sources of Guidance

Findings concerned the statistical significance of actual not perceived pension literacy. Actual pension literacy was significant in participants consulting all of the other sources of guidance, excluding friends and family and employers. The regressions

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[157] All three age groups were significant.

suggested a complementary relationship and the odds of seeking guidance increased with each standard deviation in score (Tables 68 to 75, Appendix 7). In relation to all sources of guidance, 'financial literacy' was the only significant component, apart from government sources, where only the component 'basic pension literacy' was significant (Table 73). In seeking guidance from employers, actual pension literacy was not significant (Table 75), however, the component of 'financial literacy' was. This suggests that basic financial literacy is important in the decision to seek guidance from these sources, as opposed to pension specific knowledge. This, reiterates the argument that if individuals have a basic understanding of financial concepts, they are more able to appreciate the potential value of advice and guidance (Calcagno & Monticone, 2015).

Perceived pension literacy was not significant in the decision to consult any of the sources of guidance. However, the odds ratios indicated that the likelihood of seeking guidance decreased as perceived literacy increased for all sources of guidance apart from pension providers (Table 71), the internet (Table 72) and employers (Table 75), where it increased. For sources of guidance other than those listed, it could be participants perceived their knowledge to be sufficient and as such, less in need of guidance. However, for pension providers, employers and the internet, this was not the case. This suggests that if participants perceived their pension literacy as good, they were more likely to use these sources of guidance, possibly instead of going to a financial advisor. This could be because, having obtained free guidance from these sources, they perceived they had the skills to make their own pension choices.

This was supported by the significance of perceived literacy in the variable 'any advice at all', that revealed if participants had engaged with any of the sources of advice and guidance. For one standard deviation increase in perceived literacy score, the likelihood of participants having sought any type of advice or guidance increased by 1.6 times. Actual pension literacy was not significant in determining 'any advice at all'. However, the components 'financial literacy', and 'withdrawing your pension' were significant, increases in these scores resulted in increased odds of seeking advice and guidance. 'Advisor charging' was significant, however, the higher score, the lower the likelihood of seeking advice (Table 68).

Age was a significant predictor of seeking guidance from pension providers (Table 71), the internet (Table 72), government sources (Table 73) and friends and family (Table 74). The relationship was not clear cut. Older participants were less likely to use the internet and the likelihood of seeking guidance from this source decreased substantially with age. Participants aged 61-65 were 0.3 times as likely to seek guidance from this source, compared to participants aged 40-45. This should be a concern for policy makers. 'Pension Dashboards', digital interfaces enabling individuals to view all of their pension pots in one place will soon be available on-line and in app form (House of Commons Library, 2019). Older age groups may be less likely to engage with this technology, however, engagement at an early age may make continued engagement into older age more likely.

Age was also significant in the decision to seek other forms of guidance. The odds of seeking guidance from friends and family decreased with age (Table 74), possibly in favour of other sources of advice and guidance. Participants aged 46-50 were half as likely to seek guidance from government sources as participants aged 40-45 (Table 73). Participants aged 51-55 were 1.8 times as likely as participants aged 40-45 to seek guidance from their pension provider (Table 71). There did not appear to be an obvious pattern to these findings.

Gender was significant in seeking guidance from friends and family only, with females being 1.6 times as likely to seek guidance as males (Table 74).

Marital status was significant in seeking guidance from the internet (Table 72) and government sources (Table 73). Widowed, divorced or separated participants were twice as likely to use the internet as married participants, single participants were half as likely to seek guidance from government sources as married participants.

Income was significant in seeking guidance from pension providers (Table 71), the internet (Table 72), government sources (Table 73) and friends and family (Table 74). In all cases, participants with higher incomes were more likely to seek guidance, however, not all categories of each demographic were significant. This reiterates findings discussed earlier and supports the argument that individuals with higher incomes may have greater incentive to manage their money effectively (Calcagno & Monticone, 2015). However, individuals with lower incomes also need to manage

their money well and policy makers need to ensure that these groups have access to affordable advice and guidance.

Pension pot size was a significant predictor of seeking guidance from pension providers (Table 71) and employers (Table 75). Participants who did not know their pension pot size were 2.4 times as likely as those with pots under £30,000 to seek guidance from their pension provider, possibly as they would need to establish the size of their pension prior to making further choices. Participants with larger pots were less likely than those with pots under £30,000 to seek guidance from an employer. One would expect DB scheme members more likely to seek advice from this source, however, there was no evidence of this.

Finally, employment status was significant in seeking guidance from employers (Table 75). Self- employed participants were 0.08 times as likely to use this source as those employed full time for obvious reasons.

Question two asked participants if they had ever consulted, or would be likely to, consult an IFA. This was different to question seven, in that participants could reference past experiences as well as the intention to seek advice about future choices. Both actual and perceived literacy were non-significant. However, the component of 'financial literacy' was significant with a one standard deviation increase in score increasing the likelihood of having sought advice by 1.2 times (Table 70).

Age was significant in seeking advice from an IFA, participants aged 66-75 were 0.1 times as likely to seek advice as participants aged 40-45. This could be because these participants had made less complex pension choices prior to 2015 requiring financial advice. Although non-significant, participants aged 51-55 were 0.7 times as likely and participants aged 61-65 were 0.9 times as likely to seek advice as those aged 40-45. This contradicts other earlier studies (Bluethgen et al., 2008; Hackethal et al., 2012). Age was not significant in the intention to seek advice in relation to question seven. The likelihood of seeking advice from an IFA increased significantly with income and pension pot size. Females were more likely to seek advice than males and the self-employed were more likely to seek advice than those who were employed.

Summary of Key Findings:

- Actual pension literacy was statistically significant in seeking guidance from all sources with the exception of friends and family and employers, suggesting a complementary relationship.

- For most sources of guidance, only the component of 'financial literacy' was statistically significant, suggesting that a knowledge of basic concepts increased the appreciation of the value to be gained of seeking guidance.

- Perceived pension literacy was not statistically significant in the decision to seek any of the individual sources of guidance. However, it was significant in whether participants had sought any advice at all.

- Older participants were 0.3 times as likely to engage with internet sources of advice as participants aged 40-45.

The following section draws conclusions to the chapter.

## 6.9   Chapter Conclusions

This section draws conclusions and addresses the research questions presented at the start of the chapter. This chapter discusses pension literacy and two types of financial behaviour; seeking financial advice and planning for retirement. The most important findings from the data analysis have been discussed in the preceding sections in the light of the existing literature and public policy reviewed in chapter 2.

Despite the attempts made by government agencies, only 23% of the sample intended to seek advice from a professional financial advisor about their pension choices and 14.3% had already, or were likely to, seek guidance from 'Pension Wise'. A large number of participants had yet to make up their mind about seeking advice, which suggests there is scope to persuade this group of the benefits that can be gained from doing so. 44% of participants were members of only DB pensions, these participants are less likely to need financial advice, unless they wish to transfer their pension to a DC scheme to take advantage of the Pension Freedoms. This may have partly accounted for the low uptake of advice indicated. However, uptake was also low for those participants who are likely to need advice as they are members of a DC pension, which is concerning. Some participants, having been made aware of their own level of pension literacy, changed their mind about seeking advice. This suggests that providing opportunities for individuals to assess their own pension knowledge could improve the uptake of financial advice.

Rising life expectancy, falling birth rates and the shift from DB to DC pension schemes has placed more responsibility on individuals to plan for their retirement (Finke et al., 2017). If individuals do not plan effectively, they may under-save, invest poorly and could run of money in retirement (Money Advice Service, 2015). This study found that 45.4% of participants had undertaken some retirement planning, in that they had attempted to calculate their income in retirement. Significantly more participants with pensions of some kind had planned for retirement than those with neither type of pension and those who did not know the type of pension of which they were a member. However, there was no difference in retirement planning between participants with DB and DC pensions.

Participants who had engaged with each of these financial behaviours had higher actual pension literacy than participants who had not. The former group also scored higher in all of the five components representing more specific elements of pension literacy. However, not all of the results from this initial analysis were upheld in the logistic regressions.

The regression results indicated there to be a significant relationship between both actual and perceived pension literacy and financial advice seeking. As actual pension literacy increased so too did the propensity to seek advice. This supports the findings of the majority of previous studies. Basic financial literacy is more important than specific pension knowledge in the intention to seek advice, possibly because it enables individuals to appreciate the value to be gained from doing so.

The decision to seek advice has been found to be associated with perceived, rather than actual, financial literacy (Allgood & Walstad, 2016). Perceived pension literacy had a stronger association than actual pension literacy with financial advice seeking in this study. As perceived pension literacy increased, the likelihood of seeking advice decreased. These findings support those of Kramer (2016) who found that the most confident households seek advice approximately half as much as less confident households.

The combined measure of actual and perceived literacy was not statistically significant in the decision to seek financial advice, although it was to seeking other forms of guidance. However, the high perceived, low actual (overconfident) group was 0.6 times as likely to seek advice as the low perceived, low actual group. 17% of the

sample were overconfident. Overconfidence has been found in numerous studies to relate negatively to seeking advice (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Ramalho & Forte, 2018; Robb et al., 2012). Even if overconfident individuals do seek advice, they may lack the ability to understand and implement it properly (McCannon et al., 2016).

Despite actual pension literacy being associated with the propensity to plan for retirement in the literature (Alessie et al., 2011; Bucher-Koenen & Lusardi, 2011; Lusardi & Mitchell, 2011d; Ricci & Caratelli, 2015; Sekita, 2011), it was not significant in the presence of control variables. However, perceived pension literacy was significant at the 1% level, the propensity to plan became greater as knowledge and confidence in pensions increased. When actual and perceived pension literacy were combined to form four groups, the importance of perceived literacy was reflected in the significance of the high perceived, low actual and the high perceived, high actual groups. Although actual pension literacy, measured as a continuous variable, was not significant in retirement planning, chi squared tests returned a significant difference in retirement planning between participants in groups with high and low actual pension literacy.

Various demographic factors were associated with financial behaviour. Gender was significant in the decision to seek advice, with females more likely to seek advice than males. However, gender was not significant in planning for retirement. Income and pension pot size were both significant in seeking advice and planning for retirement, with the likelihood of engaging in both financial behaviours increasing with income and pension pot size. Advisors have been found to favour clients with higher levels of wealth (Robb et al., 2012). Therefore, policy makers should ensure that less wealthy individuals are not disadvantaged by failing to access advice, whether this is due to their own disinclination or because they are less favoured by advisors. Age was significant in planning for retirement, with older individuals showing a higher likelihood of planning, however, it was not significant in seeking advice. Self-employed participants were more likely to seek advice than those who were employed full time, whereas it was not significant for retirement planning. Marital status was not significant for either type of financial behaviour.

Actual, and not perceived, pension literacy was significant in the determination to seek guidance from most other sources, specifically the components of 'financial literacy' and 'basic pension literacy'. This suggests that to engage with guidance, some financial and pension skills are required. However, perceived knowledge did not affect the decision to seek guidance in the same way as the decision to seek financial advice. One explanation is that, because guidance is free, individuals have nothing to lose by consulting guidance sources, even when they perceive that they have sufficient knowledge themselves.

Research question two asked 'What is the relationship between pension literacy and the propensity to seek financial advice?' Pension literacy was significantly associated with the propensity to seek financial advice. The results established that the higher participants' actual pension literacy, the more likely it was they intended to seek financial advice. However, conversely, the higher participants' perceived pension literacy, the less likely they were to seek advice. Although the four groups representing the combination of perceived and actual literacy were not significant, the results still provided interesting information regarding overconfident participants. From the interpretation of odds ratios, overconfident participants were 0.6 times as likely to seek advice as the low perceived, low actual group. The low perceived, high actual and the high perceived, high actual groups were nearly equally as likely to seek advice as each other.

Research question three asked 'Are pension literacy and financial advice seeking complements to, or substitutes for, each other?' An increase in actual pension literacy increased the likelihood of seeking advice, therefore, financial advice seeking and actual pension literacy were complements to each other. However, higher levels of perceived pension literacy decreased the likelihood of seeking advice, therefore, financial advice and perceived pension literacy were substitutes for each other.

Research question five asked 'What is the relationship between pension literacy and planning for retirement?' Perceived pension literacy was significantly associated with planning for retirement. The higher participants perceived their pension literacy, the more likely they were to plan for retirement. Participants classified as high perceived, low actual and high perceived high actual literacy were about twice as likely to seek advice as participants with low perceived, low actual literacy. Although actual pension

literacy was not a significant predictor in the logistic regressions, chi squared tests indicated that when combined with perceived pension literacy, it had a small effect on planning for retirement. This was sufficient evidence to reject the null hypothesis and to support the alternative, that there is a relationship between the combination of actual and perceived pension literacy and retirement planning.

The final chapter brings together the conclusions from chapter 4 and those in this chapter. In addition it presents the contributions to practice and reflects on the research, highlighting limitations of the study and suggesting areas for future research.

# 7 Conclusion and Contribution

## 7.1 Introduction

This final chapter of the thesis summarises the research journey and reflects on the study. It has some clear objectives. The first of these is to provide a brief summary of the study and reflect on the various stages of the research, considering how each stage contributed to the research aims and objectives, this is covered in section 7.2. The second and most important is to present the original contributions to practice arising from the study, covered in section 7.3. Section 7.4 discusses implications for practice, in doing so highlighting the significance of the most important findings of the study. Section 7.5 reflects on the limitations of the study and section 7.6 suggests areas for future research. Finally, personal reflections from the author are offered in section 7.7 to close the thesis.

## 7.2 Summary of the Study and Achievement of Research Aims and Objectives

### 7.2.1 Research Aims and Objectives

At the start of the study the research aims and objectives were specified. Chapter 1 quoted Jonathon Raymond, an American writer who said *'You can't know, what you don't know'.* This idea was an important inspiration for the study, in the light of the 2015 Pension Freedoms the capacity to 'not know what you don't know' is considerable. Many individuals admit to having poor knowledge of pensions. However, due to the complexity of the subject, to make an accurate assessment of one's knowledge is challenging. In this study, actual and perceived pension literacy were not associated with financial behaviour in the same way. As a consequence, a mismatch between actual and perceived pension literacy could put individuals at risk of poor financial behaviours that may jeopardise their financial security in retirement.

The 2015 Pension Freedoms provided many individuals with more choices in retirement (Taxation of Pension Act, 2014), increasing the need for financial advice (Financial Conduct Authority, 2015b). If individuals believe they know more than they do, they may fail to access needed financial advice or make suboptimal decisions when planning their retirement. Since the pension reforms, studies have shown that many retirees follow the path of least resistance when choosing pension products. This reflects a lack of awareness of the increased complexity of the market (The Personal Finance Research Center, 2017). The Financial Conduct Authority confirmed the

existence of an advice gap, in that many individuals who need advice for various reasons, fail to seek it (Financial Conduct Authority, 2016a). This study therefore, aimed to explore the relationship between actual and perceived pension literacy, both separately and combined, and two specific financial behaviours in order to make a contribution to narrowing the advice gap. In order to achieve this, the following objectives were set:

1. To define the concept of pension literacy by synthesising academic and policy definitions of financial literacy and financial capability.

2. To develop, with experts, a test of pension knowledge and incorporating it in a survey to measure actual and perceived pension literacy in a sample of individuals living in the U.K.

3. To develop research hypotheses by reviewing the relevant academic literature and test them using appropriate statistical methods, enabling the research questions to be addressed.

4. To contribute to practice by providing information enabling policy makers to increase the uptake of financial advice and guidance, decrease the risk of poor retirement decisions and help narrow the advice gap.

In order to address the research aim, it was necessary to firstly define pension literacy. The nearest concept in the literature is financial literacy however, financial literacy and pension literacy are not the same. Therefore, it was decided to review studies that defined and measured financial literacy, from which to construct a definition of pension literacy that could be used as a basis for this study. This was achieved and a definition and model of pension literacy were presented at the end of section 2.2, thus achieving objective one. These also offer the first contribution of the study, discussed in section 7.3.1

In order to study the relationship between pension literacy and financial behaviour, it was necessary to measure it. No universal standard test of pension literacy existed, particularly one that included the Pension Freedoms. Therefore, the author worked with experts from the financial services industry to develop a test of pension knowledge that incorporated basic financial literacy, basic pension knowledge and knowledge of the 2015 Pension Freedoms. This was incorporated into an on-line survey. It was not possible, due to various issues, particularly the requirements of

GDPR, to collect a nationally representative sample. Therefore, a decision was made to focus on one region of the U.K as the survey was completed by 581 respondents from the North East of England. Therefore, objective two was achieved as far as was possible and the test of pension literacy and the process by which it was developed offer the second contribution of the study, discussed in section 7.3.2.

The review of literature resulted in the derivation of five further sub research questions to supplement the main one:

> *What is the relationship between pension literacy and the propensity to consult an Independent Financial Advisor when planning for retirement in the light of the 2015 Pension Freedoms?*

Each question was addressed following the acceptance or rejection of associated hypotheses. Through this process, objective three was achieved. The final objective represents the contribution arising from the empirical data set, explained in section 7.3.3.

### 7.2.2   Literature Review

It was established early on in the study that the literature relating to the research question was too large to consider in its entirety. Therefore, the first task was to scope the literature that would be included and that which should justifiably be excluded from the review. It was decided to exclude the majority of the expansive literature concerning behavioural finance and the psychology literature concerning meta-knowledge, to allow for more relevant contributions specific to the study.

Three concepts emerged from the research question. These were financial literacy, financial advice seeking and retirement planning. The relevant literature in relation to each of these was briefly reviewed, however, it was the combination of the concepts that defined the three main themes of the review and were most relevant to the research question. These were the definition of financial literacy, financial literacy and financial advice and financial literacy and retirement planning. In addition, the literature relating to financial literacy and financial behaviour was reviewed as a prerequisite to the two specific types of financial behaviour that formed the focus of the study. There was also a short review of studies concerning the relationship between

financial advice and subsequent financial behaviour, it was justified as necessary to give a full understanding of the area.

From the review of literature concerning the definition of financial literacy, one further research question and related hypothesis emerged:

> RQ1: Can individuals assess their own level of pension literacy accurately? ($H_1$)

From the review of literature concerning financial literacy and financial advice, two further questions and three related hypotheses emerged:

> RQ2: What is the relationship between pension literacy and the propensity to seek financial advice in relation to pensions? ($H_2, H_3, H_4$)
>
> RQ3: Are pension literacy and financial advice seeking complements to, or substitutes for, each other? ($H_2, H_3, H_4$)

Finally, from the review of literature concerning financial literacy and retirement planning, the last two research questions emerged, supported by five further hypotheses:

> RQ4: How does pension literacy change with age? ($H_5, H_6$)
>
> RQ5: What is the relationship between pension literacy and retirement planning? ($H_7, H_8, H_9$)

### 7.2.3   Methodology and Methods

The first part of this chapter justified the philosophical underpinnings of the study that followed a realist ontology and a positivist epistemology. The study was deductive and tested theories concerning the relationship between pension literacy and financial behaviour, specifically, seeking financial advice and retirement planning. A large part of the chapter was given over to explaining the rigorous approach employed to build a test of pension knowledge and incorporate it into a survey that measured pension literacy according to the concept defined in chapter 2. It is thanks to experts from the financial services industry that the test had good face validity. The data analysis methods were justified and a review of empirical studies provided the academic basis for both the scoring methods applied and the statistical techniques used to test the hypotheses.

### 7.2.4 Findings and Discussion

It was decided to separate the results chapters into two. Chapter 4 was linked to the first theme in the literature review and covered the definition and measurement of pension literacy. It was judged that an understanding of the participants' pension literacy was prerequisite to associating it with their financial behaviour. The main concern of chapter 4 was therefore, to gain a full understanding of the participants' actual and perceived pension literacy, as well as how they related to each other based on the data. The participants' performance in the test of pension knowledge highlighted areas in which they did well, or less well, facilitating associations between performance and demographic factors using ANOVA. Based on previous research, pension literacy was broken down using principal components analysis into five components and analysis of performance against each of these, also using ANOVA, offered additional insights (Lusardi & Mitchell, 2013). Perceived pension literacy was represented by a composite measure comprising responses to three individual questions in the survey. These asked participants about their perceived pension knowledge and confidence, these too were associated with demographic variables using ANOVA. The objective was to identify common characteristics of participants potentially at risk of suboptimal financial behaviour, through lack of pension literacy, lack of confidence, or both. The combined measure of pension literacy was based on studies in the literature, bringing together actual and perceived pension literacy scores to form four groups based on comparison to sample means (Asaad, 2015; Gentile, Linciano, & Soccorso, 2016; Kramer, 2016). Chi-squared tests established relationships between group membership and demographic factors to provide additional information, particularly to facilitate the identification of participants who may be at risk, by subsequently making associations with financial behaviour. Finally, Bland-Altman charts and linear regression determined the extent to which perceived pension literacy was associated with actual pension literacy. In other words, the extent to which the participants were able to correctly perceive their own level of pension literacy. The analysis in chapter 4 enabled research questions one and four to be addressed.

The second part of the results concerned pension literacy and financial behaviour, chapter 5 presented the results from the data analysis, which were then discussed in the context of the literature in chapter 6. Following the approach in other studies,

logistic regression tested the associations between pension literacy and the two specific types of financial behaviour (Asaad, 2015; Kramer, 2016; Robb et al., 2012). There were two stages to the analysis. The first was to apply predictor variables, representing measures of actual and perceived pension literacy and six control variables, to each of 10 outcome variables. Each of these represented behaviours concerning seeking financial advice and retirement planning. This provided useful information about the characteristics of participants who were more or less likely to seek advice or plan for retirement, based on their pension literacy and demographic characteristics through the interpretation of odds ratios. This stage enabled research questions two, three and five to be addressed. Stage two was to build two logistic regression models to predict the likelihood of seeking financial advice or planning for retirement based on the statistically significant variables from in stage one. The following section discusses the contributions to practice.

## 7.3   Contributions to Practice

There are four main categories of contribution offered by this study:

1. Contribution to the understanding of the concept 'pension literacy' through the synthesis of a definition and model (chapter 2)
2. Contribution to method, in the development of a test of pension literacy (chapter 3)
3. Contribution to practice, in the provision of information about the association between pension literacy and demographic factors with both financial advice seeking and retirement planning (chapter 6).
4. Contribution to the financial literacy literature. Firstly, to the debate as to whether financial literacy and financial advice are complements or, or substitutes for, each other. Secondly, to the body of literature concerning actual and perceived financial literacy and how they relate to each other (chapters 4 and 6).

These are elaborated on in the following sections.

### 7.3.1   Definition and Model of Pension Literacy (1)

The first contribution is the definition and model of pension literacy (section 2.2). This was derived from the review of academic and policy papers based on financial literacy, justifying the inclusion of those elements of the concept deemed relevant to pension

literacy. It was important to do this, it became clear from the literature that financial literacy encompassed more than just knowledge of financial concepts. As such, it was logical that pension literacy also comprised a complex set of skills and abilities, as suggested in other policy research (The Personal Finance Research Center, 2017). The definition and model therefore, offer a contribution suggesting what it means to be pension literate. To ascertain a definition was also important as it informed the methodology of the study, specifically, the development of the survey. The test itself measured the knowledge element of pension literacy. Other elements of the definition were incorporated into other parts of the survey, therefore, providing richer information for data analysis.

This study defined pension literacy as

> *Pension literacy is ones' knowledge and skills in relation to pensions that are sufficient to make effective and optimal choices about ones' own retirement. This includes assessing ones' own level of pension knowledge accurately and having the confidence, motivation, appropriate attitude, mind-set and communication skills to consult with sources of advice and guidance when and as required.*

This was supported by the model in Figure 199 (below), now adapted to incorporate the study findings concerning the nature of the relationships between pension literacy and financial behaviour (in red). The model serves as an overview of the concept of pension literacy according to the definition above. It provides other researchers with a useful checklist of what should be considered when conducting future studies about pension literacy. For example, when designing surveys to measure pension literacy, regardless of pension regime, it may be useful to ensure that a holistic representation of pension literacy is incorporated[158].

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[158] The test itself could be replicated. However, other countries have different pension regimes. Therefore, using the model, a test of pension literacy could be developed with different knowledge questions, however, ensuring that other elements from the model were incorporated.
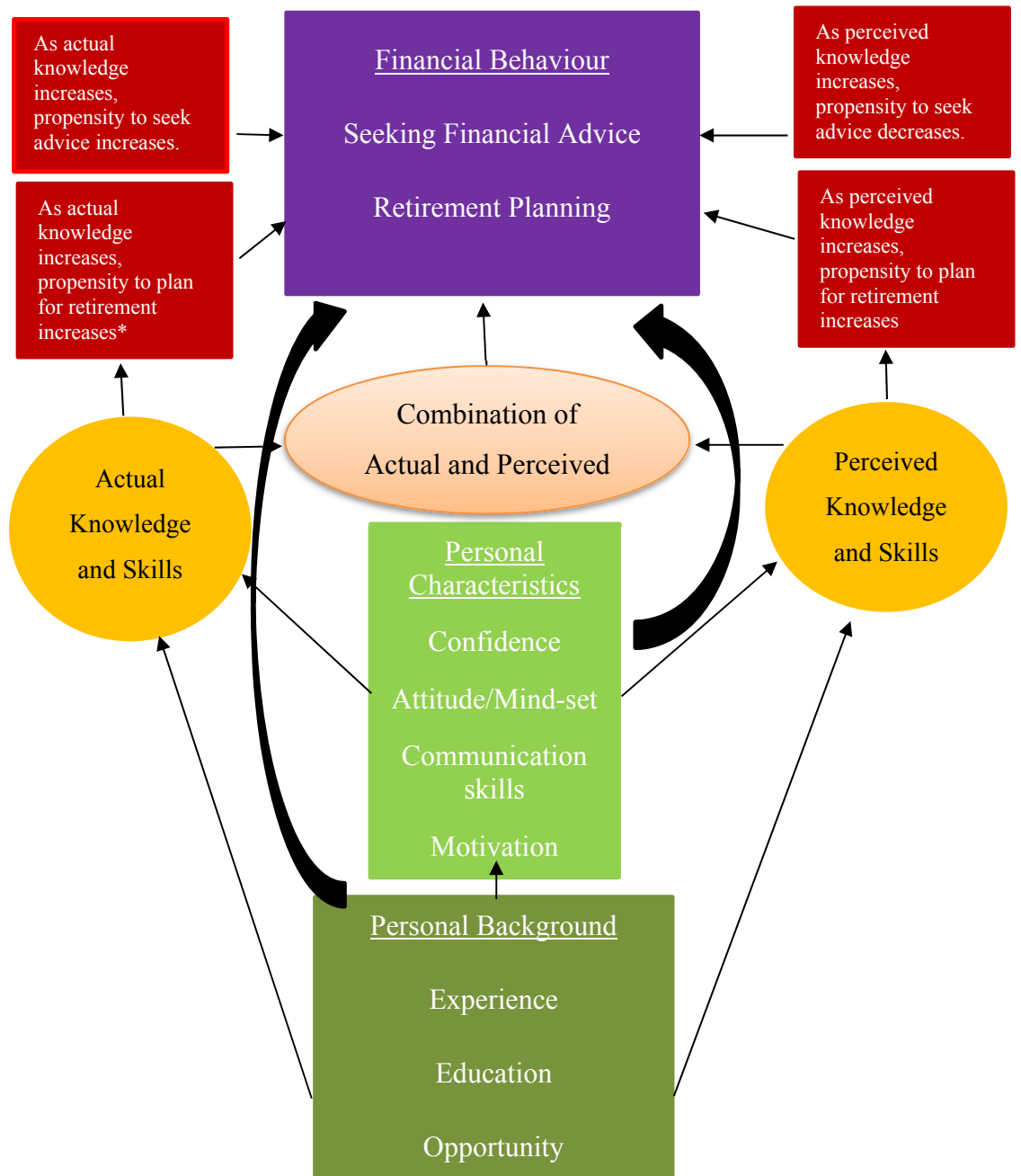
*Figure 19* Pension Literacy Model (updated)

Note: **The association between actual pension literacy and retirement planning was not statistical significant.

### 7.3.2 The Test of Pension Literacy (2)

The test of pension literacy and the process by which it was developed offer the second contribution of the study. The test can be used purely as one of knowledge,[159] or combined with the rest of the survey to incorporate other elements of pension literacy, such as perceived knowledge and confidence[160]. It can be scored based simply on absolute scoring, applying a score out of 20, alternatively, the weights in Table 10 (p.134) can be applied to obtain a score weighted by question difficulty[161]. The main concern of the author was that the test should have good face validity and be capable of differentiating between different standards of pension literacy. This was achieved firstly, through the involvement of an 'expert panel' to validate the question areas for inclusion and secondly, with the help of a financial advisor to work with the author on detailed question development. Its potential applications are discussed in section 7.4.

### 7.3.3 Pension Literacy and Financial Behaviour (3)

The third objective of the study was to contribute to practice by providing information to enable policy makers to increase the uptake of financial advice and guidance, decrease the risk of poor retirement decisions and help narrow the advice gap. This was met through analysis of the empirical data.

Based on a large sample of individuals aged over 40 living in the North East of England, the study offers insights concerning the relationship between both pension literacy and demographic factors and financial behaviours concerning retirement. The findings could assist policy makers to target interventions to improve retirement outcomes. While not statistically representative of the whole of the U.K, the study is easily replicable and could be broadened to a national sample using the survey in this study.

Specifically, the findings identified characteristics of participants more or less likely to seek financial advice or plan for retirement based upon their demographics and pension literacy. Two logistic regression models enable the likelihood of engaging

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[159] In which case the 20 questions of the survey would be used and scored in isolation.

[160] Users could change the demographic details collected to suit their own purposes.

[161] The weights were assigned based on the number of correct answers given by this sample specifically. However, due to sample size, it is likely this approximates a reasonable index of question difficulty.

with financial advice or planning for retirement to be determined based on actual and perceived pension literacy and demographic characteristics.

Finally, the study provides an indication of the extent to which individuals are aware of their own knowledge deficiencies relating to pensions. It makes a recommendation that the public should be offered opportunities to test their own pension knowledge using tests such as this one. In this study, doing so had the effect of making individuals more aware of 'what they don't know', reduced overconfidence, and for some individuals, made them more inclined to seek financial advice.

### 7.3.4 Contribution to the Financial Literacy Literature (4)

The study also makes a contribution to the financial literacy literature, in that it contributes to the debate in relation to whether financial literacy is a complement to, or substitute for, financial advice by addressing research question three (section 2.4.4). It also identified the characteristics of individuals who are more or less pension literate, therefore, adding to this body of financial literature theory (section 2.1.5).

## 7.4 Implications for Practice

This section discusses the implications for practice and elaborates on how the contributions made by the study may be useful to policy makers. It concludes with recommendations for practice.

### 7.4.1 The Test of Pension Literacy

The test of pension literacy and its development offer a methodological contribution of the study. The test itself, coupled with the rest of the survey, measure pension literacy as defined by the definition and model above. The test on its own measures pension knowledge and could be used in any context in the U.K requiring an assessment of pension literacy. It takes only eight to ten minutes to complete and as such would not be an onerous addition to any system within which it was incorporated.

Financial advisors are required to provide advice in the best interests of their clients, which includes assessing their financial literacy (De Zwaan et al., 2017). Financial Advisors may find it helpful to assess their clients' pension knowledge, with their permission, prior to a consultation. This would enable them to pitch their advice at the right level, making it more likely it is understood and followed by the client (Brancati et al., 2017). Some advisors use a 'fact find' for this purpose however, this does not

assess pension knowledge in the same way. Additionally, completing the test would enable the client to gain a better understanding of their own pension knowledge, thus enabling them, if necessary, to modify their self-assessments and become more aware of what they do and do not know. This may help to reduce the impact of overconfidence bias, which may have otherwise made the client less receptive to the advice given to them and less inclined to follow it (Bucher-Koenen & Koenen, 2015).

Including the test on public service websites such as those provided by the Money Advice Service, Pension Wise and the Citizens Advice Service[162], would enable the public to test their own pension knowledge prior to seeking advice or guidance. The study found that the higher participants perceived their pension literacy, the lower their propensity to seek advice. Some participants displayed overconfidence and were 0.6 times as likely to seek financial advice compared to other groups. Therefore, opportunities to self-assess could result in the public being made aware of their deficiencies in pension knowledge, decrease overconfidence, increase the uptake of financial advice and narrow the advice gap.

### 7.4.2   Actual and Perceived Pension Literacy

The sample in this study reflects a demographic with higher average education and income levels than exist more generally in the North East region, or in the U.K. Therefore, policy makers should be mindful that the findings on pension literacy levels may represent a 'best case' scenario. It is likely that the population as a whole may have a lower level of pension literacy than this group. However, this would need to be determined. The study found that some groups had significantly lower actual pension literacy compared to others, putting them at potential risk of suboptimal financial behaviour, particularly in the absence of advice and guidance. Some of the findings reflect those in the financial literacy literature (Bucher-Koenen et al., 2016; Klapper et al., 2011). This study deconstructed pension literacy into five components to understand in which areas of pension literacy the differences in knowledge existed. Despite the focus on pensions, the component of 'financial literacy' had the best capacity to differentiate suggesting that tests of pension literacy should include

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[162] Or the new single guidance body.

questions such as those in section one of the test[163]. The following findings are highlighted specifically:

- Females had poor financial literacy compared to males. This suggests a need to raise the financial literacy and basic pension knowledge of females. Males were also more confident in their financial security, in making pension choices and also perceived their pension knowledge to be higher than females.

- Although pension literacy improved with age, with participants under 50 having poor pension literacy compared to older participants, the differences in scores were apparent in those questions representing specific knowledge relevant to those reaching retirement. 'Financial literacy' and 'pension planning' scores indicated that younger age groups had the basic skills to make financial decisions and appreciated the need to plan for retirement. There was an upward trend with age relating to confidence and perceived knowledge.

- Being a member of a pension scheme appeared to increase pension knowledge. Participants who had a pension, scored better in all components apart from 'advisor charging'. These participants also perceived their pension literacy to be higher. Many participants did not know their pension type and scored poorly. The terms 'defined benefit' and 'defined contribution' are not well known.

- The lack of significant differences between scores in relation to 'advisor charging' suggests many participants across categories did not know how financial advisors are remunerated (40% of the sample thought advisors were paid via commission).

- Participants with larger pension pots and higher incomes scored better in all components apart from 'advisor charging'. This suggests a need to help those with less wealth who also need to make good pension choices, but lack the pension literacy to do so and are less able to afford advice. Participants with higher incomes and bigger pension pots were also more confident and perceived their knowledge as higher.

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[163] For example on compound interest, inflation and risk.

- Participants working in the private sector had better 'financial literacy' and 'basic pension literacy' than those working in the public sector[164]. They were also more confident in making choices and perceived their knowledge to be higher. Many more public sector employees will have DC schemes in the future, suggesting a need to improve pension awareness for these groups.

Actual and perceived pension literacy scores were combined to form four groups. The aim was to determine if each group was associated with participants who shared certain characteristics. Each group was subsequently treated as a categorical predictor variable in the logistic regressions, thus, potentially offering useful information about the characteristics of participants who were associated with each type of financial behaviour. The demographics of each group membership was determined (Table 26, p.179). However, statistically significant differences, revealed by Chi-squared testing, distinguished mainly between participants in the high actual, high perceived and the low actual, low perceived groups. This suggested that under, and over, confidence biases were not associated significantly with most of the demographics tested in the study. However, participants with fairly small pension pots of between £30,000 and £100,000 were overconfident and less likely than other groups to seek advice. Figure 20 (below) shows the demographics characteristics associated with each group, indicating for each category, the group to which the largest percentage of participants was assigned. Demographic categories showing a significant Chi-squared result are indicated[165]. The extent to which each group was associated with financial seeking financial advice and planning for retirement is discussed further in the following sections.

### 7.4.3   Seeking Financial Advice

Of the participants in the study, 23% intended to seek advice, 40% did not intend to seek advice and 37% were undecided. Individuals tend to follow the path of least resistance (Goel & Thakor, 2008). Therefore, to present them from doing so, policy makers still have time to convince this latter group of the benefits to be gained from financial advice.

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[164] Some public sector employees in this study were DB pension scheme members who had less need for knowledge of the new reforms. However, as most DB schemes are closing, even in the public sector are potentially at risk.
[165] See section 4.7 for a full discussion. Full results can be seen in Table 26 (p.178).

The study found there to be a complementary relationship between actual pension literacy and seeking financial advice. The component of 'financial literacy' was significant in driving that decision and participants scoring lower in this component were less likely to seek advice. It was surmised that an understanding of basic concepts such as the time value of money, risk diversification and compound interest leads to an appreciation of the value to be gained from seeking advice. This highlights the importance of educating individuals in basic financial literacy at an early age[166], as lack of pension specific knowledge can be compensated to some extent by financial advice. Policy makers should focus on making the public aware of the value of advice compared to its cost.

High
Actual
Literacy

| High Actual, Low Perceived | High Actual, High Perceived |
|---|---|
|  | Males (48%) *** |
|  | Married (36%), Widowed (47%), Separated (39%) |
|  | Age 51-55 (35%), 56-60 (39%), 61-65 (55%), 66-75 (55%) |
| Ages 40-45 (46%) and 46-50 (44%) | Degree (36%), A-level (34%), Masters (32%), PhD (38%) |
| GCSE (41%), A-level (35%), Degree (33%), Masters (33%) | Income £40k-60k (31%), £60k-£80k (57%) ***, £80k-£100k (54%) ***, over £100k (81%) *** |
| Income <£20k (40%), £20k-£40k (39%), £40k-£60k (31%) |  |
| Employed FT (35%), Self-employed (33%) | Employed FT (33%), Not working (60%), Self-employed (33%), Retired (69%) |
| Public sector (37%) ***, Not for profit (39%). Other sector (44%) | Private sector (48%) *** |
| Pension <£30k (48%) ***, 'Don't know' (46%) *** | Pension Size £100k – £250k (44%), Over £250k (71%) ***, Over £500k (86%) *** |
|  | Pension size £30k-£50k (39%) ***, £50k-£100k (37%) *** |

Low

Low — Perceived literacy — High

Figure 20 *Demographic Spread of Combined Pension Literacy Groups*

[166] The author runs a module 'Personal Finance and Wealth planning' on an undergraduate degree programme in which issues such as these are incorporated.

Note: *** indicates significance at the 1% level in Chi-squared testing. Where the largest percentage was not clear, the category is represented in both groups applicable. Ethnicity is excluded as numbers were too low to be meaningful.

Because individuals are usually unable to accurately assess their own pension literacy, perceived pension literacy is more important in the decision to seek advice as individuals act on what they think they know[167]. In this study, the higher participants perceived their knowledge, the lower their propensity to seek advice. This shows perceived pension literacy and seeking advice to be substitutes for each other. Therefore, those groups indicated in Figure 20, with high perceived literacy, may be less inclined to seek advice.

Of concern are overconfident individuals who have poor pension literacy, however, perceive their knowledge to be good. A third of the sample were either under, or over, confident however, this figure may be higher in the wider population. The overconfident group was nearly half as likely to seek advice as the low perceived, low actual group in the study, although this result was not statistically significant. This is still concerning, these participants lack pension literacy but are less likely to ask for help. Therefore, in order to reduce the advice gap, individuals such as these would benefit from the opportunity to self-assess to gain a more accurate assessment of their own pension knowledge. In this study, some individuals were prepared to seek advice having completed the test.

As discussed above, in this study, the characteristics of overconfident participants did not show significance, hence it was not possible to present a profile of a 'typical' overconfident individual. However, the study also identified which demographic variables were associated with seeking advice using logistic regression and this was useful to highlight to policy makers those groups at risk.

The following may be helpful in targeting retirement interventions in relation to the advice gap:

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[167] This can be illustrated by looking at females. Low actual pension literacy and high perceived literacy was associated with not seeking and advice. Females had poor actual and perceived pension literacy (including financial literacy). However, they were twice as likely to seek advice as males which suggests they made their decision based on their low perceived pension literacy and not their low actual financial and pension literacy.

- Females were about twice as likely to seek advice as males were. As their perceived and actual pension literacy were low in the study, this suggests their decision was based on their perceived, not their actual, pension literacy.

- Age was not a statistically significant factor in seeking advice (although all individuals in the study were over 40).

- Participants with higher incomes were more likely to seek advice.

- Participants with larger pension pots were more likely to seek advice.

- Self-employed participants were more likely to seek advice than those employed full time.

- For a one standard deviation increase in actual pension literacy, the propensity to seek advice increased by 1.4 times.

- For a one standard deviation increase in perceived pension literacy, the propensity to seek advice decreased by 0.6 times.

This identifies for policy makers groups less likely to seek advice, but who may require help in making pension choices. The challenge is therefore, to ensure they are not disadvantaged by their unwillingness to seek advice. This study recommends that one way to achieve this, is by providing individuals with opportunities to self-assess so they may engage more actively with pension and pension choices. In this study, participants modified judgements of their own pension literacy based on the test, as well as for some, their decision to seek advice.

The study also considered the propensity to consult other sources of pension guidance. Not all individuals require advice and for many guidance may be sufficient. The main message for policy makers is that actual, not perceived, pension literacy was significant in the decision to engage with guidance. This suggests that because guidance is free of charge, the propensity to use it was not affected by participants' perceptions of their own knowledge. Perhaps, participants believe they have nothing to lose by seeking guidance, whereas, if they perceive their pension knowledge to be good enough, this is enough to stop them seeking advice, for which they have to pay.

7.4.4   Retirement Planning

Just less than half of participants had tried to calculate their income in retirement, which served as a simple proxy for retirement planning. These participants had higher actual and perceived pension literacy. However, only perceived pension literacy was

significant in planning for retirement based on logistic regression. It was more important to be confident, than it was to be appropriately confident, where actual and perceived pension literacy were the same[168].

The study found certain groups more likely to plan for retirement. The following may be helpful in targeting retirement interventions:

- Actual pension literacy was not significant in the final regression model in the determination of retirement planning. However, when combined with perceived pension literacy, there were statistically significant differences between groups with high and low actual pension literacy. The higher actual pension literacy, the higher the propensity to plan for retirement, associated with pension knowledge rather than financial literacy skills.

- The higher perceived pension literacy, the more likely participants were to plan. A one standard deviation increase in perceived literacy nearly doubled the propensity to plan.

- The overconfident group (high perceived, low actual) and the high perceived, high actual group were both significantly more likely to plan than the low perceived, low actual group. This suggested it was more important to be confident than to be 'appropriately confident' and that overconfidence was not associated with lack of planning.

- Participants belonging to older age groups were more likely to plan. Participants aged 61-65 were over six times as likely to plan as those aged 40-45, as would be expected.

- Participants with higher incomes were more likely to plan for retirement.

- Participants with larger pension pots were more likely to plan for retirement.

7.4.5  Recommendations

It is hoped these findings will make a small contribution to address the financial advice gap and engage the public in effective retirement planning. The Financial Capability Strategy (now referred to as the 'National Strategy') aims to address financial literacy in the U.K (Financial Capability Board, 2019). In relation to preparing for retirement, the strategy has prioritised the creation of a retirement financial capability tracker.

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[168] The overconfident group was twice as likely to plan as the low perceived, low actual group and this was also the case for the high perceived, high actual group.

This will provide a composite measure of capability relating to saving and planning for retirement. In addition, positive steps are planned to improve awareness of pensions, such as working with employers, improving access to pension information and increased efforts to improve access and understanding of guidance and financial advice in relation to pensions.

The main recommendations to policy makers from the study are:

1. The public should be given opportunities to self-assess their own pension literacy using tests such as the one in this study. This should result in more accurate self-assessments, reduced overconfidence and an increased appreciation of 'knowing what you don't know' for some, making it more likely they will seek financial advice.
2. Policy interventions should target individuals at risk of not seeking financial advice, particularly individuals with lower incomes and pension wealth and those with high perceived, but low actual, pension literacy.
3. Policy interventions should target individuals at risk of failing to plan for retirement. These are more likely to be individuals with poor pension literacy, younger age groups and those with low incomes and small pension pots.
4. Policy makers should address the misconception about how advisors are paid. Some participants in the study did not change their mind about seeking advice even after having completed the test of pension literacy. This suggests that other factors, such as lack of trust and cost may have influenced their decision.

## 7.5   Limitations of the Study

This section addresses the limitations of the study. The first limitation concerned data collection. It was not possible to collect a nationally representative sample due to the restrictions of GDPR, discussed in chapter 3. This was tackled by re-addressing the sampling strategy. The final sample was a cluster of 581 individuals living in the North East of England. This decision led to the exclusion of 115 data cases, originating from other regions, representing a loss of data. There was however, an opportunity to use these data cases to test the logistic regression models from the stage two regressions. The sample, despite of this, was large enough to be statistically significant of the region. However, the generalisability of the findings is limited. Some findings do however, support those found by other academics in previous studies in the financial

literacy literature. This suggests they may be reflective of other populations outside of the North East region. This would need to be determined empirically.

The demographics of the sample posed some challenges. The sample included a significant number of responses collected via the Northumbria university email system. Although these participants were both academic and non-academic members of staff, the participants had higher average qualifications than that of the North East region. This may have accounted for good performances in section one of the test, highlighted in the discussion of results. A larger proportion of DB pension scheme members were in the sample than would have been preferred. The pension reforms predominately affect DC pensions, although they are also relevant to DB scheme members wishing to partake in DB to DC transfers. However, some DB scheme members in this study belonged to non-transferable schemes, therefore, not permitted to transfer their pensions. Some test questions were less relevant to this group. However, 51% of the sample had either just DC, both DB and DC, or did not know the type of their pension (so could have been either) and therefore, there was still sufficient representation of DC pensions in the final sample. Pension type was not included as a predictive variable in the logistic regression due to the large proportion of participants who did not know their pension type.

It was also the case that the sample, although reflective of the region, had insufficient non-white British cases to include in the data analysis, therefore, ethnicity was excluded.

Due to sparseness of data, some demographic categories were collapsed in the logistic regressions resulting in loss of information. These were income, employment status and marital status (section 3.9.5). Unfortunately, this was the only practicable solution to the issue, as opposed to collecting new data, which was not possible in the time constraints of the study (Field, 2013).

The combined pension literacy measure was formed by combining actual and perceived scores into four groups, following the approach of studies in the literature (Allgood & Walstad, 2016; Asaad, 2015; Kramer, 2016; Ramalho & Forte, 2018; Robb et al., 2012). However, this measure did not entirely capture differences between actual and perceived pension literacy. Even participants who correctly identified their actual pension knowledge as either high or low, may still have been over, or under,

confident to some degree[169]. It is perhaps due to the measures lack of sensitivity that more significant differences were not detected in relation to the low actual, high perceived and the high actual, low perceived groups.

Finally, the weaknesses in the logistic regression models themselves need to be acknowledged. As stated above, the two models were tested using those responses excluded from the main sample. This was less than ideal due to the differences in demographic characteristics, particularly age, to those in the final sample, probably contributing to their low success rates. However, testing represented an illustration of how the models can be applied in practice, whilst acknowledging the limitations of the analysis. In addition, the confidence intervals associated with some of the predictors in the model crossed one, limiting the reliability of conclusions made in relation to these specific variables.

## 7.6  Future Research

This section suggests areas for future research.

A decision was made in this study to include only individuals aged over 40 as they were more likely to be affected by the pension reforms. However, 70 individuals under age 40 responded, indicating sufficient engagement to spend time completing the survey. The study could be adapted to focus on the pension literacy and retirement planning habits of younger age groups, although this may need some modifications to the test of pension knowledge[170].

It would be useful to widen the study to other regions of the U.K. It was originally intended to collect a nationally representative sample. However, this was not possible and therefore, to widen the sample would to some extent represent 'unfinished business', as well as providing useful information to policy makers.

The study could be repeated in the future as the retirement market is still evolving to accommodate the Pension Freedoms, in particular, to examine whether pension

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[169] For example, a participant could have been assigned to the high perceived, high actual group but perceived their knowledge to be 90% correct when it was actually only just over the sample mean.

[170] It is unlikely that under 40's will be aware of the detail relating to the pension reforms as they are some way off making pension choices. Therefore, the test would need to be modified to include more relevant questions to this age group and their stage in the retirement planning process.

literacy increases as a result of their implementation. These reforms require the public to make more complex retirement decisions than previously and therefore, if individuals engage, either with or without financial advice, it could be hypothesised that pension literacy will improve as a consequence. In relation to the Pension Freedoms, an assessment of their impact on pension literacy, financial advice seeking and retirement planning cannot be made until some years after they were introduced.

As alluded to in the literature review, seeking financial advice does not always ensure individuals follow it. Therefore, it would be informative to study this with a view to assessing the role of pension literacy in the propensity to follow advice.

It would be interesting to gain additional insights about why individuals do not engage with financial advisors or plan for retirement, although research has already revealed useful findings (Money Advice Service, 2015; The Personal Finance Research Center, 2017) Had questions relating to these areas been included in the survey, it would have shed more light on some of the findings in the study. However, a decision was made to set the boundaries of the study at the start of the process.

## 7.7  Reflections

This final section of the thesis offers some reflections from the author:

This was the first major piece of academic research I have undertaken, completing a doctorate represented something I have wanted to achieve for a long time. Coming from an accountancy background, my career took me into the post-16 education sector, having worked as a finance manager in the NHS after having qualified as an accountant in 1993. I moved to the North East of England from Cambridge and worked in further education for a number of years, then leaving to work for a private sector accountancy training provider. Four years ago, I joined the Higher Education sector as a Senior Lecturer at Northumbria University, to which I had aspired for some time, especially the opportunity to study. In my role, I am responsible for the 'Finance and Investment Management' undergraduate programme.

I achieved both my undergraduate degree in 'Education and Training' and my 'Masters in Education' whilst working full time and in my thirties. I relished the idea of embarking on a doctorate and have really enjoyed the whole process. I have found it both challenging and rewarding to work independently on a project of this size and

parts of it presented significant learning curves for me. I found the most rewarding part working with professionals from the financial services industry to develop the test of pension literacy. I have formed some valuable professional relationships, their level of enthusiasm and willingness to help was extremely encouraging and a source of much satisfaction. I am very grateful to all of them. The most challenging part of the process was engrossing myself in statistical textbooks in order to perform the data analysis. I found this however, very rewarding. This study was the first quantitative piece of work I have undertaken of this size, my previous academic dissertations being qualitative. However, I now feel better prepared to help my students in their own dissertations going forward and am looking forward to continuing to develop my quantitative skills, conducting further research for publication.

My husband was only four years from retirement when the Pension Freedoms were implemented and as such, he and I engaged in some rudimentary retirement planning of our own. The concept of 'meta-knowledge' and the idea that we 'don't know what we don't know' I have always found interesting. Therefore, at the time when I was thinking about a proposal for my DBA, the media was having a field day about the possible dysfunctional consequences resulting from the flexibilities provided by the reforms. Would individuals run out of money in retirement? Would they spend their pension savings on expensive cars and holidays? Therefore, the idea for this study was formed and gained early enthusiasm and interest from peers and fellow academics. I have always been interested in financial capability and personal finance. I am module tutor at Northumbria for a module called 'Personal Finance and Wealth Planning'. Therefore, the focus of this study was a good fit, both from a professional and a personal perspective. I hope that this is the start of my journey in quality academic research, specialising in this area of personal capability, personal finance and pensions in particular.

# The Relationship Between Pension Literacy, Retirement Planning and the Propensity to Seek Financial Advice in the Light of the 2015 Pension Freedoms

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Doctor of Business Administration

2020

Volume 2 of 2

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# Appendix 1 – Pension Literacy Survey

**Before starting the quiz section, please can you answer the following questions. The answers you give are completely anonymous, confidential and will only be used for the purpose of this research project. If you are happy to proceed on this basis, please click OK to continue.**

\* 1. What type of private pension(s) do you have? Please ignore state pension

- ( ) Defined benefit (pension based on final or average salary)
- ( ) Defined contribution/money purchase (pension based on contribution levels)
- ( ) Both defined benefit and defined contribution
- ( ) Neither
- ( ) I have a pension but I don't know which type it is

\* 2. Which of the following would you be likely to consult (or have already done so) prior to making a decision on how to draw your pension? (Indicate all that apply then click OK to continue)

- [ ] Pension Wise
- [ ] Independent Financial Advisor
- [ ] Pension Provider
- [ ] Internet Sources
- [ ] Government Publications
- [ ] Friends and Family
- [ ] Employer
- [ ] None of the above or I do not know

\* 3. Have you ever tried to work out how much income you will need in retirement?

- ( ) Yes
- ( ) No

\* 4. On a scale of 1 to 5, where 1 is not confident at all and 5 is very confident; how confident are you that you will be financially secure in retirement?

- ( ) 1
- ( ) 2
- ( ) 3
- ( ) 4
- ( ) 5

\* 5. On a scale of 1 to 5, where 1 is very poor and 5 is excellent; indicate how you would rate your own level of knowledge about pensions?

- ( ) 1
- ( ) 2
- ( ) 3
- ( ) 4
- ( ) 5

* 6. On a scale of 1 to 5, where 1 is not confident at all and 5 is very confident; how confident do you feel about making choices on how to draw your pension?

○ 1    ○ 4

○ 2    ○ 5

○ 3

* 7. Do you intend to pay for independent professional financial advice prior to making your pension choices?

○ Yes

○ No

○ Don't know

Thank you - Now let's start the quiz! You will receive your score and feedback at the end. Quiz section one contains five questions and tests your basic financial literacy. Please answer all questions. Click OK to continue.

* 8. You invest £100 in a savings account with compound interest of 2% per year. After 5 years, how much would you have in the account if you did not make any withdrawals?

○ Exactly £110    ○ Don't know

○ More than £110    ○ Refuse to answer

○ Less than £110

* 9. You have savings in an account that pays an annual interest rate of 1.5%. If annual inflation were 2%, after one year, which of the following would apply?

○ I would be able to buy more with my savings than 1 year ago    ○ Don't know

○ I would be able to buy less with my savings than 1 year ago    ○ Refuse to answer

○ I would be able to buy the same with my savings as 1 year ago

* 10. Assume you are able to purchase some shares. Which of the following normally has the highest level of risk?

○ Investment in shares of one company    ○ Don't know

○ Investment in shares of an investment fund    ○ Refuse to answer

○ Both have equal risk

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* 11. Assume a friend inherits £10,000 today and their sibling inherits £10,000 3 years from now, who is richer because of the inheritance?

( ) Your friend

( ) Their sibling

( ) Both are equally as rich

( ) Don't know

( ) Refuse to answer

* 12. Which type of investment normally shows the greatest variability in returns over time?

( ) Savings accounts

( ) Corporate bonds

( ) Shares

( ) Don't know

( ) Refuse to answer

Thank you. Quiz section two contains eight questions and tests your understanding of basic pension concepts. Please answer all questions. Click OK to continue.

* 13. As a working figure, how much income do pension providers advise their clients they will need in retirement?

( ) One half of working income

( ) One third of working income

( ) Two thirds of working income

( ) Don't know

( ) Refuse to answer

* 14. What type of pension is described by the following: *Members (and sometimes their employers, but not always) make contributions invested in asset groups according to the risk preference of the individual. Upon retirement, the scheme member has accumulated a fund that can be used either to buy an annuity or draw down in some other way according to preference.*

( ) Defined benefit pension scheme

( ) State pension

( ) Defined contribution pension scheme

( ) Don't know

( ) Refuse to answer

* 15. Which type of pension is most likely to ensure you have a guaranteed income for life?

( ) Defined benefit pension scheme

( ) Defined contribution pension scheme

( ) Don't know

( ) Refuse to answer

* 16. If you want to have an income of around £25,000 per year, typically what size of pension pot would you require?

( ) £62,500

( ) £625,000

( ) £950,000

( ) Don't know

( ) Refuse to answer

* 17. You have a pension fund of £100,000. How many years do you think it would last if you spent £10,000 per year and you had investment returns on the remaining balance of 5% per year.

○ 10 years                          ○ Don't know

○ 12 years                          ○ Refuse to answer

○ 15 years

* 18. What is the effect of high inflation on both your pension fund and on your income needs in retirement?

○ There will be no effect on either          ○ Don't know

○ Increase pension value and decrease income need          ○ Refuse to answer

○ Decrease pension value and increase income need

* 19. If you are risk averse (you tend to avoid risk), which of the following investment funds are most likely to suit your risk preference?

○ 50% bonds, 10% cash, 20% property, 20% shares          ○ Don't know

○ 40% bonds, 10% cash, 20% property, 30% shares          ○ Refuse to answer

○ 30% bonds, 10% cash, 20% property, 40% shares

* 20. You choose to go to a financial advisor for advice on pensions. On what basis can you expect your bill to be determined?

○ Commission                          ○ Don't know

○ Fee or advisor charge                  ○ Refuse to answer

○ Both of these

Thank you. In 2015, the Government introduced major pension reforms termed 'Pension Freedoms'. This final quiz section contains seven questions and tests your understanding of their impact. Please answer all questions. Click OK to continue.

* 21. Under the 2015 Pension Freedoms, at what age can individuals currently draw upon their pension funds?

○ 50                                ○ Don't know

○ 55                                ○ Refuse to answer

○ 60

* 22. Which types of pension are directly accessible under the 2015 Pension Freedoms?

○ All pensions                        ○ Don't know

○ Only defined contribution pensions          ○ Refuse to answer

○ Only defined benefit pensions

* 23. How much of your qualifying pension fund can you normally withdraw tax free?

- ( ) 25%
- ( ) 50%
- ( ) All of it
- ( ) Don't know
- ( ) Refuse to answer

* 24. Which pension product generally allows you to leave funds invested and withdraw money as you require it?

- ( ) An Annuity product
- ( ) A Drawdown product
- ( ) Both of these
- ( ) Don't know
- ( ) Refuse to answer

* 25. Which pension product is most likely to provide a guaranteed income for life?

- ( ) An annuity product
- ( ) A drawdown product
- ( ) Both of these
- ( ) Don't know
- ( ) Refuse to answer

* 26. Which pension product is more likely to allow you to pass on any unused funds to your family?

- ( ) An annuity product
- ( ) A drawdown product
- ( ) Both of these
- ( ) Don't know
- ( ) Refuse to answer

* 27. Individuals with defined benefit pension schemes can access the total value of their pension fund at 55, only if they transfer it to a defined contribution scheme. What is the pension fund value at which they would be required to seek financial advice prior to the transfer?

- ( ) £10,000
- ( ) £30,000
- ( ) £50,000
- ( ) Don't know
- ( ) Refuse to answer

You're nearly finished - while your quiz score is being calculated, please answer a few final questions about yourself. Click OK to continue.

* 28. What is your age?

- ( ) Under 40
- ( ) 40 - 45
- ( ) 46 - 50
- ( ) 51 - 55
- ( ) 56 - 60
- ( ) 61 - 65
- ( ) 66 - 70
- ( ) Over 70
- ( ) Prefer not to say

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* 29. What is your highest level of educational qualification?

○ No formal qualifications      ○ Master's degree

○ GCSE or equivalent      ○ PhD/doctorate

○ A level or equivalent      ○ Prefer not to say

○ Undergraduate degree

* 30. What is your current total level of personal income (from all sources)?

○ Less than £20,000 per annum      ○ £80,001 to £100,000

○ £20,001 to £40,000      ○ More than £100,000

○ £40,001 to £60,000      ○ Prefer not to say

○ £60,001 to £80,000

* 31. In which region of the UK do you live?

○ North East      ○ South East

○ North West      ○ South West

○ Yorkshire and Humber      ○ Wales

○ East Midlands      ○ Scotland

○ West Midlands      ○ Northern Ireland

○ East of England      ○ Prefer not to say

○ Greater London

* 32. What best describes your *main* employment status?

○ Employed full time      ○ Unable to work

○ Employed part time      ○ Homemaker

○ Unemployed seeking work      ○ Retired

○ Unemployed not seeking work      ○ Prefer not to say

○ Self-employed

* 33. In which sector have you spent the majority of your working life to date? (Please answer even if you are now retired)

○ Public Sector      ○ Other sector not mentioned above

○ Private Sector      ○ None of these

○ Not for profit sector      ○ Refuse to answer

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* 34. In which industry have you spent the majority of your working life to date?

- ( ) Agriculture
- ( ) Mining and Extractives
- ( ) Manufacturing
- ( ) Construction
- ( ) Retail and Wholesale
- ( ) Transportation and Storage
- ( ) Accommodation and Food
- ( ) Information and Communication
- ( ) Finance and Insurance
- ( ) Real Estate
- ( ) Professional and Support
- ( ) Government, Health, Education and Defence
- ( ) Other Services
- ( ) None of these
- ( ) Prefer not to say

* 35. To which gender do you most identify?

- ( ) Male
- ( ) Female
- ( ) Transgender female
- ( ) Transgender male
- ( ) Not listed
- ( ) Prefer not to say

* 36. What is the current total size of your pension pot(s)?

- ( ) Under £30,000
- ( ) £30,001 to £50,000
- ( ) £50,001 to £100,000
- ( ) £100,001 to £250,000
- ( ) Over £250,000
- ( ) Over £500,000
- ( ) Don't know
- ( ) Prefer not to say

* 37. What is your marital status?

- ( ) Single (never married)
- ( ) Married or in a civil partnership
- ( ) Widowed
- ( ) Divorced
- ( ) Separated
- ( ) Prefer not to say

* 38. What is your ethnicity?

- ( ) White
- ( ) Mixed multiple ethinic groups
- ( ) Asian/Asian British
- ( ) Black/African/Caribbean/Black British
- ( ) Chinese
- ( ) Arab
- ( ) Other ethnic group
- ( ) Prefer not to say

* 39. Having completed the pension literacy quiz, but before being given the results, on a scale of 1 to 5 where 1 is very poor and 5 is excellent; indicate how you would rate your own level of knowledge about pensions?

- ( ) 1
- ( ) 2
- ( ) 3
- ( ) 4
- ( ) 5

* 40. Do you think that your quiz score will be likely to influence your decision about whether or not to seek independent financial advice in relation to your pension choices?

○ Yes, it will have an impact

○ No, it will have no impact

○ I don't know

○ Refuse to answer

# Appendix 2 – Coding of Variables for Logistic Regressions

Table 42 *Variables for Logistic Regressions and their Coding*

| Variable/Label | Type of variable | Coding |
|---|---|---|
| Do you intend to seek financial advice in relation to your pension? (FA_O) | Outcome - categorical | 1 = yes intend to seek advice, 0 otherwise |
| Sources of advice - Pension wise (FA_PW) | Outcome - categorical | 1 = has used/intends to use pension wise, 0 otherwise |
| Sources of advice - Independent Financial Advisor (FA_IFA) | Outcome - categorical | 1 = has used/intends to use an IFA, 0 otherwise |
| Sources of advice - Pension provider (FA_PP) | Outcome - categorical | 1 = has used/intends to use a pension provider, 0 otherwise |
| Sources of advice – Internet sources (FA_I) | Outcome - categorical | 1 = has used/intends to use the internet, 0 otherwise |
| Sources of advice – Government sources (FA_G) | Outcome - categorical | 1 = has used/intends to use government, 0 otherwise |
| Sources of advice – Friends and family (FA_FF) | Outcome - categorical | 1 = has used/intends to use friends and family, 0 otherwise |
| Sources of advice – Employer (FA_E) | Outcome - categorical | 1 = has used/intends to use employer, 0 otherwise |
| Sources of advice – Any advice at all (FA_AA) | Outcome - categorical | 1 = has used/intends to use any of the seven sources of advice, 0 otherwise |
| Retirement planning – Have you ever tried to work out how much income you will need in retirement (RP) | Outcome categorical | 1 = yes, 0 = No |
| Actual Pension Literacy – Total Score (ACT_TOT) | Predictor continuous | Total of weighted scores awarded for questions 1 to 20. Scores were standardised for stage 1 regressions. |
| Component Factor Scores – Financial Literacy score (C1_FL) Pension Literacy score (C2_PL) Pension Planning score (C3_PP) Advisor Charging score (C4_AC) Withdrawing your Pension score (C5_WP) | Predictor continuous | Total of factor scores assigned to components. Scores were standardised for stage one regressions. |
| Total of Factor Scores (PCA_TOT) | Predictor - continuous | Total of five component scores. |
| Absolute Total (ABS_TOT) | Predictor continuous | Absolute total out of 20. |
| Perceived Pension Literacy (PER_TOT) | Predictor continuous | Total of Likert scores for question four, five and six. |

| | | Scores were standardised for stage 1 regressions. |
|---|---|---|
| Combined Perceived and Actual Pension Literacy (Low Perceived-Low Actual group reference category)<br>Low Perceived, High Actual (LOWP_HIGHA)<br>High Perceived, Low Actual (HIGHP_LOWA)<br>High Perceived, High Actual (HIGHP_HIGHA) | Predictor Categorical | 1 if respondent is assigned to Low Perceived, High Actual, 0 otherwise<br><br>1 if respondent is assigned to High Perceived, Low Actual, 0 otherwise<br>1 if respondent is assigned to High Perceived, High Actual, 0 otherwise |
| Income (less than £20,000 per annum omitted group)<br>£20,001 - £40,000 (INC1)<br>£40,001 - £60,000 (INC2)<br>Over £60,000 (IN3) (note that 3 categories over £60k were collapsed due to sparseness of data ) | Predictor - categorical | 1 if £20,001 - £40,000, 0 otherwise<br>1 if £40,001 - £60,000, 0 otherwise<br>1 if over £60,001, 0 otherwise |
| Marital status (single omitted group).<br>Married/Civil partnership (MS1)<br>Widowed, divorced or separated (MS2) (note these 3 categories were collapsed due to sparseness of data) | Predictor - categorical | 1 if married, 0 otherwise<br>1 if widowed, divorced or separated, 0 otherwise |
| Age (40-45 omitted category)<br>46-50 (AGE1)<br>51-55 (AGE2)<br>56-60 (AGE3)<br>61-65 (AGE4)<br>66-75 (AGE5) (note categories, 66-70 and over 70 were collapsed due to sparseness of data). | Predictor - categorical | 1 if 46-50, 0 otherwise<br>1 if 51-55, 0 otherwise<br>1 if 56-60, 0 otherwise<br>1 if 61-65, 0 otherwise<br>1 if 66-75. 0 otherwise |
| Employment status (employed full time omitted group)<br>Employed part time (ES1)<br>Self-employed (ES2)<br>Home maker, retired or unemployed (ES3) (note these three categories were collapsed due to sparseness of data)<br>Note that for the stage two regression the omitted category was changed to not working (ES3). The other categories were recoded accordingly. | Predictor - categorical | 1 if employed part time, 0 otherwise<br>1 if self-employed, 0 otherwise<br>1 if homemaker, retired or unemployed, 0 otherwise. |
| Gender (male omitted category)<br>Female (GEN) | Predictor categorical | 1 if female, 0 otherwise |

| | | |
|---|---|---|
| Note that for the stage two regression to omitted category was changed to female. | 293 | |
| Pension pot size (under £30,000 omitted category)<br>£30,000-£50,000 (PS1)<br>£50,001-£100,000 (PS2)<br>£100,001- £250,000 (PS3)<br>Over £250,000 (PS4)<br>Over £500,000 (PS5)<br>Don't know (PS6) | Predictor categorical | 1 if £30,000-£50,000, 0 otherwise<br>1 if £50,000-£100,000, 0 otherwise<br>1 if £100,000-£250,000, 0 otherwise<br>1 if over £250,000, 0 otherwise<br>1 if over £250,000, 0 otherwise<br>1 if don't know, 0 otherwise |

Key: Blue = Outcome Variables, Orange = Predictor Variables (actual and perceived pension literacy). Green = Predictor Control Variables.

# Appendix 3 – Ethical Organisational Consent.

RESEARCH **ORGANISATION** INFORMED CONSENT FORM

Faculty of Business and Law
University of Northumbria

Completion of this form is required whenever research is being undertaken by Business and Law staff or students within any organisation. This applies to research that is carried out on the premises, or is about an organisation, or members of that organisation or its customers, as specifically targeted as subjects of research.

The researcher must supply an explanation to inform the organisation of the purpose of the study, who is carrying out the study, and who will eventually have access to the results. In particular issues of anonymity and avenues of dissemination and publications of the findings should be brought to the organisations' attention.

Researcher's Name: Julie Dick_____

Student ID No. (If applicable):____16034824_____

Researcher's Statement: see below

## Who is carrying out this study?

I am a Senior Lecturer at Northumbria University, Newcastle Business School. This is a study being carried out as part of a DBA. The results will be submitted for the DBA award but potentially could be shared with professionals from the finance industry, to include financial advisors, the FCA and other interested parties. I also have the ability to set up separate data collectors for individual organisations and therefore, specific data as to the pension literacy of an organisations' employees could be supplied to them on request.

## Survey dissemination

Members of staff will be contacted by email, using the university email distribution list. Members of staff are free to delete the email if they do not wish to participate in the survey. The email will make clear that ethical approval has been obtained. The survey itself also assures participants that their contribution is anonymous and the results only used for the purpose of the research. Participation is voluntary and there is no obligation to participate. The demographic are individuals 45-70 that have not yet retired (Northumbria staff collection to extend to 40). Upon completion, the

participants are given a pension literacy score and feedback as well as the correct answers to the questions they got wrong. A separate collector is set up to allow Northumbria staff results to be analysed in isolation to the main survey for Human Resources.

## Research aims

This research aims to make a contribution to the Financial Advice Gap, as reported by the FCA in the Financial Advice Market Review (Financial Conduct Authority, 2016a). This study explores the influence that perceived and actual levels of financial (and specifically pensions) literacy has on the propensity to seek financial advice in relation to pension choices.

The research question is as follows:

> *How do perceived and actual levels of financial (specifically pensions) literacy of potential retirees impact their propensity to consult and act on the advice of an independent financial advisor when making retirement decisions in the light of the 2015 Pension Freedoms?*

## Background to the study

The 2015 Pension Freedoms give more choice to individuals in retirement, including the ability to withdraw cash from defined contribution pension funds[171] from the age of 55 (HM Treasury, 2014). If individuals do not possess the financial literacy to understand the options available to them, they could be at risk of making poor choices and even running out of money in retirement (Hunter, 2017). This is particularly the case for those that choose not to seek financial advice (Financial Conduct Authority, 2016a; Thurley, 2015).

Previous studies have examined the effect of both actual and perceived levels of financial literacy on the propensity to seek financial advice in relation to personal finances (Gentile, Linciano, & Soccorso, 2016; Kramer, 2016). Some individuals show a discrepancy between actual and perceived financial literacy with a relevant

---

[171] A defined contribution pension is one where the individual contributes to a fund invested during an individuals' working life (since the introduction of auto-enrolment, for workplace defined contributions pensions employers are also required to contribute, for non-workplace pensions, it is usually just the individual). Upon retirement, this fund is converted into a product allowing a pension to be drawn or the funds to remain invested, or a combination of the two.

subgroup demonstrating overconfidence (where perceived financial literacy is higher than actual literacy). These individuals consider they have no requirement for financial advice because they 'know enough' already. This is pertinent to the Financial Advice Gap as these individuals may be less likely to seek advice in relation to their pensions following the Pension Freedoms.

This research also aims to make a methodological contribution by developing, with experts from the pensions and financial services industry, a diagnostic test of pension literacy. This has the potential for use by pension advisors to assess the financial/pension literacy of their clients prior to providing pensions advice. In addition, the research, through quantitative analysis of the data collected, aims to give insight as to the demographics and characteristics of those individuals who could be at risk of making poor pension choices, as such providing information that will contribute to reducing the advice gap.

The survey collects demographic information, financial capability information[172], as well as testing perceived and actual pension literacy. The test consists of three sections (each containing around 5-8 questions): basic financial literacy, basic pension literacy and the 2015 pension freedoms. The participants are given their score with feedback at the end of the survey and provided with the correct answers. This gives them the opportunity to add to their pension knowledge from completing the survey, hopefully, incentivising completion.

## Sample group and incentives

The target group are individuals in the UK, aged 45-70 that have a pension(s), but are not yet fully retired. The data collection period is from March to September 2018. Note: sample extended to 40 for Northumbria staff.

References

Financial Conduct Authority. (2016). *Financial Advice Market Review Final report*. Retrieved from https://www.fca.org.uk/publication/corporate/famr-final-report.pdf.

Gentile, M., Linciano, N., & Soccorso, P. (2016). *Financial advice, financial advice seeking and overconfidence: Evidence from the Italian Market*. Retrieved from Italy: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2802589

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[172] Financial capability is a term coined by the Money Advice Service and has a wider meaning than just financial literacy.

HM Treasury. (2014). *Freedom and Choice in Pensions*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/332714/pensions_response_online.pdf.

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Kramer, M., M. (2016). Financial literacy, confidence and financial advice seeking. *Journal of Economic Behavior & Organization, 131*, 198-217. doi:10.1016/j.jebo.2016.08.016

Thurley, D. (2015). *Pension Wise: the Guidance Guarantee*. (SN06891). House of Commons library Retrieved from http://researchbriefings.files.parliament.uk/documents/SN06891/SN06891.pdf.

Any organisation manager or representative who is empowered to give consent may do so here:

Name: _____

Position/Title: _____

Organisation Name: _____

Location: _____

If the organisation is the Faculty of Business and Law please completed the following:

| | |
|---|---|
| Start/End Date of Research / Consultancy project: | |
| Programme<br><br>Year<br><br>Sample to be used: seminar group, entire year etc. | |
| 8   Has Programme Director/Leader, Module Tutor being consulted, informed. | 9 |

Anonymity must be offered to the organisation if it does not wish to be identified in the research report. Confidentiality is more complex and cannot extend to the markers of student work or the reviewers of staff work, but can apply to the published outcomes. If confidentiality is required, what form applies?

[   ] No confidentiality required
[   ] Masking of organisation name in research report

[  ] No publication of the research results without specific organisational consent
[  ] Other by agreement as specified by addendum


Signature: _____ Date: _____


This form can be signed via email if the accompanying email is attached with the signer's personal email address included.  The form cannot be completed by phone, rather should be handled via post.

# Appendix 4 – Sample Demographics

This Appendix gives an overview of the demographics of the sample. The latest U.K census at the time of the study was dated March 2011 (Office for National Statistics, 2011). More up to date Ordinance Survey (OS) data is provided where this was available, in some cases however, this includes a wider age demographic. It provides an indication of the North East demographic, however, comparison between these statistics and the sample need to be treated with some reservations.

## Age and Gender

Table 43 (below) shows the age demographic of the NE region for individuals aged 40 to 75 and Table 44 (below) shows the sample age ranges split by gender.

Table 43 *Population of the North East Region by Age and Gender*

|  | Male | Female | Total | % |
|---|---|---|---|---|
| Overall | 1,305,486 | 1,352,423 | 2,657,909 | |
| Age 40 to 75 | 568,214 | 600,943 | 1,169,157 | |
| 40-45 | 85,357 | 89,599 | 174,956 | 15.0 |
| 46-50 | 86,662 | 91,587 | 178,249 | 15.2 |
| 51-55 | 93,924, | 98,735 | 192,659 | 16.5 |
| 56-60 | 89,012 | 93,667 | 182,679 | 15.6 |
| 61-65 | 77,933 | 81,528 | 159,461 | 13.6 |
| 66-70 | 73,135 | 78,433 | 151,568 | 13.0 |
| 71-75 | 62,191 | 67,394 | 129,585 | 11.1 |

Source: (Office for National Statistics, 2018b)

Table 44 *Sample Age ranges by Gender*

| Age Range | Male | Female | Prefer not to say | Total | % | North East region% |
|---|---|---|---|---|---|---|
| 40-45 | 59 | 73 | 2 | 134 | 23.1 | 15.0 |
| 46-50 | 57 | 60 | 1 | 118 | 20.3 | 15.2 |
| 51-55 | 58 | 81 | 2 | 141 | 24.3 | 16.5 |
| 56-60 | 41 | 74 | 1 | 116 | 20.0 | 15.6 |
| 61-65 | 31 | 26 | 0 | 57 | 9.8 | 13.6 |
| 66-70 | 8 | 3 | 0 | 11 | 1.9 | 13.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Over 70[173] | 2 | 2 | 0 | 4 | 0.6 | 11.1 |
| Total | 256 | 319 | 6 | 581 | 100 | 100 |

Source of North east regional data: (Office for National Statistics, 2018b)

## Ethnicity

Table 45 (below) shows the breakdown of the sample by ethnicity, also split by gender. There was insufficient representation of ethnicity to include it in the main data analysis.

Table 45 *Sample by Ethnicity and Gender*

| Ethnicity | Male | Female | Prefer not to say | Total | % | North East Region %[174] |
|---|---|---|---|---|---|---|
| White | 242 | 308 | 2 | 552 | 95.0 | 96.6 |
| Mixed multiple ethnic groups | 2 | 2 | 0 | 4 | 0.7 | 0.48 |
| Asian/Asian British | 3 | 1 | 0 | 4 | 0.7 | 1.85 |
| Black/Africa/Caribbean/ Black British | 0 | 2 | 0 | 2 | 0.3 | 0.40 |
| Chinese | 1 | 1 | 0 | 2 | 0.3 | 0.33 |
| Arab | 2 | 0 | 0 | 2 | 0.3 | 0.16 |
| Other ethnic group | 2 | 3 | 0 | 5 | 0.9 | 0.18 |
| Prefer not to say | 4 | 2 | 4 | 10 | 1.8 | |
| Total | 256 | 319 | 6 | 581 | 100 | 100 |

Source of North East regional data: (Office for National Statistics, 2018a)

## Marital Status

Table 46 (below) shows the breakdown of the sample by marital status and gender. A direct North East data comparator was not available[175].

Table 46 *Sample by Marital Status and Gender*

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[173] For the purposes of calculating mean and median, this category was closed at 70-75.

[174] Ethnicity data breakdown of 1,169,157 North East residents aged 40-75 based on ad-hoc data set produced by the ONS for the Race Disparity Unit in 2018. Provided to author on request.

[175] The 2011 census shows 45.6% of North East residents to be married, the proportion reported as single (34.4%) is likely higher than in the sample, due to the wider ages ranges included.

| Marital Status | Male | Female | Prefer not to say | Total | % |
|---|---|---|---|---|---|
| Single | 32 | 44 | 0 | 76 | 13.1 |
| Married/civil partnership | 194 | 212 | 2 | 408 | 70.2 |
| Widowed | 4 | 11 | 0 | 15 | 2.6 |
| Divorced | 14 | 38 | 0 | 52 | 9.0 |
| Separated | 8 | 6 | 0 | 14 | 2.4 |
| Prefer not to say | 4 | 8 | 4 | 16 | 2.7 |
| Total | 256 | 319 | 6 | 581 | 100 |

## Highest Level of Education

Table 47 (below) shows highest level of educational qualification by gender.

Table 47 *Highest level of Education by Gender*

| Education Level | Male | Female | Prefer not to say | Total | % | North East Region %[176] |
|---|---|---|---|---|---|---|
| No formal qualifications | 5 | 3 | 0 | 8 | 1.4 | 26.5 |
| GCSE or equivalent | 35 | 31 | 0 | 66 | 11.4 | 34.2 |
| A level of equivalent | 37 | 40 | 0 | 77 | 13.3 | 13.1 |
| Undergraduate degree | 67 | 95 | 3 | 165 | 28.4 | 26.2* |
| Master's degree | 53 | 86 | 0 | 139 | 23.9 | |
| PhD/doctorate | 58 | 57 | 0 | 115 | 19.8 | |
| Prefer not to say | 1 | 7 | 3 | 11 | 1.8 | |
| Total | 256 | 319 | 6 | 581 | 100 | 100 |

Note: There is no information on North East breakdown of qualifications of level 4 and above. Therefore the 26.2% includes, undergraduate, masters and PhD qualifications.

Source for NE regional data: (Office for National Statistics, 2011)

## Employment

Table 48, 49 and 50 (below) show employment status, sector and industry split by gender. Recent data shows 20% of the region to be employed in the public sector, as opposed to 80% in the private sector[177](Office for National Statistics, 2018b).

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[176] North East comparative data based on 2011 census data, which was the latest at time of the study. Percentage split based on 2,134,449 individuals aged 16-74.

[177] Figures are based on ONS 2018 data splitting public and private sector employment only based on headcount. Based on 1,148,000 individuals over aged 16, 229,000 were employed in the public sector and 919,000 based in the private sector.

Table 48 *Employment Status by Gender*

| Employment Status | Male | Female | Prefer not to say | Total | % | North East Region % |
|---|---|---|---|---|---|---|
| Employed full time | 200 | 216 | 5 | 421 | 72.5 | 38.8 |
| Employed part time | 21 | 84 | 1 | 105 | 18.2 | 14.9 |
| Unemployed seeking work | 0 | 1 | 0 | 1 | 0.2 | 5.7 |
| Unemployed not seeking work | 2 | 1 | 0 | 3 | 0.5 | 12.7 |
| Self employed | 2 | 10 | 0 | 30 | 5.2 | 6.9 |
| Homemaker | 1 | 0 | 0 | 1 | 0.2 | 4.3 |
| Retired | 10 | 6 | 0 | 16 | 2.7 | 16.7 |
| Prefer not to say | 2 | 1 | 0 | 3 | 0.5 | |
| Total | 256 | 319 | 6 | 581 | 100 | 100 |

Source of North east regional data: (Office for National Statistics, 2011)

Table 49 *Sector of Employment by Sector and Gender*

| Employment Sector | Male | Female | Prefer not to say | Total | % |
|---|---|---|---|---|---|
| Public Sector | 128 | 219 | 4 | 351 | 60.4 |
| Private Sector | 103 | 76 | 1 | 180 | 31.0 |
| Not for Profit Sector | 14 | 14 | 0 | 28 | 4.8 |
| Other sector not mentioned above | 6 | 7 | 0 | 13 | 2.2 |
| None of these | 2 | 2 | 0 | 4 | 0.7 |
| Prefer not to say | 3 | 1 | 1 | 5 | 0.9 |
| Total | 256 | 319 | 6 | 581 | 100 |

Table 50 *Industry of Employment by Gender*

| Industry Sector | Male | Female | Prefer not to say | Total | % | North East Region % |
|---|---|---|---|---|---|---|
| Mining and Extractives | 0 | 2 | 0 | 20 | 0.3 | 0.5 |
| Manufacturing | 24 | 10 | 0 | 34 | 5.9 | 10.2 |
| Construction | 11 | 1 | 0 | 12 | 2.1 | 8.7 |
| Retail and Wholesale | 5 | 9 | 0 | 14 | 2.4 | 15.4 |
| Transportation and Storage | 3 | 1 | 0 | 4 | 0.7 | 4.8 |
| Accommodation and Food | 2 | 2 | 0 | 4 | 0.7 | 5.8 |
| Information and Communication | 18 | 16 | 1 | 35 | 6.0 | 2.7 |
| Finance and Insurance | 30 | 13 | 0 | 43 | 7.4 | 2.8 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Real Estate | 1 | 2 | 0 | 3 | 0.5 | 1.4 |
| Professional and Support | 13 | 22 | 0 | 35 | 6.0 | 4.6 |
| Government, Health, Education and Defence | 115 | 210 | 2 | 327 | 56.3 | 32.6 |
| Other Services | 22 | 19 | 1 | 42 | 7.2 | 4.4 |
| None of these | 9 | 9 | 0 | 18 | 3.1 | 6.1 |
| Prefer not to say | 3 | 3 | 2 | 8 | 1.4 | |
| Total | 256 | 319 | 6 | 581 | 100 | 100 |

Source of North East regional data: (Office for National Statistics, 2011)

## Level of Personal Income

Table 51 (below) shows personal income split by gender. The overall mean annual income was £41,849 (SD £21,846, median of £39,376). For males the mean was higher at £46,797 (SD £22,262, median £44,895) and for females lower at £37,904 (SD £20,662, median £35,427)[178]. The average earnings for the U.K is £29,669 but the North East stands below this at £26,697 (House of Commons Library, 2018).

Table 51 *Personal Income by Gender*

| Income Level (per annum) | Male | Female | Prefer not to say | Total | % |
|---|---|---|---|---|---|
| Less than £20,000 | 22 | 54 | 1 | 77 | 13.3 |
| £20,000-£40000 | 78 | 129 | 1 | 208 | 35.8 |
| £40,001-£60,000 | 94 | 99 | 1 | 194 | 33.4 |
| £60,001-£80,000 | 36 | 12 | 1 | 49 | 8.4 |
| £80,001-£100,000 | 7 | 6 | 0 | 13 | 2.2 |
| More than £100,000 | 9 | 7 | 0 | 16 | 2.8 |
| Prefer not to say | 10 | 12 | 2 | 24 | 4.1 |
| Total | 256 | 319 | 6 | 581 | 100 |

## Pension Type and Size

Table 52 (below) shows the type of private pension split by gender. Respondents were instructed to ignore state pensions.

Table *53* (below) shows the size of pension fund split by gender.

---

[178] The 'prefer not to say' answers (income) were excluded from the calculations of grouped means and standard deviations.

Table 52 *Type of Private Pension by Gender*

| Type of Pension | Male | Female | Prefer not to say | Total | % |
|---|---|---|---|---|---|
| Defined Benefit | 114 | 140 | 2 | 256 | 44.1 |
| Defined Contribution | 47 | 34 | 1 | 82 | 14.1 |
| Both Defined Benefit and Defined Contribution | 46 | 42 | 1 | 89 | 15.3 |
| Neither | 14 | 17 | 2 | 33 | 5.7 |
| I have a pension but I don't know which type | 35 | 86 | 0 | 121 | 20.8 |
| Total | 256 | 319 | 6 | 581 | 100 |

*Note* Each option was accompanied by a short description for example, defined benefit (pension based on final or average salary) to help identify the pension type.

Further analysis shown in Table 54 (below) shows, of the 300 respondents who did not know their pension size, 133 had DB pensions.

Table 53 *Size of Pension Fund by Gender*

| Size of Pension | Male | Female | Prefer not to say | Total | % |
|---|---|---|---|---|---|
| Under £30,000 | 19 | 41 | 0 | 60 | 10.3 |
| £30,001 - £50,000 | 11 | 14 | 0 | 25 | 4.3 |
| £50,001 - £100,000 | 15 | 20 | 0 | 35 | 6.0 |
| £100,001 - £250,000 | 26 | 19 | 0 | 45 | 7.7 |
| Over £250,000 | 21 | 14 | 1 | 36 | 6.2 |
| Over £500,000 | 31 | 12 | 0 | 43 | 7.4 |
| Don't know | 114 | 183 | 3 | 300 | 51.6 |
| Prefer not to say | 19 | 16 | 2 | 37 | 6.5 |
| Total | 256 | 319 | 6 | 581 | 100 |

Table 54 *Analysis of Pension Size by Pension Type*

| Type of Pension/Size of pension fund | DB | DC | Both | Neither | Don't know | Total | % |
|---|---|---|---|---|---|---|---|
| Under £30,000 | 19 | 10 | 4 | 8 | 19 | 60 | 10.3 |
| £30,001 - £50,000 | 14 | 2 | 1 | 3 | 5 | 25 | 4.3 |
| £50,001 - £100,000 | 16 | 14 | 3 | 0 | 2 | 35 | 6.0 |
| £100,001 - £250,000 | 24 | 8 | 12 | 0 | 1 | 45 | 7.7 |
| Over £250,000 | 12 | 8 | 10 | 2 | 4 | 36 | 6.2 |
| Over £500,000 | 20 | 8 | 13 | 1 | 1 | 43 | 7.4 |
| Don't know | 133 | 27 | 38 | 15 | 87 | 300 | 51.6 |
| Prefer not to say | 18 | 5 | 8 | 4 | 2 | 37 | 6.5 |
| Total | 256 | 82 | 89 | 33 | 121 | 581 | 100 |

# Appendix 5 –Performance in Test of Pension Knowledge

Tables 55 – 57 show the performance of the sample in each section of the test.

Table 55 *Answers to Basic Financial Literacy Questions (section 1)*

| Ques no | Topic | Correct *n* | Incorrect *n* | Don't know *n* | Refuse to answer *n* | % correct |
|---|---|---|---|---|---|---|
| 1 | Compound interest | 397 | 161 | 21 | 2 | 68.3 |
| 2 | Effect of inflation | 488 | 45 | 47 | 1 | 84.0 |
| 3 | Risk | 366 | 139 | 74 | 2 | 63.0 |
| 4 | Time value of money | 388 | 127 | 62 | 4 | 66.8 |
| 5 | Variability of returns | 418 | 71 | 92 | 0 | 71.9 |

Table 56 *Answers to Basic Pension Literacy Questions (section 2)*

| Ques no | Topic | Correct *n* | Incorrect *n* | Don't know *n* | Refuse to answer *n* | % correct |
|---|---|---|---|---|---|---|
| 6 | Income in retirement | 216 | 193 | 172 | 0 | 37.2 |
| 7 | Types of pensions | 360 | 79 | 140 | 2 | 62.0 |
| 8 | Types of pensions | 352 | 101 | 128 | 0 | 60.6 |
| 9 | Pension pot size for income | 289 | 125 | 167 | 0 | 49.7 |
| 10 | Length of return | 317 | 192 | 72 | 0 | 54.6 |
| 11 | Inflation effect | 480 | 38 | 62 | 1 | 82.6 |
| 12 | Portfolio composition and risk | 404 | 59 | 114 | 4 | 69.5 |
| 13 | Basis of advisor charges | 275 | 236 | 68 | 2 | 47.3 |

Table 57 *Answers to 2015 Pension Freedom Questions (section 3)*

| Ques no | Topic | Correct *n* | Incorrect *n* | Don't know *n* | Refuse to answer *n* | % correct |
|---|---|---|---|---|---|---|
| 14 | Age freedoms take effect | 357 | 140 | 84 | 0 | 61.4 |
| 15 | Accessible pension types | 151 | 221 | 209 | 0 | 26.0 |
| 16 | Tax free percentage | 318 | 113 | 150 | 0 | 54.7 |
| 17 | Drawdown products | 303 | 99 | 178 | 1 | 52.2 |
| 18 | Annuity products | 335 | 58 | 188 | 0 | 57.7 |
| 19 | Inheritance of pensions | 167 | 138 | 276 | 0 | 28.7 |
| 20 | Advice threshold | 80 | 131 | 370 | 0 | 13.8 |

Note: 'Refuse to answer' responses were coded as missing data in data analysis.

to provide full results from each of the three regressions. However, they are not discussed in the text. They
ignificant variables when different measures of actual and perceived pension literacy were used as predictors.
ion was variable based on the number of 'refuse to answer' responses in relation to all survey questions.

*ion with Main Predictors only – Outcome Variable: 'Do you intend to seek financial advice?' (Q7)*

| | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| | -0.505** | 0.224 | 0.024 | 0.604 | 0.551*** | 0.115 | 0.000 | 0.577 | -0.549*** | 0.116 | 0.000 | 0.577 |
| | | | | | | | | | | | | |
| | 0.004 | 0.361 | 0.992 | 1.004 | | | | | | | | |
| | -0.543 | 0.343 | 0.114 | 0.581 | | | | | | | | |
| | 0.168 | 0.281 | 0.549 | 1.183 | | | | | | | | |
| | | | | | 0.413*** | 0.130 | 0.002 | 1.511 | | | | |
| | | | | | | | | | 0.345** | 0.135 | 0.011 | 1.412 |
| | | | | | | | | | 0.149 | 0.133 | 0.263 | 1.160 |
| | | | | | | | | | 0.066 | 0.116 | 0.572 | 1.068 |
| | | | | | | | | | 0.057 | 0.115 | 0.618 | 1.059 |
| | | | | | | | | | 0.081 | 0.115 | 0.482 | 1.084 |
| | | | | | -0.270** | 0.124 | 0.029 | 0.763 | -0.284** | 0.125 | 0.023 | 0.753 |

were excluded so only those participants answering a 'yes' or 'no' were included in the analysis.

Table 59 *Results of Logistic Regression with Main Predictors only – Outcome Variable: any Advice at all (answered yes to any source of advice listed in Q2).*

| Variables | Groups | | | | Weighted Score./Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | 1.246*** | 0.175 | 0.000 | 3.476 | 1.896*** | 0.131 | 0.000 | 6.658 | 1.988*** | 0.140 | 0.000 | 7.300 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.299 | 0.326 | 0.360 | 1.348 | | | | | | | | |
| Combined groups high perceived low actual | 1.351*** | 0.429 | 0.002 | 3.863 | | | | | | | | |
| Combined groups high perceived high actual | 1.129*** | 0.315 | 0.000 | 3.092 | | | | | | | | |
| Total weighted score | | | | | 0.138 | 0.135 | 0.307 | 1.148 | | | | |
| Financial literacy | | | | | | | | | 0.233* | 0.130 | 0.072 | 1.262 |
| Pension literacy | | | | | | | | | -0.151 | 0.149 | 0.312 | 0.860 |
| Pension planning | | | | | | | | | 0.056 | 0.128 | 0.663 | 1.057 |
| Advisor charging | | | | | | | | | -0.348*** | 0.132 | 0.008 | 0.706 |
| Withdrawing your pension | | | | | | | | | 0.439*** | 0.133 | 0.001 | 1.551 |
| Total perceived score | | | | | 0.467*** | 0.143 | 0.001 | 1.595 | 0.461*** | 0.143 | 0.001 | 1.586 |

Note: *n* = 568.

Table 60 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from Pension Wise*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -2.375*** | 0.261 | 0.000 | 0.093 | -1.835*** | 0.126 | 0.000 | 0.160 | -1.848*** | 0.413 | 0.000 | 0.158 |

| Variables | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.830** | 0.380 | 0.029 | 2.293 | | | | | | | | |
| Combined groups high perceived low actual | 0.167 | 0.423 | 0.694 | 1.181 | | | | | | | | |
| Combined groups high perceived high actual | 1.098*** | 0.315 | 0.000 | 2.998 | | | | | | | | |
| Total weighted score | | | | | 0.453*** | 0.148 | 0.002 | 1.572 | | | | |
| Financial literacy | | | | | | | | | -0.073 | 0.142 | 0.608 | 0.930 |
| Pension literacy | | | | | | | | | 0.465*** | 0.148 | 0.002 | 1.592 |
| Pension planning | | | | | | | | | 0.291** | 0.128 | 0.023 | 1.337 |
| Advisor charging | | | | | | | | | -0.135 | 0.125 | 0.281 | 0.281 |
| Withdrawing your pension | | | | | | | | | 0.295** | 0.136 | 0.030 | 1.344 |
| Total perceived score | | | | | 0.003 | 0.137 | 0.984 | 1.003 | -0.023 | 0.140 | 0.869 | 0.977 |

Note: *n* = 568.

Table 61 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from an IFA*

| | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -0.522*** | 0.151 | 0.001 | 0.593 | -0.200** | 0.086 | 0.020 | 0.819 | -0.204** | 0.086 | 0.019 | 0.816 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.144 | 0.261 | 0.581 | 1.155 | | | | | | | | |
| Combined groups high perceived low actual | 0.182 | 0.252 | 0.469 | 1.200 | | | | | | | | |
| Combined groups high perceived high actual | 0.822*** | 0.211 | 0.000 | 2.276 | | | | | | | | |
| Total weighted score | | | | | 0.294*** | 0.099 | 0.003 | 1.341 | | | | |
| Financial literacy | | | | | | | | | 0.268*** | 0.098 | 0.006 | 1.307 |
| Pension literacy | | | | | | | | | 0.096 | 0.100 | 0.337 | 1.101 |
| Pension planning | | | | | | | | | 0.036 | 0.089 | 0.688 | 1.036 |

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Advisor charging | | | | | | | | | -0.113 | 0.089 | 0.205 | 0.893 |
| Withdrawing your pension | | | | | | | | | 0.156* | 0.091 | 0.087 | 1.169 |
| Total perceived score | | | | | 0.161* | 0.097 | 0.098 | 1.175 | 0.153 | 0.098 | 0.121 | 1.165 |

Note: *n* = 568.

Table 62 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from Pension Provider*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -0.961*** | 0.163 | 0.000 | 0.382 | -0.425*** | 0.087 | 0.000 | 0.654 | -0.433*** | 0.088 | 0.000 | 0.648 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.674** | 0.267 | 0.012 | 1.962 | | | | | | | | |
| Combined groups high perceived low actual | 0.743*** | 0.258 | 0.004 | 2.102 | | | | | | | | |
| Combined groups high perceived high actual | 0.876*** | 0.219 | 0.000 | 2.402 | | | | | | | | |
| Total weighted score | | | | | 0.217** | 0.100 | 0.031 | 1.242 | | | | |
| Financial literacy | | | | | | | | | 0.236** | 0.099 | 0.018 | 1.266 |
| Pension literacy | | | | | | | | | -0.110 | 0.102 | 0.281 | 0.896 |
| Pension planning | | | | | | | | | 0.122 | 0.090 | 0.177 | 1.129 |
| Advisor charging | | | | | | | | | -0.025 | 0.090 | 0.779 | 0.975 |
| Withdrawing your pension | | | | | | | | | 0.209** | 0.093 | 0.024 | 1.233 |
| Total perceived score | | | | | 0.143 | 0.098 | 0.145 | 1.154 | 0.166* | 0.100 | 0.096 | 1.180 |

Note: *n* = 568.

Table 63 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from Internet Sources*

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| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.246*** | 0.175 | 0.000 | 0.288 | -0.985*** | 0.096 | 0.000 | 0.374 | -1.018*** | 0.099 | 0.000 | 0.361 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.275 | 0.293 | 0.348 | 1.317 | | | | | | | | |
| Combined groups high perceived low actual | 0.080 | 0.292 | 0.784 | 1.083 | | | | | | | | |
| Combined groups high perceived high actual | 0.632*** | 0.232 | 0.007 | 1.881 | | | | | | | | |
| Total weighted score | | | | | 0.351*** | 0.112 | 0.002 | 1.420 | | | | |
| Financial literacy | | | | | | | | | 0.395*** | 0.115 | 0.001 | 1.485 |
| Pension literacy | | | | | | | | | 0.068 | 0.112 | 0.539 | 1.071 |
| Pension planning | | | | | | | | | 0.170* | 0.100 | 0.089 | 1.185 |
| Advisor charging | | | | | | | | | -0.209** | 0.100 | 0.036 | 0.812 |
| Withdrawing your pension | | | | | | | | | 0.011 | 0.102 | 0.942 | 1.011 |
| Total perceived score | | | | | -0.082 | 0.108 | 0.449 | 0.922 | -0.077 | 0.110 | 0.484 | 0.926 |

Note: *n* = 568.

Table 64 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from Government Sources*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.340*** | 0.180 | 0.000 | 0.262 | -0.979*** | 0.096 | 0.000 | 0.376 | -0.989* | 0.097 | 0.000 | 0.372 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.314 | 0.298 | 0.293 | 1.369 | | | | | | | | |
| Combined groups high perceived low actual | 0.229 | 0.292 | 0.435 | 1.257 | | | | | | | | |
| Combined groups high perceived high actual | 0.818*** | 0.235 | 0.000 | 2.266 | | | | | | | | |
| Total weighted score | | | | | 0.307*** | 0.112 | 0.006 | 1.359 | | | | |

| | | | | | | | | | 0.154 | 0.110 | 0.164 | 1.166 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Financial literacy | | | | | | | | | 0.154 | 0.110 | 0.164 | 1.166 |
| Pension literacy | | | | | | | | | 0.264** | 0.112 | 0.018 | 1.302 |
| Pension planning | | | | | | | | | 0.055 | 0.098 | 0.577 | 1.056 |
| Advisor charging | | | | | | | | | -0.168* | 0.099 | 0.088 | 0.845 |
| Withdrawing your pension | | | | | | | | | 0.062 | 0.101 | 0.539 | 1.064 |
| Total perceived score | | | | | 0.057 | 0.107 | 0.598 | 1.058 | 0.039 | 0.109 | 0.716 | 1.040 |

Note: *n* = 568.

Table 65 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from Friends and Family*

| | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Variables | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -0.857*** | 0.159 | 0.000 | 0.424 | -0.863*** | 0.092 | 0.000 | 0.422 | -0.886*** | 0.094 | 0.000 | 0.412 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.047 | 0.278 | 0.867 | 1.048 | | | | | | | | |
| Combined groups high perceived low actual | 0.043 | 0.268 | 0.874 | 1.044 | | | | | | | | |
| Combined groups high perceived high actual | -0.051 | 0.227 | 0.821 | 0.950 | | | | | | | | |
| Total weighted score | | | | | 0.081 | 0.105 | 0.441 | 1.084 | | | | |
| Financial literacy | | | | | | | | | 0.245** | 0.105 | 0.020 | 1.278 |
| Pension literacy | | | | | | | | | -0.193* | 0.109 | 0.078 | 0.825 |
| Pension planning | | | | | | | | | 0.175* | 0.097 | 0.072 | 1.191 |
| Advisor charging | | | | | | | | | -0.052 | 0.097 | 0.590 | 0.949 |
| Withdrawing your pension | | | | | | | | | -0.056 | 0.098 | 0.566 | 0.945 |
| Total perceived score | | | | | -0.176* | 0.105 | 0.093 | 0.839 | -0.157 | 0.107 | 0.141 | 0.855 |

Note: *n* = 568.

Table 66 *Results of Logistic Regression with Main Predictors only – Outcome Variable: Advice from an Employer*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds |
| Constant | -0.857*** | 0.159 | 0.000 | 0.424 | -0.921*** | 0.093 | 0.000 | 0.398 | 0.928*** | 0.094 | 0.000 | 0.395 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | -0.286 | 0.292 | 0.328 | 0.752 | | | | | | | | |
| Combined groups high perceived low actual | 0.179 | 0.264 | 0.498 | 1.196 | | | | | | | | |
| Combined groups high perceived high actual | -0.158 | 0.230 | 0.492 | 0.854 | | | | | | | | |
| Total weighted score | | | | | -0.109 | 0.105 | 0.299 | 0.896 | | | | |
| Financial literacy | | | | | | | | | -0.061 | 0.102 | 0.550 | 0.941 |
| Pension literacy | | | | | | | | | -0.103 | 0.109 | 0.346 | 0.902 |
| Pension planning | | | | | | | | | 0.068 | 0.097 | 0.478 | 1.071 |
| Advisor charging | | | | | | | | | -0.142 | 0.097 | 0.145 | 0.868 |
| Withdrawing your pension | | | | | | | | | 0.025 | 0.099 | 0.802 | 1.025 |
| Total perceived score | | | | | -0.003 | 0.105 | 0.976 | 0.997 | 0.007 | 0.107 | 0.949 | 1.007 |

Note: *n* = 568.

# Appendix 7 – Pension Literacy and Financial Advice – Stage One Regressions with Control Variables

Note: The shaded areas are included to provide full results from each of the three regressions. However, they are not discussed in the text. They provide additional assurance of the significant variables when different measures of actual and perceived pension literacy were used as predictors.

Table 67 *Results of Logistic Regression with Control Variables– Outcome Variable: 'Do you intend to seek Financial Advice?' (Q7)*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.493** | 0.681 | 0.028 | 0.225 | -1.610** | 0.657 | 0.014 | 0.200 | -0.511** | 0.672 | 0.025 | 0.211 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | -0.001 | 0.415 | 0.998 | 0.999 | | | | | | | | |
| Combined groups high perceived low actual | -0.449 | 0.431 | 0.297 | 0.638 | | | | | | | | |
| Combined groups high perceived high actual | 0.035 | 0.396 | 0.929 | 1.036 | | | | | | | | |
| Total weighted score | | | | | 0.337** | 0.167 | 0.044 | 1.401 | | | | |
| Financial literacy | | | | | | | | | 0.304* | 0.168 | 0.071 | 1.355 |
| Pension literacy | | | | | | | | | 0.109 | 0.169 | 0.517 | 1.115 |
| Pension planning | | | | | | | | | 0.113 | 0.140 | 0.418 | 1.120 |
| Advisor charging | | | | | | | | | 0.044 | 0.140 | 0.754 | 1.045 |
| Withdrawing your pension | | | | | | | | | -0.018 | 0.144 | 0.900 | 0.982 |
| Total perceived score | | | | | -0.452*** | 0.170 | 0.008 | 0.636 | -0.475*** | 0.173 | 0.006 | 0.622 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.193 | 0.397 | 0.627 | 0.825 | -0.223 | 0.401 | 0.578 | 0.800 | -0.195 | 0.404 | 0.630 | 0.823 |
| Age 51-55 | -0.491 | 0.405 | 0.226 | 0.612 | -0.486 | 0.407 | 0.233 | 0.615 | -0.449 | 0.415 | 0.279 | 0.638 |
| Age 56 - 60 | -0.503 | 0.429 | 0.241 | 0.605 | -0.368 | 0.434 | 0.396 | 0.692 | -0.328 | 0.444 | 0.461 | 0.721 |
| Age 61-65 | -0.578 | 0.500 | 0.247 | 0.561 | -0.508 | 0.499 | 0.308 | 0.601 | -0.456 | 0.507 | 0.368 | 0.634 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age 66-75 | -1.159 | 0.971 | 0.233 | 0.314 | -1.207 | 1.011 | 0.233 | 0.299 | -1.223 | 1.016 | 0.228 | 0.294 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.948 | 0.745 | 0.203 | 2.581 | 1.115 | 0.744 | 0.134 | 3.050 | 1.110 | 0.772 | 0.150 | 3.036 |
| Pot size (£50,000 to £100,000) | -0.091 | 0.612 | 0.882 | 0.913 | 0.102 | 0.622 | 0.870 | 1.107 | 0.087 | 0.638 | 0.891 | 1.091 |
| Pot size (£100,000 to £250,000) | 0.231 | 0.571 | 0.686 | 1.259 | 0.392 | 0.588 | 0.505 | 1.480 | 0.369 | 0.592 | 0.533 | 1.447 |
| Pot size (over £250,000) | 0.715 | 0.626 | 0.254 | 2.044 | 1.011 | 0.645 | 0.117 | 2.747 | 1.001 | 0.649 | 0.123 | 2.721 |
| Pot size (over £500,000) | 1.318** | 0.618 | 0.033 | 3.736 | 1.594** | 0.648 | 0.014 | 4.925 | 1.656** | 0.655 | 0.011 | 5.239 |
| Pot size (don't know) | -0.539 | 0.442 | 0.223 | 0.583 | -0.468 | 0.446 | 0.294 | 0.626 | -0.535 | 0.458 | 0.243 | 0.586 |
| Employment Status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.032 | 0.392 | 0.934 | 0.968 | -0.048 | 0.398 | 0.903 | 0.953 | -0.064 | 0.404 | 0.874 | 0.938 |
| Employment status - self employed | 1.520** | 0.604 | 0.012 | 4.570 | 1.603*** | 0.618 | 0.009 | 4.969 | 1.628*** | 0.622 | 0.009 | 5.092 |
| Employment status - not working | 0.233 | 0.789 | 0.768 | 1.262 | 0.366 | 0.810 | 0.652 | 1.441 | 0.295 | 0.815 | 0.717 | 1.343 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | 0.817*** | 0.306 | 0.008 | 2.263 | 0.737** | 0.305 | 0.016 | 2.089 | 0.748** | 0.306 | 0.014 | 2.113 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | 0.473 | 0.405 | 0.246 | 1.606 | 0.437 | 0.406 | 0.282 | 1.548 | 0.411 | 0.418 | 0.325 | 1.508 |
| Marital status widowed, divorced or separated | 0.250 | 0.369 | 0.498 | 1.284 | 0.187 | 0.379 | 0.621 | 1.206 | 0.153 | 0.386 | 0.692 | 1.165 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.396 | 0.469 | 0.398 | 1.486 | 0.336 | 0.477 | 0.480 | 1.400 | 0.276 | 0.487 | 0.571 | 1.317 |
| Income £40,000 to £60,000 | 0.920* | 0.508 | 0.070 | 2.510 | 0.873* | 0.511 | 0.088 | 2.395 | 0.761 | 0.530 | 0.151 | 2.141 |
| Income over £60,000 | 1.303** | 0.578 | 0.024 | 3.679 | 1.278** | 0.584 | 0.029 | 3.588 | 1.119* | 0.612 | 0.067 | 3.062 |

$n$ = 317. 'Don't know answers were excluded so only those participants answering a 'yes' or 'no' were included in the analysis (this also excluded those participants who had answered 'refuse to answer' to any of the demographic questions).

Table 68 *Results of Logistic Regression with Control Variables – Outcome Variable: any Advice at all (answered yes to any sources of advice listed in Q2).*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | 0.585 | 0.616 | 0.342 | 1.796 | 1.163* | 0.609 | 0.056 | 3.199 | 1.404** | 0.629 | 0.025 | 4.073 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.193 | 0.394 | 0.623 | 1.213 | | | | | | | | 0.193 |
| Combined groups high perceived low actual | 1.469*** | 0.520 | 0.005 | 4.347 | | | | | | | | |
| Combined groups high perceived high actual | 0.807** | 0.402 | 0.045 | 2.241 | | | | | | | | |
| Total weighted score | | | | | 0.133 | 0.160 | 0.406 | 1.142 | | | | |
| Financial literacy | | | | | | | | | 0.282* | 0.154 | 0.066 | 1.326 |
| Pension literacy | | | | | | | | | -0.215 | 0.177 | 0.224 | 0.807 |
| Pension planning | | | | | | | | | 0.104 | 0.147 | 0.482 | 1.109 |
| Advisor charging | | | | | | | | | -0.333** | 0.15 | 0.026 | 0.717 |
| Withdrawing your pension | | | | | | | | | 0.369** | 0.153 | 0.016 | 1.446 |
| Total perceived score | | | | | 0.340* | 0.178 | 0.056 | 1.405 | 0.344* | 0.180 | 0.056 | 1.410 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | 0.386 | 0.395 | 0.329 | 1.471 | 0.382 | 0.393 | 0.331 | 1.465 | 0.45 | 0.405 | 0.267 | 1.568 |
| Age 51-55 | 0.509 | 0.418 | 0.223 | 1.664 | 0.492 | 0.411 | 0.232 | 1.635 | 0.651 | 0.431 | 0.131 | 1.917 |
| Age 56 - 60 | 0.223 | 0.445 | 0.616 | 1.25 | 0.23 | 0.443 | 0.603 | 1.259 | 0.202 | 0.454 | 0.656 | 1.224 |
| Age 61-65 | -0.406 | 0.517 | 0.432 | 0.666 | -0.463 | 0.515 | 0.368 | 0.629 | -0.357 | 0.548 | 0.515 | 0.7 |
| Age 66-75 | -1.568* | 0.884 | 0.076 | 0.208 | -1.557* | 0.884 | 0.078 | 0.211 | -1.509* | 0.877 | 0.085 | 0.221 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.535 | 1.133 | 0.637 | 1.708 | 0.739 | 1.128 | 0.512 | 2.095 | 0.449 | 1.152 | 0.697 | 1.567 |
| Pot size (£50,000 to £100,000) | -0.102 | 0.778 | 0.895 | 0.903 | 0.031 | 0.767 | 0.968 | 1.031 | -0.232 | 0.787 | 0.768 | 0.793 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (£100,000 to £250,000) | -0.219 | 0.714 | 0.759 | 0.804 | -0.334 | 0.718 | 0.642 | 0.716 | -0.375 | 0.724 | 0.604 | 0.687 |
| Pot size (over £250,000) | 0.719 | 1.161 | 0.536 | 2.052 | 0.796 | 1.159 | 0.492 | 2.216 | 0.829 | 1.192 | 0.487 | 2.292 |
| Pot size (over £500,000) | 0.851 | 1.168 | 0.466 | 2.343 | 0.729 | 1.17 | 0.533 | 2.073 | 0.61 | 1.178 | 0.604 | 1.841 |
| Pot size (don't know) | -0.738 | 0.464 | 0.111 | 0.478 | -0.681 | 0.456 | 0.135 | 0.506 | -0.868 | 0.47 | 0.065 | 0.42 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.008 | 0.409 | 0.985 | 0.992 | 0.029 | 0.407 | 0.943 | 1.029 | 0.002 | 0.413 | 0.996 | 1.002 |
| Employment status - self employed | -0.303 | 0.602 | 0.614 | 0.739 | -0.262 | 0.597 | 0.661 | 0.769 | -0.223 | 0.627 | 0.721 | 0.8 |
| Employment status - not working | 0.965 | 0.967 | 0.318 | 2.624 | 1.126 | 1.004 | 0.262 | 3.084 | 1.021 | 1.024 | 0.319 | 2.776 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | 0.351 | 0.310 | 0.257 | 1.421 | 0.333 | 0.309 | 0.281 | 1.395 | 0.389 | 0.321 | 0.225 | 1.476 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.947*** | 0.335 | 0.005 | 0.388 | -0.906*** | 0.333 | 0.007 | 0.404 | -0.92*** | 0.347 | 0.008 | 0.398 |
| Marital status widowed, divorced or separated | 0.817 | 0.529 | 0.122 | 2.264 | 0.786 | 0.522 | 0.132 | 2.195 | 0.692 | 0.538 | 0.198 | 1.998 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 1.11*** | 0.406 | 0.006 | 3.036 | 1.067*** | 0.405 | 0.008 | 2.905 | 0.966** | 0.418 | 0.021 | 2.627 |
| Income £40,000 to £60,000 | 1.176** | 0.463 | 0.011 | 3.242 | 1.028** | 0.457 | 0.024 | 2.795 | 0.957** | 0.482 | 0.047 | 2.605 |
| Income over £60,000 | 1.261** | 0.601 | 0.036 | 3.528 | 1.036* | 0.602 | 0.085 | 2.817 | 0.976 | 0.627 | 0.120 | 2.654 |

$n$ = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 69 *Results of Logistic Regression with Control Variables – Outcome Variable: Advice from Pension Wise*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -3.095*** | 0.761 | 0.000 | 0.045 | -2.499*** | 0.715 | 0.000 | 0.082 | -2.689*** | 0.743 | 0.000 | 0.068 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 1.032** | 0.449 | 0.021 | 2.808 | | | | | | | | |
| Combined groups high perceived low actual | 0.167 | 0.517 | 0.747 | 1.181 | | | | | | | | |
| Combined groups high perceived high actual | 1.082** | 0.430 | 0.012 | 2.951 | | | | | | | | |
| Total weighted score | | | | | 0.445** | 0.179 | 0.013 | 1.560 | | | | |
| Financial literacy | | | | | | | | | -0.218 | 0.174 | 0.212 | 0.804 |
| Pension literacy | | | | | | | | | 0.498*** | 0.185 | 0.007 | 1.646 |
| Pension planning | | | | | | | | | 0.463*** | 0.157 | 0.003 | 1.589 |
| Advisor charging | | | | | | | | | -0.040 | 0.151 | 0.790 | 0.960 |
| Withdrawing your pension | | | | | | | | | 0.270 | 0.164 | 0.101 | 1.309 |
| Total perceived score | | | | | -0.132 | 0.176 | 0.454 | 0.877 | -0.105 | 0.178 | 0.555 | 0.900 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | 0.386 | 0.535 | 0.471 | 1.471 | 0.364 | 0.531 | 0.493 | 1.439 | 0.420 | 0.542 | 0.438 | 1.522 |
| Age 51-55 | 0.848* | 0.494 | 0.086 | 2.335 | 0.932* | 0.489 | 0.057 | 2.539 | 0.805 | 0.500 | 0.108 | 2.237 |
| Age 56 - 60 | 1.438*** | 0.504 | 0.004 | 4.213 | 1.522*** | 0.501 | 0.002 | 4.581 | 1.528*** | 0.514 | 0.003 | 4.607 |
| Age 61-65 | 0.959 | 0.587 | 0.102 | 2.610 | 1.107* | 0.587 | 0.059 | 3.024 | 1.217* | 0.600 | 0.042 | 3.379 |
| Age 66-75 | 0.889 | 0.962 | 0.355 | 2.431 | 0.956 | 0.962 | 0.320 | 2.602 | 1.193 | 0.985 | 0.226 | 3.296 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | -1.274 | 1.120 | 0.255 | 0.280 | -1.294 | 1.117 | 0.246 | 0.274 | -1.314 | 1.151 | 0.253 | 0.269 |
| Pot size (£50,000 to £100,000) | 0.349 | 0.656 | 0.595 | 1.417 | 0.329 | 0.646 | 0.611 | 1.389 | 0.187 | 0.656 | 0.776 | 1.206 |
| Pot size (£100,000 to £250,000) | 0.487 | 0.579 | 0.401 | 1.627 | 0.460 | 0.584 | 0.431 | 1.584 | 0.253 | 0.598 | 0.672 | 1.288 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | -0.201 | 0.704 | 0.775 | 0.818 | -0.131 | 0.710 | 0.854 | 0.877 | -0.381 | 0.721 | 0.597 | 0.683 |
| Pot size (over £500,000) | -0.083 | 0.649 | 0.898 | 0.920 | -0.132 | 0.664 | 0.843 | 0.877 | -0.375 | 0.668 | 0.586 | 0.687 |
| Pot size (don't know) | -0.440 | 0.471 | 0.351 | 0.644 | -0.511 | 0.463 | 0.270 | 0.600 | -0.605 | 0.473 | 0.201 | 0.546 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.442 | 0.427 | 0.302 | 0.643 | -0.456 | 0.426 | 0.285 | 0.634 | -0.562 | 0.446 | 0.208 | 0.570 |
| Employment status - self employed | -0.117 | 0.641 | 0.855 | 0.890 | -0.187 | 0.636 | 0.768 | 0.829 | -0.469 | 0.654 | 0.473 | 0.625 |
| Employment status - not working | -0.024 | 0.711 | 0.973 | 0.977 | 0.118 | 0.713 | 0.869 | 1.125 | 0.130 | 0.766 | 0.866 | 1.138 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | -0.289 | 0.307 | 0.345 | 0.748 | -0.348 | 0.309 | 0.260 | 0.706 | -0.430 | 0.323 | 0.183 | 0.651 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | 0.228 | 0.422 | 0.716 | 1.256 | 0.196 | 0.418 | 0.638 | 1.217 | 0.387 | 0.433 | 0.371 | 1.473 |
| Marital status widowed, divorced or separated | 0.270 | 0.382 | 0.589 | 1.311 | 0.277 | 0.381 | 0.438 | 1.319 | 0.293 | 0.392 | 0.455 | 1.341 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.512 | 0.495 | 0.301 | 1.669 | 0.501 | 0.491 | 0.3080 | 1.651 | 0.678 | 0.510 | 0.184 | 1.971 |
| Income £40,000 to £60,000 | 0.063 | 0.545 | 0.908 | 1.065 | 0.077 | 0.539 | 0.887 | 1.080 | 0.387 | 0.575 | 0.501 | 1.472 |
| Income over £60,000 | -0.588 | 0.654 | 0.368 | 0.555 | -0.500 | 0.652 | 0.443 | 0.606 | -0.239 | 0.685 | 0.727 | 0.788 |

$n$ = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 70 *Results of Logistic Regression with Control Variables – Outcome variable: Advice from an IFA*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.891*** | 0.592 | 0.000 | 0.151 | -1.724*** | 0.491 | 0.000 | 0.178 | -1.640*** | 0.495 | 0.001 | 0.194 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | -0.026 | 0.307 | 0.932 | 0.974 | | | | | | | | |
| Combined groups high perceived low actual | -0.017 | 0.305 | 0.956 | 0.983 | | | | | | | | |
| Combined groups high perceived high actual | 0.376 | 0.284 | 0.182 | 1.460 | | | | | | | | |
| Total weighted score | | | | | 0.169 | 0.121 | 0.164 | 1.184 | | | | |
| Financial literacy | | | | | | | | | 0.221* | 0.116 | 0.057 | 1.247 |
| Pension literacy | | | | | | | | | -0.035 | 0.122 | 0.774 | 0.966 |
| Pension planning | | | | | | | | | 0.077 | 0.103 | 0.456 | 1.080 |
| Advisor charging | | | | | | | | | -0.093 | 0.104 | 0.374 | 0.911 |
| Withdrawing your pension | | | | | | | | | 0.062 | 0.108 | 0.563 | 1.064 |
| Total perceived score | | | | | -0.035 | 0.125 | 0.779 | 0.965 | -0.041 | 0.126 | 0.744 | 0.960 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | 0.047 | 0.289 | 0.870 | 1.049 | 0.039 | 0.289 | 0.891 | 1.040 | 0.066 | 0.290 | 0.820 | 1.068 |
| Age 51-55 | -0.366 | 0.295 | 0.213 | 0.693 | -0.373 | 0.292 | 0.202 | 0.689 | -0.305 | 0.297 | 0.305 | 0.737 |
| Age 56 - 60 | 0.037 | 0.314 | 0.906 | 1.038 | 0.067 | 0.316 | 0.832 | 1.069 | 0.093 | 0.319 | 0.771 | 1.098 |
| Age 61-65 | -0.157 | 0.410 | 0.702 | 0.855 | -0.135 | 0.408 | 0.741 | 0.874 | -0.045 | 0.416 | 0.913 | 0.956 |
| Age 66-75 | -2.139** | 0.950 | 0.024 | 0.118 | -2.147** | 0.956 | 0.025 | 0.117 | -2.031* | 0.942 | 0.031 | 0.131 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 1.035* | 0.545 | 0.057 | 2.814 | 1.070** | 0.544 | 0.049 | 2.915 | 0.958* | 0.584 | 0.084 | 2.607 |
| Pot size (£50,000 to £100,000) | 0.739 | 0.499 | 0.138 | 2.094 | 0.799 | 0.497 | 0.108 | 2.223 | 0.753 | 0.504 | 0.135 | 2.124 |
| Pot size (£100,000 to £250,000) | 1.205** | 0.473 | 0.011 | 3.335 | 1.177** | 0.480 | 0.014 | 3.246 | 1.200** | 0.485 | 0.013 | 3.322 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | 1.991*** | 0.568 | 0.000 | 7.326 | 2.079*** | 0.573 | 0.000 | 7.999 | 2.071*** | 0.578 | 0.000 | 7.932 |
| Pot size (over £500,000) | 2.008*** | 0.558 | 0.000 | 7.449 | 2.067*** | 0.568 | 0.000 | 7.898 | 2.127*** | 0.578 | 0.000 | 8.389 |
| Pot size (don't know) | 0.402 | 0.349 | 0.250 | 1.494 | 0.419 | 0.348 | 0.229 | 1.520 | 0.344 | 0.354 | 0.331 | 1.410 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | 0.297 | 0.291 | 0.307 | 1.346 | 0.274 | 0.290 | 0.348 | 1.315 | 0.264 | 0.292 | 0.366 | 1.302 |
| Employment status - self employed | 1.539*** | 0.496 | 0.002 | 4.658 | 1.531*** | 0.500 | 0.002 | 4.624 | 1.533*** | 0.504 | 0.002 | 4.632 |
| Employment status - not working | 1.048 | 0.650 | 0.107 | 2.853 | 1.088 | 0.646 | 0.092 | 2.967 | 0.956 | 0.653 | 0.143 | 2.601 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | 0.444* | 0.226 | 0.050 | 1.559 | 0.411* | 0.028 | 0.068 | 1.509 | 0.435* | 0.227 | 0.055 | 1.546 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | 0.212 | 0.284 | 0.456 | 1.236 | 0.175 | 0.283 | 0.538 | 1.191 | 0.167 | 0.286 | 0.561 | 1.181 |
| Marital status widowed, divorced or separated | 0.144 | 0.291 | 0.622 | 1.154 | 0.122 | 0.292 | 0.677 | 1.130 | 0.063 | 0.296 | 0.830 | 1.065 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.558* | 0.334 | 0.095 | 1.747 | 0.513 | 0.333 | 0.123 | 1.670 | 0.454 | 0.337 | 0.178 | 1.575 |
| Income £40,000 to £60,000 | 0.401 | 0.374 | 0.285 | 1.493 | 0.319 | 0.372 | 0.391 | 1.376 | 0.209 | 0.383 | 0.585 | 1.233 |
| Income over £60,000 | 1.200*** | 0.438 | 0.006 | 3.321 | 1.165*** | 0.437 | 0.008 | 3.207 | 1.037** | 0.450 | 0.021 | 2.822 |

*n* = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 71 *Results of Logistic Regression with Control Variables – Outcome variable: Advice from a Pension Provider*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -2.505* | 0.544 | 0.082 | 0.082 | -1.951* | 0.523 | 0.000 | 0.142 | -1.859* | 0.526 | 0.000 | 0.156 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.716** | 0.302 | 0.018 | 2.047 | | | | | | | | |
| Combined groups high perceived low actual | 0.646** | 0.301 | 0.032 | 1.908 | | | | | | | | |
| Combined groups high perceived high actual | 0.872*** | 0.284 | 0.002 | 2.391 | | | | | | | | |
| Total weighted score | | | | | 0.244** | 0.119 | 0.041 | 1.277 | | | | |
| Financial literacy | | | | | | | | | 0.281** | 0.116 | 0.015 | 1.324 |
| Pension literacy | | | | | | | | | -0.076 | 0.119 | 0.523 | 0.927 |
| Pension planning | | | | | | | | | 0.097 | 0.101 | 0.340 | 1.101 |
| Advisor charging | | | | | | | | | -0.021 | 0.101 | 0.831 | 0.979 |
| Withdrawing your pension | | | | | | | | | 0.117 | 0.106 | 0.269 | 1.124 |
| Total perceived score | | | | | 0.101 | 0.122 | 0.409 | 1.106 | 0.106 | 0.123 | 0.389 | 1.111 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | 0.227 | 0.300 | 0.449 | 1.254 | 0.208 | 0.298 | 0.484 | 1.231 | 0.218 | 0.300 | 0.467 | 1.244 |
| Age 51-55 | 0.439 | 0.289 | 0.128 | 1.551 | 0.511* | 0.284 | 0.072 | 1.667 | 0.569* | 0.290 | 0.050 | 1.766 |
| Age 56 - 60 | 0.364 | 0.317 | 0.251 | 1.439 | 0.417 | 0.316 | 0.187 | 1.517 | 0.426 | 0.320 | 0.183 | 1.532 |
| Age 61-65 | 0.384 | 0.389 | 0.324 | 1.468 | 0.418 | 0.389 | 0.282 | 1.520 | 0.512 | 0.397 | 0.197 | 1.668 |
| Age 66-75 | -0.776 | 0.779 | 0.319 | 0.460 | -0.752 | 0.784 | 0.337 | 0.471 | -0.693 | 0.783 | 0.376 | 0.500 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.519 | 0.578 | 0.370 | 1.680 | 0.565 | 0.577 | 0.327 | 1.760 | 0.384 | 0.588 | 0.514 | 1.468 |
| Pot size (£50,000 to £100,000) | 0.708 | 0.524 | 0.178 | 2.026 | 0.745 | 0.521 | 0.152 | 2.107 | 0.658 | 0.526 | 0.211 | 1.931 |
| Pot size (£100,000 to £250,000) | 0.857* | 0.490 | 0.081 | 2.355 | 0.800 | 0.494 | 0.105 | 2.226 | 0.833* | 0.499 | 0.095 | 2.290 |

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| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | 0.594 | 0.545 | 0.276 | 1.812 | 0.593 | 0.548 | 0.280 | 1.809 | 0.571 | 0.554 | 0.303 | 1.770 |
| Pot size (over £500,000) | 0.515 | 0.528 | 0.330 | 1.673 | 0.416 | 0.536 | 0.438 | 1.516 | 0.450 | 0.543 | 0.407 | 1.568 |
| Pot size (don't know) | <span style="color:red">0.923**</span> | 0.382 | 0.016 | 2.517 | <span style="color:red">0.875**</span> | 0.378 | 0.021 | 2.399 | <span style="color:red">0.790**</span> | 0.382 | 0.039 | 2.293 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.091 | 0.288 | 0.752 | 0.913 | -0.082 | 0.288 | 0.776 | 0.921 | -0.081 | 0.291 | 0.780 | 0.922 |
| Employment status - self employed | -0.532 | 0.494 | 0.281 | 0.587 | -0.541 | 0.493 | 0.273 | 0.582 | -0.544 | 0.499 | 0.275 | 0.581 |
| Employment status - not working | 0.568 | 0.613 | 0.355 | 1.764 | 0.628 | 0.614 | 0.307 | 1.874 | 0.567 | 0.619 | 0.360 | 1.763 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | -0.005 | 0.215 | 0.981 | 0.995 | -0.039 | 0.215 | 0.856 | 0.962 | -0.036 | 0.217 | 0.868 | 0.965 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.395 | 0.294 | 0.179 | 0.673 | -0.384 | 0.293 | 0.189 | 0.681 | -0.417 | 0.295 | 0.158 | 0.659 |
| Marital status widowed, divorced or separated | 0.042 | 0.283 | 0.882 | 1.043 | 0.056 | 0.281 | 0.841 | 1.058 | -0.006 | 0.284 | 0.984 | 0.994 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | <span style="color:red">0.852**</span> | 0.349 | 0.015 | 2.343 | <span style="color:red">0.841**</span> | 0.347 | 0.015 | 2.319 | <span style="color:red">0.806**</span> | 0.352 | 0.022 | 2.239 |
| Income £40,000 to £60,000 | <span style="color:red">0.698*</span> | 0.381 | 0.067 | 2.009 | <span style="color:red">0.677*</span> | 0.377 | 0.072 | 1.968 | 0.594 | 0.390 | 0.128 | 1.811 |
| Income over £60,000 | 0.154 | 0.442 | 0.728 | 1.166 | 0.120 | 0.439 | 0.785 | 1.127 | 0.025 | 0.454 | 0.956 | 1.025 |

*n* = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 72 *Results of Logistic Regression with Control Variables – Outcome variable: Advice from the Internet*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.763*** | 0.587 | 0.003 | 0.171 | -1.317** | 0.573 | 0.021 | 0.268 | -1.234** | 0.578 | 0.033 | 0.291 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.211 | 0.337 | 0.531 | 1.235 | | | | | | | | |
| Combined groups high perceived low actual | 0.324 | 0.338 | 0.337 | 1.383 | | | | | | | | |
| Combined groups high perceived high actual | 0.878*** | 0.306 | 0.004 | 2.407 | | | | | | | | |
| Total weighted score | | | | | 0.299** | 0.134 | 0.026 | 1.348 | | | | |
| Financial literacy | | | | | | | | | 0.285** | 0.128 | 0.026 | 1.330 |
| Pension literacy | | | | | | | | | 0.097 | 0.131 | 0.460 | 1.102 |
| Pension planning | | | | | | | | | 0.133 | 0.111 | 0.231 | 1.434 |
| Advisor charging | | | | | | | | | -0.145 | 0.112 | 0.196 | 0.865 |
| Withdrawing your pension | | | | | | | | | -0.038 | 0.117 | 0.741 | 0.962 |
| Total perceived score | | | | | 0.014 | 0.134 | 0.914 | 1.015 | 0.014 | 0.135 | 0.920 | 1.014 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.484 | 0.315 | 0.124 | 0.616 | -0.502 | 0.314 | 0.110 | 0.605 | -0.451 | 0.317 | 0.155 | 0.637 |
| Age 51-55 | -0.480 | 0.305 | 0.116 | 0.619 | -0.453 | 0.301 | 0.133 | 0.636 | -0.355 | 0.307 | 0.247 | 0.701 |
| Age 56 - 60 | -0.443 | 0.335 | 0.186 | 0.642 | -0.357 | 0.334 | 0.286 | 0.700 | -0.296 | 0.339 | 0.382 | 0.743 |
| Age 61-65 | -1.127** | 0.469 | 0.016 | 0.324 | -1.068** | 0.469 | 0.023 | 0.344 | -0.954** | 0.475 | 0.045 | 0.385 |
| Age 66-75 | -2.516** | 1.164 | 0.031 | 0.081 | -2.395** | 1.162 | 0.039 | 0.091 | -2.243* | 1.148 | 0.051 | 0.106 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.216 | 0.607 | 0.723 | 1.241 | 0.305 | 0.605 | 0.614 | 1.356 | 0.248 | 0.616 | 0.687 | 1.282 |
| Pot size (£50,000 to £100,000) | -0.475 | 0.614 | 0.439 | 0.622 | -0.345 | 0.611 | 0.572 | 0.708 | -0.312 | 0.615 | 0.612 | 0.732 |
| Pot size (£100,000 to £250,000) | 0.494 | 0.520 | 0.343 | 1.638 | 0.421 | 0.527 | 0.425 | 1.524 | 0.476 | 0.534 | 0.372 | 1.610 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | -0.081 | 0.587 | 0.890 | 1.922 | 0.042 | 0.593 | 0.943 | 1.043 | 0.065 | 0.600 | 0.914 | 1.067 |
| Pot size (over £500,000) | -0.138 | 0.569 | 0.809 | 0.871 | -0.073 | 0.578 | 0.900 | 0.930 | 0.082 | 0.587 | 0.889 | 1.085 |
| Pot size (don't know) | 0.361 | 0.401 | 0.368 | 1.435 | 0.371 | 0.401 | 0.354 | 1.450 | 0.309 | 0.406 | 0.448 | 1.362 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.318 | 0.331 | 0.337 | 0.728 | -0.341 | 0.330 | 0.301 | 0.711 | -0.397 | 0.335 | 0.236 | 0.673 |
| Employment status - self employed | -0.650 | 0.588 | 0.269 | 0.522 | -0.687 | 0.588 | 0.243 | 0.503 | -0.728 | 0.595 | 0.221 | 0.483 |
| Employment status - not working | 0.582 | 0.725 | 0.422 | 1.790 | 0.682 | 0.717 | 0.341 | 1.979 | 0.413 | 0.725 | 0.569 | 1.512 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | -0.236 | 0.235 | 0.314 | 0.789 | -0.302 | 0.234 | 0.196 | 0.739 | -0.245 | 0.235 | 0.297 | 0.782 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.403 | 0.335 | 0.228 | 0.668 | -0.433 | 0.333 | 0.194 | 0.649 | -0.430 | 0.337 | 0.202 | 0.650 |
| Marital status widowed, divorced or separated | 0.768*** | 0.295 | 0.009 | 2.156 | 0.739** | 0.294 | 0.012 | 2.094 | 0.693** | 0.297 | 0.020 | 2.000 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.832* | 0.424 | 0.050 | 2.299 | 0.772* | 0.421 | 0.067 | 2.164 | 0.673 | 0.425 | 0.113 | 1.960 |
| Income £40,000 to £60,000 | 0.813* | 0.454 | 0.073 | 2.254 | 0.698 | 0.449 | 0.120 | 2.010 | 0.502 | 0.461 | 0.276 | 1.653 |
| Income over £60,000 | 0.972* | 0.499 | 0.051 | 2.644 | 0.905* | 0.495 | 0.068 | 2.472 | 0.655 | 0.514 | 0.203 | 1.924 |

*n* = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 73 *Results of Logistic Regression with Control Variables – Outcome variable: Advice from Government Sources*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.220** | 0.546 | 0.026 | 0.295 | -0.957* | 0.534 | 0.073 | 0.384 | -0.937* | 0.540 | 0.083 | 0.392 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.181 | 0.341 | 0.596 | 1.198 | | | | | | | | |
| Combined groups high perceived low actual | 0.141 | 0.342 | 0.680 | 1.151 | | | | | | | | |
| Combined groups high perceived high actual | 0.520* | 0.309 | 0.092 | 1.682 | | | | | | | | |
| Total weighted score | | | | | 0.253* | 0.134 | 0.059 | 1.288 | | | | |
| Financial literacy | | | | | | | | | 0.143 | 0.128 | 0.267 | 1.153 |
| Pension literacy | | | | | | | | | 0.231* | 0.131 | 0.077 | 1.260 |
| Pension planning | | | | | | | | | 0.054 | 0.112 | 0.628 | 1.056 |
| Advisor charging | | | | | | | | | -0.157 | 0.112 | 0.161 | 0.855 |
| Withdrawing your pension | | | | | | | | | -0.008 | 0.117 | 0.948 | 0.992 |
| Total perceived score | | | | | -0.098 | 0.134 | 0.466 | 0.907 | -0.103 | 0.135 | 0.447 | 0.903 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.694** | 0.342 | 0.043 | 0.497 | -0.699** | 0.343 | 0.041 | 0.497 | -0.657* | 0.344 | 0.056 | 0.518 |
| Age 51-55 | -0.327 | 0.311 | 0.294 | 0.721 | -0.309 | 0.309 | 0.317 | 0.734 | -0.253 | 0.313 | 0.420 | 0.777 |
| Age 56 - 60 | -0.073 | 0.333 | 0.826 | 0.930 | 0.007 | 0.334 | 0.983 | 1.007 | 0.033 | 0.339 | 0.923 | 1.033 |
| Age 61-65 | -0.197 | 0.424 | 0.643 | 0.822 | -0.117 | 0.424 | 0.783 | 0.890 | -0.096 | 0.430 | 0.824 | 0.909 |
| Age 66-75 | 0.567 | 0.726 | 0.549 | 1.764 | 0.615 | 0.725 | 0.392 | 1.849 | 0.690 | 0.728 | 0.348 | 1.993 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.128 | 0.586 | 0.827 | 1.137 | 0.218 | 0.584 | 0.710 | 1.243 | 0.258 | 0.595 | 0.664 | 1.295 |
| Pot size (£50,000 to £100,000) | -0.150 | 0.556 | 0.787 | 0.861 | -0.061 | 0.554 | 0.912 | 0.940 | -0.060 | 0.559 | 0.914 | 0.942 |
| Pot size (£100,000 to £250,000) | 0.432 | 0.494 | 0.382 | 1.540 | 0.415 | 0.500 | 0.407 | 1.515 | 0.403 | 0.503 | 0.423 | 1.496 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | 0.602 | 0.543 | 0.268 | 1.825 | 0.718 | 0.548 | 0.191 | 2.050 | 0.701 | 0.552 | 0.204 | 2.016 |
| Pot size (over £500,000) | 0.325 | 0.536 | 0.544 | 1.384 | 0.388 | 0.548 | 0.478 | 1.475 | 0.431 | 0.553 | 0.436 | 1.538 |
| Pot size (don't know) | -0.262 | 0.376 | 0.486 | 0.769 | -0.258 | 0.374 | 0.490 | 0.773 | -0.274 | 0.378 | 0.468 | 0.760 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.262 | 0.317 | 0.408 | 0.769 | -0.281 | 0.317 | 0.376 | 0.755 | -0.348 | 0.324 | 0.282 | 0.706 |
| Employment status - self employed | -0.574 | 0.549 | 0.296 | 0.563 | -0.625 | 0.551 | 0.257 | 0.535 | -0.671 | 0.558 | 0.229 | 0.511 |
| Employment status - not working | -0.645 | 0.694 | 0.353 | 0.525 | -0.568 | 0.695 | 0.413 | 0.566 | -0.701 | 0.698 | 0.315 | 0.496 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | -0.127 | 0.236 | 0.591 | 0.881 | -0.178 | 0.237 | 0.451 | 0.837 | -0.128 | 0.239 | 0.592 | 0.880 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.617* | 0.354 | 0.082 | 0.540 | -0.646* | 0.354 | 0.068 | 0.524 | -0.615* | 0.358 | 0.086 | 0.541 |
| Marital status widowed, divorced or separated | 0.146 | 0.299 | 0.625 | 1.157 | 0.112 | 0.300 | 0.709 | 1.118 | 0.087 | 0.302 | 0.772 | 1.091 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.712* | 0.394 | 0.071 | 2.038 | 0.662* | 0.393 | 0.092 | 1.938 | 0.608 | 0.397 | 0.126 | 1.837 |
| Income £40,000 to £60,000 | 0.386 | 0.431 | 0.370 | 1.471 | 0.305 | 0.429 | 0.477 | 1.357 | 0.228 | 0.442 | 0.607 | 1.256 |
| Income over £60,000 | 0.214 | 0.491 | 0.663 | 1.239 | 0.166 | 0.490 | 0.735 | 1.181 | 0.040 | 0.508 | 0.938 | 1.040 |

$n$ = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

Table 74 *Results of Logistic Regression with control variables – Outcome variable: Advice from Friends and Family*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.460*** | 0.522 | 0.005 | 0.232 | -1.367*** | 0.513 | 0.008 | 0.255 | -1.260** | 0.518 | 0.015 | 0.284 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.056 | 0.316 | 0.859 | 1.058 | | | | | | | | |
| Combined groups high perceived low actual | 0.127 | 0.320 | 0.690 | 1.136 | | | | | | | | |
| Combined groups high perceived high actual | 0.303 | 0.299 | 0.310 | 1.354 | | | | | | | | |
| Total weighted score | | | | | 0.120 | 0.129 | 0.352 | 1.127 | | | | |
| Financial literacy | | | | | | | | | 0.172 | 0.122 | 0.159 | 1.188 |
| Pension literacy | | | | | | | | | -0.088 | 0.128 | 0.493 | 0.916 |
| Pension planning | | | | | | | | | 0.168 | 0.108 | 0.119 | 1.183 |
| Advisor charging | | | | | | | | | -0.009 | 0.108 | 0.936 | 0.991 |
| Withdrawing your pension | | | | | | | | | -0.033 | 0.112 | 0.768 | 0.967 |
| Total perceived score | | | | | -0.126 | 0.130 | 0.330 | 0.881 | -0.143 | 0.044 | 0.320 | 0.957 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.606** | 0.299 | 0.043 | 0.546 | -0.610** | 0.299 | 0.041 | 0.543 | -0.590* | 0.301 | 0.050 | 0.554 |
| Age 51-55 | -0.798*** | 0.299 | 0.008 | 0.450 | -0.768*** | 0.296 | 0.009 | 0.464 | -0.725** | 0.301 | 0.016 | 0.484 |
| Age 56 - 60 | -0.571 | 0.316 | 0.071 | 0.565 | -0.488 | 0.317 | 0.124 | 0.614 | -0.444 | 0.322 | 0.168 | 0.642 |
| Age 61-65 | -1.238*** | 0.466 | 0.008 | 0.290 | -1.163** | 0.466 | 0.013 | 0.313 | -1.017** | 0.474 | 0.032 | 0.362 |
| Age 66-75 | -2.219** | 1.122 | 0.048 | 0.109 | -2.137* | 1.120 | 0.056 | 0.118 | -2.106* | 1.118 | 0.060 | 0.122 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | -0.473 | 0.623 | 0.448 | 0.623 | -0.323 | 0.621 | 0.603 | 0.724 | -0.451 | 0.630 | 0.475 | 0.637 |
| Pot size (£50,000 to £100,000) | -0.452 | 0.556 | 0.417 | 0.636 | -0.288 | 0.553 | 0.602 | 0.750 | -0.330 | 0.561 | 0.557 | 0.719 |
| Pot size (£100,000 to £250,000) | -0.223 | 0.506 | 0.659 | 0.800 | -0.163 | 0.513 | 0.750 | 0.849 | -0.159 | 0.517 | 0.758 | 0.853 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | 0.363 | 0.544 | 0.504 | 1.438 | 0.559 | 0.548 | 0.308 | 1.749 | 0.555 | 0.552 | 0.315 | 1.741 |
| Pot size (over £500,000) | -0.284 | 0.561 | 0.613 | 0.753 | -0.108 | 0.570 | 0.850 | 0.898 | -0.015 | 0.576 | 0.979 | 0.985 |
| Pot size (don't know) | 0.081 | 0.358 | 0.820 | 1.085 | 0.122 | 0.357 | 0.733 | 1.129 | 0.016 | 0.363 | 0.965 | 1.016 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | 0.361 | 0.298 | 0.226 | 1.435 | 0.372 | 0.299 | 0.213 | 1.450 | 0.347 | 0.302 | 0.250 | 1.414 |
| Employment status - self employed | -0.844 | 0.646 | 0.191 | 0.430 | -0.896 | 0.647 | 0.166 | 0.408 | -0.960 | 0.652 | 0.141 | 0.383 |
| Employment status - not working | 0.401 | 0.745 | 0.590 | 1.494 | 0.465 | 0.747 | 0.534 | 1.592 | 0.309 | 0.759 | 0.684 | 1.363 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | 0.558** | 0.233 | 0.017 | 1.748 | 0.485** | 0.233 | 0.037 | 1.624 | 0.519** | 0.235 | 0.027 | 1.681 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.096 | 0.303 | 0.750 | 0.908 | -0.131 | 0.304 | 0.666 | 0.877 | -0.172 | 0.309 | 0.578 | 0.842 |
| Marital status widowed, divorced or separated | 0.178 | 0.296 | 0.548 | 1.195 | 0.148 | 0.297 | 0.619 | 1.159 | 0.106 | 0.299 | 0.722 | 1.112 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.538 | 0.374 | 0.150 | 1.713 | 0.522 | 0.374 | 0.163 | 1.685 | 0.473 | 0.380 | 0.213 | 1.605 |
| Income £40,000 to £60,000 | 0.947** | 0.409 | 0.021 | 2.578 | 0.906** | 0.408 | 0.026 | 2.473 | 0.769* | 0.421 | 0.068 | 2.157 |
| Income over £60,000 | 0.895* | 0.465 | 0.054 | 2.447 | 0.883* | 0.465 | 0.058 | 2.417 | 0.729 | 0.480 | 0.129 | 2.073 |

$n$ = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

*Table 75 Results of Logistic Regression with Control Variables – Outcome variable: Advice from Employer*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -0.813 | 0.513 | 0.113 | 0.444 | -0.675 | 0.503 | 0.180 | 0.509 | -0.727 | 0.511 | 0.155 | 0.483 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | -0.171 | 0.324 | 0.598 | 0.843 | | | | | | | | |
| Combined groups high perceived low actual | 0.453 | 0.311 | 0.145 | 1.573 | | | | | | | | |
| Combined groups high perceived high actual | 0.258 | 0.295 | 0.381 | 1.295 | | | | | | | | |
| Total weighted score | | | | | -0.062 | 0.125 | 0.620 | 0.940 | | | | |
| Financial literacy | | | | | | | | | -0.212* | 0.119 | 0.074 | 0.809 |
| Pension literacy | | | | | | | | | 0.039 | 0.129 | 0.761 | 1.040 |
| Pension planning | | | | | | | | | 0.119 | 0.108 | 0.272 | 1.126 |
| Advisor charging | | | | | | | | | -0.112 | 0.109 | 0.302 | 0.894 |
| Withdrawing your pension | | | | | | | | | 0.112 | 0.114 | 0.326 | 1.118 |
| Total perceived score | | | | | 0.121 | 0.130 | 0.353 | 1.129 | 0.134 | 0.132 | 0.308 | 1.143 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.067 | 0.304 | 0.826 | 0.935 | -0.082 | 0.303 | 0.786 | 0.921 | -0.094 | 0.306 | 0.758 | 0.910 |
| Age 51-55 | -0.023 | 0.297 | 0.938 | 0.977 | -0.027 | 0.293 | 0.928 | 0.974 | -0.100 | 0.300 | 0.739 | 0.905 |
| Age 56 - 60 | 0.074 | 0.326 | 0.821 | 1.077 | 0.086 | 0.326 | 0.792 | 1.090 | 0.018 | 0.332 | 0.957 | 1.018 |
| Age 61-65 | -0.066 | 0.435 | 0.879 | 0.936 | -0.088 | 0.434 | 0.840 | 0.916 | -0.106 | 0.439 | 0.810 | 0.900 |
| Age 66-75 | -1.586 | 1.113 | 0.154 | 0.205 | -1.571 | 1.112 | 0.158 | 0.208 | -1.509 | 1.107 | 0.173 | 0.221 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | -0.774 | 0.589 | 0.189 | 0.461 | -0.694 | 0.588 | 0.238 | 0.499 | -0.752 | 0.601 | 0.210 | 0.471 |
| Pot size (£50,000 to £100,000) | -0.230 | 0.510 | 0.653 | 0.795 | -0.104 | 0.506 | 0.837 | 0.901 | -0.189 | 0.512 | 0.712 | 0.828 |
| Pot size (£100,000 to £250,000) | -1.159** | 0.527 | 0.028 | 0.314 | -1.153** | 0.532 | 0.030 | 0.316 | -1.212** | 0.536 | 0.024 | 0.298 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pot size (over £250,000) | -1.184** | 0.579 | 0.041 | 0.306 | -1.066* | 0.579 | 0.066 | 0.344 | -1.149** | 0.585 | 0.049 | 0.317 |
| Pot size (over £500,000) | -1.722*** | 0.599 | 0.004 | 0.179 | -1.636*** | 0.607 | 0.007 | 0.195 | -1.721*** | 0.616 | 0.005 | 0.179 |
| Pot size (don't know) | -0.442 | 0.345 | 0.200 | 0.643 | -0.403 | 0.343 | 0.240 | 0.668 | -0.418 | 0.348 | 0.230 | 0.658 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.274 | 0.314 | 0.383 | 0.760 | -0.254 | 0.314 | 0.418 | 0.776 | -0.229 | 0.317 | 0.470 | 0.795 |
| Employment status - self employed | -2.555** | 1.041 | 0.014 | 0.078 | -2.575** | 1.042 | 0.013 | 0.076 | -2.674** | 1.047 | 0.011 | 0.069 |
| Employment status - not working | -0.461 | 0.747 | 0.537 | 0.631 | -0.435 | 0.746 | 0.560 | 0.647 | -0.355 | 0.749 | 0.636 | 0.701 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | -0.318 | 0.229 | 0.164 | 0.728 | -0.358 | 0.228 | 0.116 | 0.699 | -0.374 | 0.231 | 0.105 | 0.688 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | -0.123 | 0.295 | 0.678 | 0.885 | -0.119 | 0.295 | 0.687 | 0.888 | -0.056 | 0.301 | 0.853 | 0.946 |
| Marital status widowed, divorced or separated | -0.032 | 0.307 | 0.917 | 0.968 | -0.032 | 0.307 | 0.916 | 0.968 | -0.055 | 0.309 | 0.860 | 0.947 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.790** | 0.383 | 0.039 | 2.203 | 0.778** | 0.382 | 0.042 | 2.177 | 0.856** | 0.389 | 0.028 | 2.354 |
| Income £40,000 to £60,000 | 0.890** | 0.418 | 0.033 | 2.436 | 0.847** | 0.416 | 0.042 | 2.332 | 1.102** | 0.434 | 0.020 | 2.751 |
| Income over £60,000 | 0.806* | 0.481 | 0.094 | 2.238 | 0.758 | 0.480 | 0.114 | 2.134 | 0.923* | 0.501 | 0.065 | 2.517 |

*n* = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

# Appendix 8 – Pension Literacy and Retirement Planning – Stage One Regressions with Main Predictor Variables

Note: The shaded areas are included to provide full results from each of the three regressions. However, they are not discussed in the text. They provide additional assurance of the significant variables when different measures of actual and perceived pension literacy were used as predictors.

Table 76 *Results of Logistic Regression Main Predictors only – Outcome variable: Have you ever tried to work out your income in retirement (Q4)?*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -1.043*** | 0.166 | 0.000 | 0.353 | -0.220** | 0.093 | 0.017 | 0.802 | -0.220** | 0.093 | 0.018 | 0.802 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.479* | 0.274 | 0.081 | 1.614 | | | | | | | | |
| Combined groups high perceived low actual | 1.023*** | 0.259 | 0.000 | 2.781 | | | | | | | | |
| Combined groups high perceived high actual | 1.776*** | 0.228 | 0.000 | 5.906 | | | | | | | | |
| Total weighted score | | | | | 0.270** | 0.106 | 0.011 | 1.311 | | | | |
| Financial literacy | | | | | | | | | 0.163 | 0.104 | 0.177 | 1.177 |
| Pension literacy | | | | | | | | | 0.213** | 0.106 | 0.044 | 1.238 |
| Pension planning | | | | | | | | | -0.066 | 0.095 | 0.487 | 0.936 |
| Advisor charging | | | | | | | | | -0.037 | 0.095 | 0.702 | 0.964 |
| Withdrawing your pension | | | | | | | | | 0.117 | 0.097 | 0.229 | 1.124 |
| Total perceived score | | | | | 0.776*** | 0.111 | 0.000 | 2.173 | 0.760*** | 0.111 | 0.000 | 2.138 |

*n* = 568. Excludes 'refuse to answer' responses.

# Appendix 9 – Pension Literacy and Retirement Planning – Stage One Regressions with Control Variables

Note: The shaded areas are included to provide full results from each of the three regressions. However, they are not discussed in the text. They provide additional assurance of the significant variables when different measures of actual and perceived pension literacy were used as predictors.

Table 77 *Results of Logistic Regression with Control Variables – Outcome variable: Have you ever tried to work out your income in retirement (Q4)?*

| Variables | Groups | | | | Weighted score/Perceived | | | | Components from PCA/Perceived | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | SE | P value | Odds | B | SE | P value | Odds | B | SE | P value | Odds Ratio |
| Constant | -2.112*** | 0.546 | 0.000 | 0.121 | -1.499*** | 0.532 | 0.005 | 0.2239 | -1.504*** | 0.538 | 0.005 | 0.222 |
| Combined groups (reference low low) | | | | | | | | | | | | |
| Combined groups Low perceived high actual | 0.020 | 0.329 | 0.951 | 1.020 | | | | | | | | |
| Combined groups high perceived low actual | 0.664** | 0.317 | 0.036 | 1.943 | | | | | | | | |
| Combined groups high perceived high actual | 0.926*** | 0.298 | 0.002 | 2.524 | | | | | | | | |
| Total weighted score | | | | | 0.053 | 0.130 | 0.685 | 1.054 | | | | |
| Financial literacy | | | | | | | | | 0.042 | 0.125 | 0.734 | 1.043 |
| Pension literacy | | | | | | | | | 0.065 | 0.130 | 0.615 | 1.068 |
| Pension planning | | | | | | | | | -0.037 | 0.113 | 0.742 | 0.963 |
| Advisor charging | | | | | | | | | -0.109 | 0.114 | 0.338 | 0.897 |
| Withdrawing your pension | | | | | | | | | 0.118 | 0.116 | 0.307 | 1.127 |
| Total perceived score | | | | | 0.626*** | 0.140 | 0.000 | 1.870 | 0.620*** | 0.140 | 0.000 | 1.859 |
| Age (reference 40-45) | | | | | | | | | | | | |
| Age 46-50 | -0.408 | 0.331 | 0.217 | 0.665 | -0.486 | 0.339 | 0.151 | 0.615 | -0.474 | 0.341 | 0.165 | 0.623 |
| Age 51-55 | 0.438 | 0.306 | 0.152 | 1.550 | 0.406 | 0.308 | 0.188 | 1.501 | 0.425 | 0.314 | 0.176 | 1.529 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age 56 - 60 | 0.596* | 0.334 | 0.074 | 1.815 | 0.488 | 0.340 | 0.151 | 1.630 | 0.465 | 0.344 | 0.176 | 1.592 |
| Age 61-65 | 1.953*** | 0.453 | 0.000 | 7.052 | 1.826*** | 0.455 | 0.000 | 6.209 | 1.776*** | 0.462 | 0.000 | 5.904 |
| Age 66-75 | 1.925** | 0.826 | 0.020 | 6.854 | 1.797** | 0.839 | 0.032 | 6.033 | 1.811** | 0.824 | 0.028 | 6.114 |
| Pension pot size (reference under 30k) | | | | | | | | | | | | |
| Pot size (£30,000 to £50,000) | 0.631 | 0.571 | 0.269 | 1.880 | 0.416 | 0.573 | 0.468 | 1.516 | 0.376 | 0.583 | 0.518 | 1.457 |
| Pot size (£50,000 to £100,000) | 0.330 | 0.520 | 0.526 | 1.391 | 0.146 | 0.524 | 0.787 | 1.157 | 0.100 | 0.530 | 0.580 | 1.105 |
| Pot size (£100,000 to £250,000) | 1.147** | 0.503 | 0.023 | 3.149 | 0.869* | 0.510 | 0.088 | 2.383 | 0.826 | 0.511 | 0.106 | 2.285 |
| Pot size (over £250,000) | 1.924*** | 0.639 | 0.003 | 6.850 | 1.615** | 0.642 | 0.012 | 5.030 | 1.580** | 0.647 | 0.015 | 4.857 |
| Pot size (over £500,000) | 1.668*** | 0.611 | 0.006 | 5.304 | 1.379** | 0.627 | 0.028 | 3.971 | 1.279** | 0.632 | 0.043 | 3.595 |
| Pot size (don't know) | -0.114 | 0.375 | 0.760 | 0.892 | -0.202 | 0.378 | 0.594 | 0.817 | -0.214 | 0.383 | 0.576 | 0.807 |
| Employment status (reference employed FT) | | | | | | | | | | | | |
| Employment status - employed part time | -0.357 | 0.322 | 0.267 | 0.700 | -0.453 | 0.329 | 0.169 | 0.636 | -0.436 | 0.330 | 0.184 | 0.645 |
| Employment status - self employed | 0.456 | 0.523 | 0.384 | 1.577 | 0.527 | 0.533 | 0.323 | 1.693 | 0.581 | 0.545 | 0.286 | 1.788 |
| Employment status - not working | -0.767 | 0.672 | 0.254 | 0.465 | -0.840 | 0.681 | 0.218 | 0.432 | -0.830 | 0.682 | 0.224 | 0.436 |
| Gender (reference male) | | | | | | | | | | | | |
| Gender female | 0.232 | 0.238 | 0.328 | 1.262 | 0.316 | 0.240 | 0.187 | 1.372 | 0.316 | 0.243 | 0.193 | 1.372 |
| Marital status (reference married) | | | | | | | | | | | | |
| Marital status single | 0.038 | 0.315 | 0.904 | 1.039 | 0.078 | 0.319 | 0.807 | 1.081 | 0.113 | 0.322 | 0.727 | 1.119 |
| Marital status widowed, divorced or separated | 0.146 | 0.301 | 0.629 | 1.157 | 0.223 | 0.304 | 0.463 | 1.250 | 0.197 | 0.307 | 0.521 | 1.218 |
| Income (reference under £20,000 pa) | | | | | | | | | | | | |
| Income £20,000 to £40,000 | 0.514 | 0.363 | 0.156 | 1.673 | 0.472 | 0.369 | 0.200 | 1.604 | 0.475 | 0.371 | 0.200 | 1.608 |
| Income £40,000 to £60,000 | 0.941** | 0.400 | 0.019 | 2.563 | 0.875** | 0.405 | 0.031 | 2.400 | 0.913** | 0.417 | 0.029 | 2.493 |
| Income over £60,000 | 0.942** | 0.467 | 0.044 | 2.564 | 0.821* | 0.474 | 0.083 | 2.272 | 0.854* | 0.488 | 0.080 | 2.349 |

$n$ = 504. Excluded participants who responded 'refuse to answer' to demographic questions.

# Appendix 10 – Stage Two Regressions – Building the Models

The initial models were built hierarchically using the results from the stage one regressions to inform the order in which the variables were entered. Therefore, actual and perceived pension literacy, the main theoretical variables of interest, were entered into block one, the statistically significant variables from stage one were entered into block two, finally, the non-significant variables from stage one were entered into block three[179]. By examining the improvement of the deviance statistic (2LL) for significance, the variables to be included in the final models were determined. The relevant model statistics are shown in Table 79 (below).

Seeking Financial Advice

The relevant statistics for the model to determine the odds of seeking financial advice are shown in Table 78.

Table 78 *Model Statistics – Intention to seek Financial Advice*

| Statistic | Block 0 | Block 1 | Block 2 | Block 3 |
|---|---|---|---|---|
| Variables | Intercept | ACT_TOT PER_TOT | GEN, INC, PS, ES | AGE, MS |
| Deviance (2LL) | 415.28 | 405.66 | 360.91 | 356.71 |
| Classification | 63.7% | 64.0% | 73.2% | 71.0% |
| Chi-sq. (*df*), *p* | N/A | 9.61 (2), $p = 0.008$ | 44.75 (13), $p < .001$ | 4.20 (3), $p = 0.757$ |
| Homer-Lemeshow | N/A | 0.107 | 0.336 | 0.447 |
| Nagelkerke $R^2$ | N/A | 0.041 | 0.216 | 0.231 |

The raw actual and perceived scores were used instead of standardised scores to enable the model to be used more easily[180]. The addition of marital status and age in block

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[179] The omitted categories for gender and employment status were changed from the stage one regressions. The omitted reference categories were revised to 'female' and 'not working'.

[180] The raw weighted score and the total perceived literacy scores can be input into the model without further manipulation. Although the scores were standardised in stage one for ease of interpretation, using raw scores did not impact the model at all, apart from changing the *β* coefficients and odds ratios for these two variables only. All other aspects of the model were unchanged.

three did not significantly improve the model. Therefore, in the interests of parsimony, only the predictors in blocks one and two were included in the final model[181].

The regression was repeated, using blocks one and two only (Field, 2013). The revised statistics are shown in Table 79 (below). Homer and Lemeshow's statistic was non-significant ($p$ = 0.235), indicating a good fit. The classification table indicated an improvement to 73.6% and the Nagelkerke $R^2$ was 0.222.

Table 79 *Final Model Statistics*

|  | Intercept only model | Block 1 | Block 2 Final Model |
|---|---|---|---|
| Deviance (2LL) | 420.89 | 410.96 | 364.15 |
| Chi-squared (*df*) /*p* value (sig) | N/A | 9.93 (2), $p$ = <.007 | 46.82 (13), $p$<.001 |
| Homer-Lemeshow | N/A | 0.295 | 0.235 |
| Nagelkerke $R^2$ | N/A | 0.042 | 0.222 |
| Classification table (correct %) | 64.0% | 64.9% | 73.6% |

Interaction Term

The interaction term between actual and perceived pension literacy was added to the model to see if this would further improve it. This however, was non-significant ($p$ = 0.834), therefore, removed in the interests of parsimony.

Principal Components

The replacement of actual pension literacy with the five principal components from the PCA was considered. However, the Homer-Lemeshow test was highly significant ($p$ <.001) showing this model to have a poor fit. Unfortunately, a weakness of the Homer-Lemeshow test is that it does not indicate why this is the case (Peng & Tak-Shing, 2002).

Consideration took place as to whether to add the five continuous variables representing the five sets of component scores (C1_FL, C2_PL, C3_PP, C4_AC, and C5_WP) to the regression. However, as the components represented different elements of pension literacy, this would be double-counting, therefore could breach the

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[181] The variables of age and marital status were also added to the model individually to see if they improved the model by so doing so. However, this was not the case.

assumption of multi-collinearity. To test whether this was the case, an additional variable representing the total of all five PCA component scores was computed (PCA_TOT). The following regression was then performed and the residuals saved as a continuous variable in SPSS:

$$PCA\_TOT = \alpha + \beta \, ACT\_TOT + \varepsilon$$

By running this regression and obtaining ε, it can be said that ε is a part of PCA not explained by ACT_TOT. It is orthogonal to ACT_TOT. I.e. it is unrelated.

Therefore, the residual term (ε) only was added to the logistic regression (in addition to the ACT_TOT) but was found to be non-significant. Therefore, ACT_TOT only was retained in the interests of parsimony.

Planning for Retirement

The relevant statistics of the planning for retirement model are shown in Table 80.

Table 80 *Model Statistics – Planning for Retirement*

| Statistic | Block 0 | Block 1 | Block 2 | Block 3 |
|---|---|---|---|---|
| Variables | Intercept | ACT_TOT PER_TOT | INC, PS, AGE | GEN, MS, ES |
| Deviance (2LL) | 690.54 | 604.86 | 542.53 | 536.43 |
| Classification | 56.3% | 68.3% | 72.2% | 74.0% |
| Chi-sq. (*df*), *p* | N/A | 85.69 (2), $p = <.001$ | 62.33 (14), $p <.001$ | 6.11 (6) $p = 0.412$ |
| Homer-Lemeshow | N/A | 0.867 | 0.809 | 0.898 |
| Nagelkerke $R^2$ | N/A | 0.210 | 0.341 | 0.353 |

Block three, as expected, did not significantly improve the model[182] therefore the variables in blocks one and two were selected for the final model in the interests of parsimony. The regression was repeated, including only the variables in blocks one and two (Field, 2013). Upon addition of the control variables, the variable for actual literacy (ACT_TOT) was no longer significant. However, this was a main variable of interest and its removal did not impact the *β* coefficients of the other variables.

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[182] The variables in block 3 were also added to the model individually to check that none caused an improvement to the model. However, all were non-significant.

Therefore, it was retained in the model (Hosmer & Lemeshow, 2013). The final model statistics are shown in Table 81 (below).

Table 81 *Final Model Statistics – SPSS Output*

| Statistic | Block 0 | Block 1 | Block 2 Final Model |
|---|---|---|---|
| Variables | Intercept | ACT_TOT PER_TOT | INC, PS, AGE |
| Deviance (2LL) | 709.02 | 623.71 | 559.98 |
| Classification | 56.1% | 67.3% | 72.5% |
| Chi-sq. (*df*), *p* | N/A | 85.31 (2), *p* = <.001 | 63.72 (14), *p* <.001 |
| Homer-Lemeshow | N/A | 0.730 | 0.681 |
| Nagelkerke $R^2$ | N/A | 0.204 | 0.336 |

Interaction Term

The interaction term between actual and perceived pension literacy was added to the model to see if this would further improve it. It was non-significant ($p = 0.231$), therefore, removed in the interests of parsimony.

Principal Components

In the same way as described above, the residual term ($\varepsilon$) was seen to represent that part of the component total (PCA_TOT) not explained by actual literacy (ACT_TOT). Therefore, the residual term was added to the final model (in addition to ACT_TOT) but found to be non-significant. Therefore, only ACT_TOT was included in the final model.

Model Residuals and Diagnostic Tests

Table 82 and Table 83 (below) show the tests performed on the residuals of the models. All were satisfactory.

Table 82 *Diagnostic Tests - Seeking Financial Advice Model*

| Residual | Criteria | Result |
|---|---|---|
| Cook's distance | All cases should be <1 | Min 0.0067<br>Max 0.62436 |
| Leverage | Values should be no more than 3 times expected leverage of 15+1/322[183] | 4 cases only |
| Standardised and normalised residuals | No more than 5% of cases have absolute values greater than 2 | Standardised 6 cases > 2<br>Normalised 13 cases > 2 |
| DF Betas | No values greater than 1 | No values > 1 |

Table 83 *Diagnostic tests – Retirement Planning Model*

| Residual | Criteria | Result |
|---|---|---|
| Cook's distance | All cases should be <1 | Min 0.00020<br>Max 0.64939 |
| Leverage | Values should be no more than 3 times expected leverage of 16+1/517 | 7 cases only |
| Standardised and normalised residuals | No more than 5% of cases have absolute values greater than 2 | Standardised 8 cases > 2<br>Normalised 8 cases > 2 |
| DF Betas | No values greater than 1 | No values > 1 |

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[183] This is the number of predictors + 1 /sample size (Field, 2013)

# Glossary of Terms

| | |
|---|---|
| Accumulation | In respect of pensions, this is the process by which a pension entitlement is built up through contributions prior to retirement. |
| Annuity | A fixed sum of money paid out regularly for life or a set period. |
| Decummulation | In respect of pensions, this is the process of converting a pension fund into income for retirement. |
| Defined Benefit Pension | Pension scheme where an employer pays a pension and lump sum on retirement that is predetermined based on the employee's years of service, age and earnings history. |
| Defined Contribution Pension | Pension scheme where contributions are invested and the proceeds used to buy a pension or other pension product at retirement. |
| Financial Advice Gap | Term used to describe the gap between individuals who need advice in relation to pensions and other aspects of personal finance and those who seek it. The financial advice gap was the subject of the Financial Advice Market Review conducted by the FCA in 2016. |
| Financial Advice market Review | FCA review of the financial advice market conducted in 2016. |
| Financial Conduct Authority | Regulator for financial services in the U.K. |
| Financial Services Authority | Agency that regulated financial services in the U.K between 2001 and 20136. |
| Guidance Guarantee | Free and impartial pensions guidance under the brand 'Pension Wise' |
| Investment Pathways | FCA initiative to provide retirees with alternative investment options upon retirement according to their preferred level of risk and preference. Aimed |

| | |
|---|---|
| | to prevent retirees taking the 'path of least resistance' |
| Occupational Pensions | A pension scheme provided by an employer. They could be DC or DB schemes and employers and employees contribute during accumulation phase. |
| Pension Freedoms | Term used to describe the tax rules introduced in 2015 permitting people greater access to their pensions. |
| Pensions Regulator | Public body that protects workplace pensions in the U.K and other bodies that operate pensions on behalf of individuals in the U.K. |
| Pension Wise | Brand for the free guidance provided under the guidance guarantee. |
| Personal Pensions | Pensions not provided by the state. |
| Principal Components Analysis | Statistical procedure that transforms (possibly) correlated variables into a smaller number of uncorrelated variables called principal components. |
| Private Pensions | Defined Contribution schemes set up by either an individual or an employer in their behalf. All defined contribution schemes. |
| 401(k) Schemes | U.S retirement savings scheme sponsored by an employer. Employees save and invest contributions and taxes are paid when money is taken out. |
| Single Financial Guidance Body | Replaced from 1 Jan 2019 he three providers of government sponsored guidance. These were the Money Advice Service, Pension Wise and the Pensions Advisory Service. |
| Workplace Pensions | A pension arranged by the employer – now under Auto-enrolment. |

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