Mental Health and Wellbeing: Associations with Religion Across the Life Course

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Declaration of authorship

I, Aradhna Kaushal, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Impact Statement

The research presented in this thesis is original: It is the first study to examine associations between religiosity, and mental health and wellbeing in the UK. The findings suggest that frequent religious attendance could be a successful coping mechanism for poor mental health and that religiosity may buffer the negative effects of stressful life events on mental health and wellbeing. This has opened up avenues for future research such as cross-cohort analyses and the application of the methodology to other health outcomes.

The findings of this research are particularly important in light of the UK becoming a progressively secularised country and the increasing prevalence of common mental disorders in the UK over the past 30 years. For people who are actively religious, this thesis highlights a potential role for religious institutions to offer formal psychological support, e.g. using religiosity integrated cognitive behavioural therapy. By conducting research to further understand the mechanisms of how religion impacts mental health and wellbeing, it may also be possible to identify targets for social and psychological interventions.

Dissemination of this research is ongoing and has already been achieved in several ways. The main findings of this thesis have been disseminated at 10 conferences between 2014 and 2018, either as oral or poster presentations. These findings will also be published in peer-reviewed journals in the next year. In 2017, this project was part of a public engagement project at the Green Man Festival. During this three-day event, over 500 festival-goers took part in an activity to introduce them to the concepts and challenges of life course research, including the role of religiosity in mental health and wellbeing.

Abstract

Previous research studies have reported benefits of religious practices and beliefs for a range of health outcomes, including mental health and wellbeing. However, most of the research on religion and health is cross-sectional and based on populations from the USA. Therefore, there is a need for evidence from populations outside the USA to assess the external generalisability of these associations. This thesis investigated longitudinal associations between religiosity, and the outcomes of mental health and wellbeing, using data from the Medical Research Council (MRC) National Survey for Health and Development (NSHD). This unique longitudinal data set following the participants from birth was used to investigate 1) the patterns and trends of religiosity across the life course 2) whether religiosity is associated with mental health and wellbeing 3) the role of psychological, social and lifestyle factors on religiosity, and mental health and wellbeing, and 4) whether religiosity moderates the impact of stressful life events on mental health and wellbeing. Associations were tested using regression models, auto-regressive cross-lagged models and interaction terms. A general decline in religious attendance and beliefs across the life course was observed and frequent religious attendance was associated with higher wellbeing scores. Evidence for bi-directional associations between religiosity and mental health was found, but not for wellbeing. Analysis of psychological, social factors and lifestyle factors identified agreeableness, mastery and social support as important factors in associations between religiosity, and mental health and wellbeing. Some aspects of religious beliefs and practices were found to moderate the association between stressful life events, and mental health and wellbeing. There is limited evidence of direct benefits of religiosity for mental health and wellbeing. However, it is possible that religiosity is used as a coping mechanism in response to stressful life events and to some extent buffers their deleterious impact on mental health and wellbeing.

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Contents

List of tables

List of figures

1 Introduction

1.1 Population ageing and health

Older individuals face particular challenges in later life, including an increased risk of various age-associated medical conditions, social isolation, fewer chances to participate in society and difficulty living independently. By 2038, 1 in 12 people will be over the age of 80, almost double the number in 2014 (Office for National Statistics 2015a). Considering this projected increase in life expectancy and the additional needs for health care, ageing is set to be the next global public health challenge (Prince et al. 2015, Suzman et al. 2015).

Historically, religious institutions have played significant social, economic and political roles in the UK. These institutions have been important during key stages of life such as births, marriages and deaths in addition to providing comfort, support and guidance in times of grief (Turner 2016). Furthermore, religious institutions have been responsible for the establishment and operation of hospitals and palliative care (Koenig et al. 2012a). As the UK becomes increasingly secularised, it is important to consider the possible implications for health and wellbeing, particularly in older age. This is an area of research which has received very little attention in the UK.

This chapter will first introduce the main concepts of mental health and wellbeing investigated in the thesis. Second, the research into religiosity and mental health and wellbeing are outlined, and potential pathways through which religiosity is related to mental health and wellbeing are discussed. Third, a life course approach to religiosity in relation to mental health and wellbeing is described, with a review of the current literature and a presentation of the gaps in the evidence. Finally, the aims, objectives and conceptual model for the thesis are described.

1.2 Mental health and wellbeing in an ageing population

Healthy ageing requires an optimal level of mental wellbeing, a high degree of social and mental capital as well good physical health (Argen 2006, Foresight Mental Capital and Wellbeing Project 2008). Therefore, identifying factors that can predict healthy ageing is an important and imperative area of research.

Mental health and wellbeing

Mental health problems are common, affecting 1 in 4 people in the UK (McManus et al. 2007). The most common mental illness is depression which affects approximately 1 in 6 people, and 1 in 5 people over the age of 65 (Singleton et al. 2003). Experiencing mental health difficulties can be accompanied by personal suffering, stigma, and difficulties engaging with society, as well as being less likely to be employed, being more likely to have poor physical health and having a lower life expectancy (World Health Organization 2012). Mental health is estimated to cost around £22.5 billion a year in health services, and £28 billion in lost earnings and these costs are expected to increase by 45% by 2026 (McCrone et al. 2008).

Mental health problems are defined and diagnosed using the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders (5th edition) criteria or the International Classification of Disease (ICD) criteria (Kupfer and Regier 2010, World Health Organization 1992). Common Mental Disorder is a term used to describe symptoms of depression and anxiety which are different aspects of underlying vulnerability. As the name implies, Common Mental Disorders are the most common mental disorder in the UK (Mental Health Foundation 2015). Depression is characterised by a persistent low mood that is not easily raised by positive life events, a lack of interest and pleasure in activities that would typically be pleasurable, fatigue, low self-esteem and confidence, feelings of guilt, thoughts of suicide, sleep disturbance, change in appetite and weight loss or weight gain. Anxiety disorders are characterised by worry

and apprehension about every-day events, difficulty concentrating, dizziness, nausea, shortness of breath, and sleep disturbances. These symptoms can be debilitating, and even sub-clinical levels of depression are associated with significant decreases in functioning. It is therefore unsurprising that depression is the leading cause of disability in middle and high-income countries (World Health Organization 2001).

In recent years, there have been many revisions in the way mental health is conceptualised. Definitions have moved from disease-centred to person-centred where mental health is viewed as more than just the absence of a disease. Mental illness refers to the presence of symptoms of a disorder, and wellbeing to the degree to which one feels positive and enthusiastic about life (Manderscheid et al. 2010).

Mental wellbeing is a multidimensional concept, with no widespread agreement on its definition. Most research into wellbeing centres on subjective wellbeing, which refers to how people feel about their lives regarding life satisfaction and emotions. Historically there have been two main approaches to subjective wellbeing; hedonic wellbeing and eudaemonic wellbeing (Ryan and Deci 2001). Hedonic wellbeing relates to positive emotions, pleasure, happiness and life satisfaction. Eudaemonic wellbeing means 'good spirit' and refers to fulfilment, purpose and meaning in life. Ryff proposed that the core dimensions of eudaemonic wellbeing are autonomy, environmental mastery, personal growth, positive relations with others, purpose in life and self-acceptance (Ryff 2013). Although these two perspectives have been studied separately, new measures of wellbeing seek to integrate both hedonic and eudaemonic wellbeing (Henderson and Knight 2012). Although wellbeing has long been recognised as important for health, the UK government only began implementing routine measures of the nation's wellbeing in 2012 (Office for National Statistics 2015b).

Conceptually, mental health problems and psychological wellbeing can be seen as opposite ends of a spectrum in which an individual can either have poor mental health

or good mental wellbeing (Manderscheid et al. 2010). Although mental illness and wellbeing are moderately correlated, these terms should not be used interchangeably as they are distinctly different dimensions (Keyes et al. 2010, Weich et al. 2011, Westerhof and Keyes 2010). Therefore, in this thesis mental health and wellbeing will be examined as separate outcome measures, e.g. it is possible for an individual to have high levels of wellbeing co-existing with a mental illness or to have poor wellbeing without any mental health problems (Hatch et al. 2010, Keyes 2007, Ryff and Singer 2000).

Predictors of mental health and wellbeing

The causes of poor mental health and wellbeing are complex and multi-factorial (Foresight Mental Capital and Wellbeing Project 2008). Decades of research have shown that poor mental health and wellbeing are caused by genetic factors in conjunction with psychological and social stressors. Stressors can be chronic in nature or acute life events such as unemployment, health problems or bereavement (Thoits 2010). The relationship between stress and poor mental health and wellbeing is also affected by how stressful a situation is perceived to be, and the skills and resources used by an individual as coping mechanisms (Cohen et al. 1995).

Some researchers suggest that certain aspects of religion can have a direct impact on mental health and wellbeing, and influence the appraisal of stressful life events and provides resources for coping. These hypotheses are the basis of this thesis which will investigate direct associations between religiosity, and mental health and wellbeing, and the role of religiosity in buffering the deleterious impact of stressful life events.

1.3 Religiosity

"A religion is a unified system of beliefs and practices relative to sacred things, that is to say, things set apart and forbidden—beliefs and practices which unite into one single moral community called a Church, all those who adhere to them."

Émile Durkheim (The elementary forms of the religious life, Chapter 1, page 47, 1912)

Definitions of religion include belief in God or spirits but also acknowledge private practices and beliefs as being religious or spiritual activities. Religiosity can include any of the following; religious membership, beliefs, attitudes, commitment, rituals or ceremonies, attendance at religious services, taking part in scripture or prayer groups, private prayer or meditation, private reading, watching or listening to religious broadcasts on television or on the radio, giving money or time to religion, or religious pilgrimage (Koenig et al. 2012a). As religiosity is a multi-dimensional concept, it is challenging to capture all its aspects and their inter-relationships which is perhaps one of the reasons it is an understudied topic in epidemiology (King and Crowther 2004).

A commonly used measure of religiosity in observational studies is the Duke University Religion Index (Koenig and Büssing 2010). This represents a 5-item measure of religiosity, which was designed for use in epidemiology. The scale measures religious attendance, private religious practice and intrinsic religiosity. Intrinsic religiosity refers to religious commitment where religion is seen as 'an end to itself', and extrinsic religiosity is when religion is seen 'an end to something,' e.g. social desirability. More detailed measures of different aspects of religiosity have also been developed such as closeness to God, religion as motivating and orienting forces, religious support and religious coping (Hill and Pargament 2008). Other studies delve further into specific aspects of religiosity, e.g. how people pray (Nance et al. 2010). Spirituality is a slightly different concept to religiosity which as yet has no satisfactory method of measurement. The main challenge of measuring spirituality is that it is self-defined and that it means different things to different people (Monod et al. 2011).

These religious activities can broadly be categorised as practice (attendance or prayer), belief (general religious belief, belief in God, afterlife and importance of religion or God in life) and denomination or affiliation (denomination during upbringing or adulthood, or identifying as being a member of a particular religious group). In this thesis, the term 'practice', 'belief' and 'denomination' will be used as described above. Where necessary,

the type of practice will be clarified as either religious attendance or prayer. The term ‘religiosity’ will also be used to describe practices, beliefs and denomination in a broad sense.

1.4 The role of religiosity in mental health and wellbeing

Koenig et al. (2012a) have carried out a systematic review of literature relating to religiosity and mental health and wellbeing, published between and 1872 and 2010. They identified 32 peer-reviewed papers presenting associations between religiosity and wellbeing or happiness, 444 articles relating to religiosity and depression, and 299 papers investigating religiosity and anxiety. The majority of the papers found that religiosity was associated with higher levels of wellbeing, and lower levels of depression and anxiety. There are some important limitations to consider in this review. Most of the studies reviewed are cross-sectional obscuring the direction of the associations, and due to the heterogeneity of the measures of religiosity, it is not possible to know which aspects of religiosity are associated with mental health and wellbeing when combined measures are used, e.g. religious beliefs and rituals may be practised in the community or privately. A limitation of these previous reviews on religiosity and health is that they fail to account for the possibility that religious attendance and religious beliefs may impact on people’s health in different ways (Bonelli and Koenig 2013, Koenig 2009, Koenig 2012, Koenig and Larson 2001, McCullough et al. 2000).

A systematic review examining the association between religiosity and mental and wellbeing has been conducted as part of this thesis and is reported in Chapter 2 (page 54). The review comprises longitudinal studies on nationally representative or community samples that investigate associations between religion, and mental health and wellbeing. Results are reported by religious attendance, beliefs, personal practice and denomination.

The following section is a brief literature review of the associations between religiosity, and mental health and wellbeing. Relationships between religiosity and mental health and wellbeing are discussed in relation to religious upbringing, religious beliefs and religious practices.

1.4.1 Religious upbringing

There are very few studies which investigate religious upbringing and later mental health or wellbeing. This is surprising as childhood is a sensitive period for factors associated with mental health and wellbeing in adulthood (Colman et al. 2014, Stafford et al. 2015). Among the studies which have been published, a measure of parental religiosity or own religiosity is often used rather than upbringing. Lonczak et al. (2006) investigated how religious upbringing was related to the mental health of incarcerated adults. They found that religious upbringing was associated with lower levels of depression and anxiety symptoms and that this association was independent of stressful life events. The authors concluded that a religious upbringing is not only associated with better emotional adjustment to being in prison but that its impact was beyond just coping with stressful life events. It is important to note that not all aspects of religious upbringing are positive. For example, Hansen (1998) found that a strict religious upbringing was associated with feelings of guilt and poor mental health outcomes in adulthood.

Any associations found between religious upbringing and later mental health and wellbeing are likely to be strongly related to parental religious belief. There is evidence that parents who are religious are more social, less hostile and operate a more pro-social parenting style compared to non-religious parents (Strayhorn et al. 1990). The authors cited these factors as possible mechanisms through which religious upbringing is related to better mental health outcomes in adulthood.

There is a large body of research investigating associations between religiosity and mental health in childhood and adolescence. A systematic review of 115 studies related

to religiosity and mental health in adolescence found that attendance, the importance of religion, denomination and beliefs were all associated with better psychological health and that these findings were consistent across study designs and sample sizes (Dew et al. 2008). A more recent cross-sectional study found that religiosity, as measured by the strength of beliefs, the frequency of attendance, and importance of religion, was related to lower levels of emotional and conduct disorders (Meltzer et al. 2011). This is supported by results from a study of religiosity and risk of depression in adolescents in Canada (Rasic et al. 2013) which found that religious attendance but not the importance of religion, was associated with lower risk of depressive symptoms 2 years later. They also reported some interesting gender differences where religious attendance was protective of the risk of developing depressive symptoms for girls without depressive symptoms at baseline, and religious attendance was protective for boys who did have depressive symptoms at baseline.

There are currently no studies which report associations between religious upbringing and wellbeing in adulthood. However, there is some research on the relationship between religiosity and wellbeing in childhood and adolescence. A recent study by Chen and VanderWeele (2018) following up around 6,000 participants found that more frequent religious attendance and prayer in adolescence was associated with fewer depressive symptoms and higher levels of life satisfaction in early adulthood. Marques et al. (2013) also examined how spirituality and religious attendance was related to life satisfaction in a sample of 227 adolescents. Despite the relatively small sample, they found that importance of spirituality in life, but not religious attendance was associated with higher levels of life satisfaction 6 months and 1 year later.

1.4.2 Denomination and affiliation

There is little evidence of how religious denomination and affiliation are related to mental health and wellbeing in the UK. The Office for National Statistics recently published data

on how anxiety, happiness, life satisfaction and feeling that life is worthwhile, vary by religion, categorised as no religion, Christian (all denominations), Buddhist, Hindu, Jewish, Muslim, Sikh and other faiths (Office for National Statistics 2017). There was considerable variation between religious groups on measures of happiness, life satisfaction. For example, Sikhs, Hindus and Jews had comparatively higher levels of happiness, life satisfaction and feeling that life is worthwhile compared to Christians, while Muslims and Buddhists had similar results on these measures as those reporting no religious affiliation. There were no significant differences in anxiety levels between religions. These findings should be interpreted cautiously, as there were no controls for gender or socio-economic circumstances, which could have confounded these associations.

Findings from well-designed epidemiological studies controlling for socioeconomic circumstances usually show no or weak associations between denomination, and mental health and wellbeing. Studies comparing Catholic and Protestant groups (denominations within the Christian religion) usually find no differences in depressive symptoms (Braam et al. 2004, Kasen et al. 2014, Miller et al. 2012, Ronneberg et al. 2014). Other studies which investigate church or synagogue membership also show no differences in depressive symptoms between those who report being a member compared to those who are not members (Fenix et al. 2006, Williams et al. 1991). Very few studies examine denomination and wellbeing. One study conducted by Levin and Taylor (1998) examined church membership with life satisfaction and happiness and found no associations compared to those with no church membership.

It is important to note that the interpretation of these findings is dependent on the reference category. There is little evidence that there are differences in mental health and wellbeing by different religions and identifying as religious denominations after controlling for socioeconomic circumstances. However, when compared to those with no religious affiliation, there is some evidence that religion is related to better mental health

and wellbeing. Exceptionally there are some religious denominations such as the Latter-Day Saints, where affiliation is associated with worse mental health outcomes when compared to other religious groups combined in a mostly religious sample (Norton et al. 2008).

1.4.3 Religious beliefs

In the field of religiosity and health, the role of religious beliefs is one most investigated. There are various ways to measure religious beliefs, but measures usually capture subjective religiosity, the strength of religious beliefs, the importance of religion or spirituality in life, and whether religion provides meaning in life. Other measures less commonly used are religious orthodoxy (belief in the existence of heaven and hell, belief in the after-life etc.) and religious doubt. There are considerably more studies investigating associations between religious beliefs and mental health than religious beliefs and wellbeing.

Many of the studies in this area rely on cross-sectional survey data, which limits our understanding of the temporality in the reported associations. Several studies are on clinical populations and investigate how religious beliefs are associated with mental health in the context of health-related stress such as being diagnosed with cancer or HIV (Sowell et al. 2000, Tuck et al. 2001, Visser et al. 2010). These studies are important for understanding how religiosity can be utilised to cope with stressful life events but are limited in their generalisability to the general population.

Several studies have shown that increasing importance of religion is associated with fewer depressive symptoms, but this has not been consistently shown (Braam et al. 1997, Braam et al. 2004, Miller et al. 2012, Sun et al. 2012). Other studies examining the importance of religion on mental health found no significant association (Balbuena et al. 2013, Ronneberg et al. 2014). Another way of assessing the relationship between religious beliefs and mental health is by measuring “religious doubt”, which is measured

by asking if participants had concerns about religious or spiritual beliefs, religious teachings, religious scriptures, the effect of prayer and God's involvement in daily life. In a study by Krause (2006a), limited to those identifying as Christian, religious doubt was associated with higher levels of depression. This finding suggests that loss of belief or insecure religious beliefs may be important for mental health and wellbeing. This is also supported by Braam et al. (1997) who found that a lack of religious salience was associated with risk of chronic depression over one year.

Furthermore, the third National Psychiatric Morbidity Study in England found that spiritual beliefs were associated with a higher risk for mental disorders compared to participants reporting they held religious beliefs or secular beliefs (King et al. 2013). The authors suggest that there may be a particular vulnerability for people with spiritual beliefs in the absence of a religious framework. This finding is supported by Leurent et al. (2013) who found that spiritual beliefs were associated with an increased risk for onset of depression. Similar results were also found in the Canadian National Population Health Survey (Baetz et al. 2004). However, these two studies are cross-sectional (King et al. 2013) or have a relatively short follow-up period (Leurent et al. 2013) which does not allow us to exclude the possibility that the associations found here are a due to higher levels of spirituality being a consequence of mental disorders rather than a predictor.

As with the research on religious beliefs and mental health, findings related to religious beliefs and wellbeing are relatively mixed. A study by Krause (2003) found that meaning in life from religion was positively associated with wellbeing (measured by life satisfaction, self-esteem and optimism) after adjusting for age, sex, education, marital status, ethnicity, religious attendance, and private prayer.

Religious beliefs have also been associated with happiness. Barkan and Greenwood (2003) found that fundamental religious beliefs were positively associated with happiness compared to liberal religious beliefs, and that importance of religion in life was

positively associated with happiness independent of gender, income, marital status, ethnicity, and social support. These associations are supported by Cooper et al. (2010) who reported findings from the National Psychiatric Morbidity Survey and found that in addition to gender, ethnicity, education, home ownership, marriage and social participation, the importance of religion was associated with happiness. Opposing findings by Levin and Taylor (1998) found no association between subjective religiosity and subsequent life satisfaction.

Religious doubt was investigated by Krause (2006a) in relation to psychological wellbeing 3 years later. He found that having religious doubt was associated with lower levels of psychological wellbeing. This association was stronger for those with low levels of education suggesting that education could be protective in people with religious doubt. The author suggests that the struggles involved in handling religious doubt are in part intellectual, and a learning process which may explain why education appears to be protective of the association between religious doubt and wellbeing.

1.4.4 Religious practice

Religious practices can encompass religious attendance or more private practices such as prayer or reading religious books. It is evident that religious attendance is likely to reflect different experiences compared to private practices, as there are various social aspects and community engagement associated with religious attendance, which is not captured by other measures of religiosity. Most of the research on religious practice in relation to mental health and wellbeing use religious attendance as a measure of practice rather than private religious practices. There is significantly more research on religious practices relating to mental health compared to wellbeing.

Religious attendance

One of the most recent and largest studies to investigate religious attendance and mental health is by Li et al. (2016). Using longitudinal data from more than 48000 female nurses

in the USA, they found that frequent attendance was associated with a lower risk of depression compared to women who never attended. In the UK, there is very little research on religious attendance and mental health. One of the questions arising from studies investigating religious attendance and mental health is whether associations are due to religious attendance or social participation in general. This question was addressed by Croezen et al. (2015) who examined longitudinal associations between different forms of social involvement and depression in older age, using data from 10 European countries. By comparing social participation in voluntary or charity work, education or training, sports or social clubs, political and religious organisations, they found that social participation in religious organisations was associated with a decline in depressive symptoms over four years of follow-up, but not for other forms of social participation. This finding is supported by a study of around 3000 older Taiwanese adults which found that religious attendance was associated with a lower risk of depression four years later, but that this association was partially explained by social variables such as ties with friends or neighbours, marital status and other social activities (Yeager et al. 2006). Adjusting for baseline depression completely attenuated the association between religious attendance and mental health, possibly indicating that participants with better mental health are more likely to attend religious services. This is similar to the finding of Li et al. (2016) who found that poor mental health was related to infrequent religious attendance. It is suggested by the authors that associations found between religious attendance, and mental health should be interpreted with caution, as there is a risk of bias due to participants who have worse mental health being less likely to attend religious services in first place.

There are very few studies, which have directly assessed the associations between religious attendance and wellbeing. In the UK, there is some cross-sectional evidence from wave 5 of the English Longitudinal Study of Ageing, showing that frequent religious attendance is associated with higher eudaemonic wellbeing, more enjoyment of life and

positive affect (Banks et al. 2012). This association is also supported by findings from The General Social Survey, a nationally representative survey of adults in the USA, which found that religious attendance is associated with life satisfaction and happiness (Barkan and Greenwood 2003). These cross-sectional studies are supported by findings from longitudinal studies which have found that religious attendance is associated with higher levels of subjective wellbeing, life satisfaction, happiness, positive affect and personal growth (Greenfield and Marks 2007, Koenig and Vaillant 2009, Lechner and Leopold 2015, McIntosh et al. 2011). Levin and Taylor (1998) also examined these associations and found cross-sectional associations between religious attendance and subjective wellbeing but no longitudinal associations after 12-13 years of follow-up, controlling for wellbeing levels at baseline.

Private religious practice

The frequency of prayer is the most commonly investigated measure of private religious practice but can also include measures of private spiritual or religious readings, and watching or listening to religious radio and television programmes. Studies which examine associations between prayer and mental health show a mixture of findings with some studies finding associations with better mental health, worse mental health or no associations at all. It is possible that there are bi-directional associations between private religious practice and mental health and wellbeing. For example, people who have poor mental health and wellbeing may be less able to attend religious services and therefore turn to private religious practices. It is also important to understand the type of private religious practices people undertake. Koenig et al. (1997) investigated different aspects of religiosity among 4000 older adults, and their associations with depressive symptoms. The authors found no associations between prayer or bible reading and mental health, but watching religious TV or listening to religious radio programmes was associated with more depressive symptoms. Research from the Longitudinal Ageing Study in Amsterdam further highlights how the context of private practice is important (Braam et

al. 2007). The researchers found no overall association between prayer and depressive symptoms, but found that unaffiliated widows who reported frequent prayer had a higher risk of depressive symptoms.

1.4.5 Summary

There is some research on the associations between religiosity, and mental health and wellbeing which suggests a protective association. The strongest evidence is for religious attendance and mental health with protective associations comparable to the effects of higher education, social support, income and self-rated health (Balbuena et al. 2013, Lim and Putnam 2010). The evidence for religious beliefs is not as compelling which may be partly due to the different measures and conceptualisation of religious beliefs. There is very little research on associations between religious upbringing and mental health and wellbeing outcomes in adulthood and very few longitudinal studies investigating associations between religiosity and wellbeing which used validated measures of wellbeing. There is not much evidence that there are differences in mental health or wellbeing by denomination or prayer.

1.5 Pathways between religiosity, and mental health and wellbeing

There are several possible mechanisms through which religion is associated with mental health and wellbeing. These can be broadly grouped into psychological, social and lifestyle pathways (George et al. 2002, Koenig 2012, Levin 2009, Woźniak 2015). It is proposed that certain aspects of religiosity may influence psychological factors such as feeling in control, increase social integration and networks, and promote healthier lifestyles, which all, in turn, are associated with better mental health and wellbeing.

1.5.1 Psychological pathways

Mastery

Mastery is “the extent to which one regards one’s life-chances as being under one’s control” (Pearlin et al. 2007). High levels of personal mastery have been associated with depression, anxiety and low wellbeing (Colman et al. 2011, Gallagher et al. 2011). The relationship between personal control and religiosity is not straightforward. A cross-sectional survey of older Americans found that religiosity as measured by attendance, religious beliefs and frequency of prayer, was associated with higher levels of mastery but only for African American and not for White American participants (Jang et al. 2003). Other researchers have found that religiosity is associated with lower levels of mastery and perceived control (Schieman et al. 2003, Shaw and Krause 2001).

An explanation for this inverse relationship found between religiosity and mastery is the concept that religiosity can increase perceived control via God-mediated control or divine control where a person works collaboratively with God in response to a problem or the reliance on God for guidance and decision making. The associations between God-mediated control and psychological wellbeing have been investigated by Krause (2005) in a sample of older adults in the USA. God-mediated control was assessed by asking to what extent participants agreed they relied on God to help control their life, were able to succeed with God’s help and that all things were possible when they work together with God. Krause found that God-mediated control was positively associated with life satisfaction, self-esteem, optimism and lower levels of anxiety around death after controlling for age, sex, education, marital status, race, church attendance and private prayer. He also found an interaction between God-mediated control and all four measures of psychological wellbeing where associations were stronger for African Americans than White participants.

It is unclear whether religiosity is associated with an increase in mastery, or if belief in divine control is related to relinquished personal control. This question was addressed by Schieman (2008) who examined associations between mastery, divine control and religiosity among 1,800 American adults. Personal control was inversely related to divine control which provides evidence for the relinquished control hypothesis. Schieman also found that these associations were weaker for participants who reported stronger religious beliefs, frequent prayer and frequent attendance.

Personality

Personality is another psychological factor which is associated with religiosity, and mental health and wellbeing. There are several measures of personality used in psychological research. However, most psychometric tests map onto the Big Five personality traits. These are neuroticism, extraversion, openness, agreeableness, and conscientiousness (Costa and McCrae 1992). Neuroticism is a measure of a tendency to experience distress or degree of emotional stability; extraversion represents a measure of a range of traits such as being sociable, enthusiastic and talkative; openness refers to being open to experiences and traits such as curiosity, imagination and willingness to try new things; agreeable traits reflect aspects of personality related to co-operation, empathy and being able to get along with others; and conscientiousness personality types are well organised, self-disciplined and dutiful.

There has been much research on the associations between personality traits, and mental health and wellbeing. Meta-analyses of 175 studies indicated that neuroticism was strongly associated with a higher risk of mental health disorders such as depression and anxiety (Kotov et al. 2010), and extraversion and conscientiousness were associated with lower risk of depression and anxiety disorders. No overall associations were found between agreeableness and openness, and depression and anxiety disorders. Soto (2015) investigated bi-directional associations between the Big 5 personality traits, and

life satisfaction, positive affect and negative affect using data from an Australian longitudinal study. He found that all Big 5 personality traits were associated with better mental health and wellbeing, apart from neuroticism which was associated with worse mental health and wellbeing. Soto was also able to show that the relationships between personality traits and mental health and wellbeing are bi-directional, i.e. changes in mental health and wellbeing were associated with changes in personality traits. Research from longitudinal studies find that extraversion in early adulthood is positively associated with wellbeing in early old age, neuroticism and extraversion are associated with happiness and neuroticism conscientiousness associated with life satisfaction and wellbeing (Abbott et al. 2008, Gale et al. 2013, Hayes and Joseph 2003).

There is also some evidence that personality is associated with religiosity. A meta-analysis of studies researching religion and personality traits found that the personality traits associated with religion were conscientiousness, agreeableness and extraversion (Lodi-Smith and Roberts 2007, Saroglou 2002). Most research on religiosity and personality is cross-sectional, and so it is not possible to infer the direction of causality. It is plausible that personality may influence religiosity and that religiosity can influence personality development. This is important as exposure to religiosity, and personality development occurs in early life. McCullough et al. (2003) conducted a longitudinal study to investigate how personality in adolescence is associated with trajectories of religiosity (practices and beliefs) into adulthood using data from the Terman Life Cycle Study of Children with High Ability in the 1920s to the 1940s. They found that conscientiousness was the only personality trait associated with religiosity in adulthood. They also found an interaction between religious upbringing and emotional stability in adolescence and religiosity in adulthood: the association between religious upbringing and later religiosity was stronger for participants with higher levels of emotional instability.

1.5.2 Social pathways

Social integration

The aspects of religiosity which relate to being part of a community such as social networks, support, and engagement could potentially be pathways linking religiosity to mental health and wellbeing. Berkman et al. (2000) present a conceptual model of how social networks and social support can influence health. Social networks refer to the number and structure of people in a network around an individual, and social support can include measures of instrumental, informational, emotional, and decision-making support. Social support is an important determinant of mental health and wellbeing (Umberson and Montez 2010). Netuveli et al. (2008) investigated the role of social support in changes in mental health following adversity and found that those who were able to return to baseline levels of mental health after adversity were more likely to have higher levels of social support, i.e. having someone who listens, helps in a crisis, relaxes with them, appreciates them and can be counted on for comfort.

Conversely, the absence of social relationships when they are wanted can lead to feelings of loneliness which are also associated with adverse outcomes for mental health and wellbeing (Cacioppo et al. 2010, Golden et al. 2009). Associations between social networks and social support are often gender-specific. For example, Cable et al. (2013) found that large family networks were associated with better wellbeing for men, but not women and that large friendship networks were more important for women's wellbeing than for men.

Not all social relationships are positive. There is evidence that some social relationships are stressful and are associated with poor mental health and wellbeing. An example of how this is measured is the Close Person Questionnaire which includes measures of positive and negative social support (Stansfeld and Marmot 1992). The negative social support scale items comprise items asking if the person closest to them gives them

worries, makes things worse and if they would like to be able to confide in them more. Unsurprisingly, negative social support has been associated with worse mental health and wellbeing (Lincoln 2000).

It is possible that being part of a religious community and regularly attending religious services confers access to emotional support, advice and practical help which are related to mental health and wellbeing (VanderWeele 2017). For example, Ross and Mirowsky (1989) found that people belonging to religious groups were more likely to talk about their problems than non-religious groups which could be beneficial for mental health. Salsman et al. (2005) investigated if social support was a mediator between religiosity and mental health and wellbeing, i.e. whether the associations between religiosity and mental health and wellbeing was via a change in social support. They found evidence that social support was a partial mediator between intrinsic religiosity, and psychological distress and life satisfaction. Higher levels of religiosity were positively associated with social support, and social support was associated with lower levels of psychological distress and higher levels of life satisfaction.

Another mechanism through which religiosity could be related to mental health and wellbeing is through marriage. People who are religious are more likely to marry and less likely to divorce than those who are not religious (Mahoney et al. 2008, Strawbridge et al. 2001). As marital stability is associated both with religiosity and mental health and wellbeing, it is possible that these associations are explained by the benefit of being married (Willitts et al. 2004). A review by Waite and Lehrer (2003) summarises the various socio-economic and health benefits that religion and marriage offer but also highlights important caveats, e.g. partners who have very different religious beliefs may have more conflicts within their marriage and be more likely to divorce than partners with the same religious beliefs.

The evidence for whether religiosity can protect against loneliness is not clear. Some studies have found that religious beliefs and attendance are associated with reduced risk of loneliness (Kirkpatrick et al. 1999, Rote et al. 2012). In addition to looking at direct associations between religiosity and loneliness, Rote et al. (2012) also investigated if these associations operate through social integration and social support in a sample of over 3,000 of American adults ages 57-85 years old. They found that religious attendance was associated with higher levels of social integration (measured by the size of their social networks and how often they see their friends and family) and social support and that these two factors, in turn, were associated with a lower risk of loneliness.

Volunteering is another social factor which has been associated with religiosity, and mental health and wellbeing (Mofidi et al. 2007, Mollidor et al. 2015). These findings are supported by Jenkinson et al. (2013) who carried out a systematic review of twenty longitudinal cohort studies which examined associations between volunteering, and depression, life satisfaction and wellbeing. The authors found evidence that volunteering was associated with lower levels of depression, and higher levels of life satisfaction and wellbeing. Jenkinson et al. also found that the associations between volunteering and mental health and wellbeing were not found in experimental studies demonstrating inconsistencies in research findings on the relationship between volunteering, and mental health and wellbeing.

Some of the studies in this review suggest that the benefits of volunteering may be greater for older populations and that sustained volunteering rather than temporary volunteering is required for mental health and wellbeing benefits. One of the proposed mechanisms through which volunteering affects mental health and wellbeing is through role-identity. Greenfield and Marks (2004) suggest that sustained formal volunteering can be beneficial for mental health and wellbeing, especially for older adults. Role-identity refers to the number of social roles in different life domains, e.g. partner, employment or parent. Older adults have fewer roles in life as they may be retired,

widowed and not have children to look after. Role-identity absences were associated with reduced positive affect and reduced feelings of purpose in life, and volunteering was associated with an increased purpose in life, especially for participants with more role absences. Further research by Greenfield and Marks (2007) investigated how different types of volunteering were associated with depressive symptoms and personal growth independent of socio-economic factors. This study used longitudinal data on 4,646 adults in the USA aged 35 to 92 and compared recreational, religious and civic volunteering. They found that continued participation in religious and civic volunteering but not recreational volunteering was associated with fewer depressive symptoms over 5 years. Continuous participation in recreational and religious volunteering, but not civic volunteering was associated with greater personal growth. These findings are supported by Musick and Wilson (2003) who also found that for older participants only, religious volunteering was more strongly associated with lower levels of depression and anxiety compared to secular types of volunteering.

1.5.3 Lifestyle pathways

A final proposed pathway through which religiosity can impact mental health and wellbeing is through lifestyle factors. Several large epidemiological studies published from 2000 onwards have found that people who are religious tend to live longer than people who are not religious (Chida et al. 2009, Lutgendorf et al. 2004, VanderWeele et al. 2017, Yeager et al. 2006). It has been suggested that these associations are due to certain aspects of religious involvement promoting healthier lifestyle behaviours such as not smoking, being physically active, having a healthy diet, not using recreational drugs and limiting alcohol consumption (Koenig 2012). A study by Debnam et al. (2012) investigated how social support, specifically from religious sources was related to health behaviours such as alcohol consumption, fruit and vegetable intake and smoking. They examined emotional support (both received and provided), negative interactions, and

anticipated support from religious communities. Receiving emotional support was associated with eating more vegetables, and anticipated social support was associated with moderate physical activity. Negative social interactions were associated with increased levels of alcohol consumption. This thesis will focus on alcohol consumption as this factor has been shown to have the strongest associations with religiosity, and mental health and wellbeing (Lynskey 1998, Stranges et al. 2014).

High levels of alcohol consumption are associated with worse mental health and wellbeing. There is some evidence that not drinking any alcohol is related to worse mental health and wellbeing compared to moderate drinkers (Boden and Fergusson 2011, Geiger and MacKerron 2016). However, this finding may be due to this group including a significant proportion of people with prior alcohol dependencies, or because moderate drinking may function as a way of coping with stress. It is also likely that associations between alcohol consumption, and mental health and wellbeing are bi-directional.

Many, but not all religious organisations discourage alcohol use which may be why religiosity is associated with better mental health and wellbeing (Musick et al. 2000). A study by Strawbridge et al. (2001) found that American women who attended church on a weekly basis were more likely to reduce heavy drinking (more than 45 alcohol drinks per month) over the follow-up period of 28 years, compared to those never attending. This finding was supported by Koenig and Vaillant (2009) who also showed that religious attendance was cross-sectionally associated with a reduced risk of alcohol dependency. These findings are similar to those found by Booth et al. (2004) who investigated factors which predicted reduced alcohol consumption over 6 months in a sample of 733 ‘at-risk’ drinkers (current or predicted alcohol disorder) found that religiosity (a combined measure of beliefs and practices) was a protective factor for alcohol consumption.

Some of the research described so far has alluded to evidence which indicates that religiosity is particularly beneficial for coping with adversity. In the following section, research directly relating to religious coping will be described in addition to evidence from religion-based interventions for mental health and wellbeing.

1.5.4 Effect modification of stressful life events

Religion is frequently reported as a coping mechanism for stressful life events, particularly in response to health problems (Harrison et al. 2001, Park 2006). Researchers from the Longitudinal Study of Ageing in Amsterdam found that religious attendance is associated with experiencing fewer depressive symptoms, in particular for those with functional limitations (Braam et al. 2004). The authors suggested that religion acts as a stress-buffer by providing an alternative framing for suffering and thus combating the depressive effects of functional limitations. This idea is supported by another study where religious attendance was found to buffer the impact of stressful life events on levels of psychological distress (Williams et al. 1991). Research involving people who experience stressful life events such as the September 11th attacks show that religion and spirituality are associated with lower odds of a mental disorder after such traumatic events (McIntosh et al. 2011). A similar pattern was found women with HIV where spiritual activities such as praying and talking to God were associated with reporting reduced emotional distress (Sowell et al. 2000). Many of the studies investigating if religiosity buffers associations between stress and mental health and wellbeing are on vulnerable samples such as hospitalised patients, those who were recently bereaved or widowed, or caregivers (Brown et al. 2004, Hayward and Krause 2014, Hebert et al. 2007, Koenig 2007, Yohannes et al. 2008).

Krause and Hayward (2014) investigated the role of religious doubt in relation to mental health after bereavement in older American adults. They found that religious doubt was associated with an increase in depressive symptoms over 3 waves of data collection in

the seven years after bereavement. Those who reported less religious doubt had no changes or improvement in depressive symptoms.

Wortmann and Park (2008) reviewed 73 studies investigating the role of religion and spirituality after bereavement. All dimensions of religiosity apart from affiliation were related to positive adjustment after bereavement. Religiosity can also be useful for other types of stress such as financial strain. Krause (2009) found in a 2-year longitudinal study of older adults that religiosity was associated with an increased feeling of gratitude which in turn was found to buffer the association between financial strain and depressive symptoms.

Woźniak (2015) suggested that religion may provide people with a sense of coherence, a term used to describe how a person perceives and understands their world in a way which is comprehensible, manageable and meaningful, which may explain some of the research finding beneficial health outcomes (Antonovsky 1996, Eriksson and Lindström 2006). Religious beliefs may be a source of coherence enabling people to understand stressful life events, feel they can cope, and to provide meaning to the situation. Conversely, lack of sense of coherence may lead to difficulty in dealing with stressful life events and an increase in psychological distress.

These studies indicate that religiosity protects against the effect of adversity on mental health and wellbeing. The use of religion to cope with stressful life events is called religious coping. Pargament *et al.* (2000) developed the religious coping scale (RCOPE) which is designed to measure a range of religious coping methods. The RCOPE uses 21 subscales to measure five different ways in which religion may be protective of mental health and wellbeing, particularly in relation to stressful life events: first, religion provides meaning in life and a framework for which to understand and deal with difficult situations; second, religion may offer a sense of control; third, comfort found in the sense of transcendence, i.e. experiencing something greater than oneself; fourth, social support

and social cohesiveness through ritual and traditions; and fifth the opportunity for spiritual or life transformation, e.g. seeking new direction, religious conversion and forgiveness.

An important consideration when measuring religious coping is that it is not necessarily always a positive experience. The RCOPE has subscales which measure positive and negative religious coping methods. Negative religious coping methods include religious doubts or discontent, blaming evil for stressful events or pleading for direct intervention. This type of religious coping has been shown to be related to increased psychological distress. Ano and Vasconcelles (2005) carried out a meta-analysis of 49 studies measuring different types of religious coping and psychological adjustment to stress. Four sets of analyses were carried out to investigate the associations between positive and negative religious coping, and mental health and wellbeing. They found that positive religious coping was associated with better mental health and wellbeing and that negative religious coping was associated with worse mental health. No association was found between negative religious coping and wellbeing.

These findings are supported by qualitative research which identified six themes relating to how religion is related to health among African American adults. One theme was that religion is a positive method of coping with stress, religion providing hope, meaning and purpose in life, and social support received from their religious congregation (Marks et al. 2005).

Based on observational evidence that religiosity may help people cope with stress, religious-based interventions have been developed and tested (Pargament 2011). Propst et al. (1992) conducted a randomised controlled trial to compare traditional cognitive behavioural therapy (CBT) to Christian-based CBT, and to a pastoral counselling for treating depression in 59 religious patients. All three trial groups showed reductions in depression scores from pre-treatment to post-treatment and at three-months and two-year's follow-up. There was some evidence that immediately after

treatment the Christian-based CBT group had fewer depressive symptoms than the other groups. At two-year follow-up, the pastoral counselling group and the Christian based CBT group had fewer depressive symptoms than the traditional CBT group. More recently James and Wells (2003) have proposed that mechanisms linking religiosity, and mental health are likely to be cognitive-behavioural. In agreement with previous research, they suggest that religiosity can provide an alternative framework for coping with stressful life events and that religious beliefs can offer different perspectives on thinking processes. These studies provide opportunities for clinicians to incorporate religious elements into their practice for patients who are religious (Pearce et al. 2015).

1.5.5 Summary

There are several mechanisms through which religiosity may be related to mental health and wellbeing. There is some evidence that psychological factors such as personality and mastery are patterned by religiosity, although it is difficult to tease out the direction of the association. Social pathways is another plausible mechanism with many religions placing an emphasis on social support and community, although this aspect of religiosity could be detrimental as well as beneficial to mental health and wellbeing. People who are religious tend to embrace healthier lifestyles, which perhaps represent one of the main explanations for the associations found between religiosity and longevity. However, there is limited evidence to show that these lifestyle differences impact mental health and wellbeing. Much of the literature on religiosity and mental health and wellbeing support the theory that religion can be used as coping mechanisms in relation to adversity. These findings have never been replicated in a UK population.

1.6 Religiosity across the life course

1.6.1 Age and cohort effects on religiosity

It is broadly accepted that the UK, historically a predominantly Christian country, has been undergoing a period of secularisation in the past century characterised by fewer people attending religious services and believing in god (Gill et al. 1998, Turner 2016). The secularisation thesis proposes that as a society modernises, religious practices beliefs inevitably decline (Bruce 2002). Research on how religious practices and beliefs vary by age do not yield consistent results (Davie and Vincent 1998). For example, Idler et al. (2001) found in a longitudinal study of 2,800 people that religious beliefs were stable during their last years of life. However, another longitudinal study of people aged 65 and over from Southampton, UK, found that religious commitment declined over a 20 year period (Coleman et al. 2004).

Analysis of repeated survey data indicates that the decline in religious affiliation is a cohort effect, rather than age or period effect, i.e. secularisation is due to successive cohorts not practising religion rather than individuals changing their beliefs as they age (Voas and Chaves 2016). This is at least true for Christians as the analysis was limited to this group. In reality, the religious make-up of the UK is changing from a Christian society to a multi-faith society (The Woolf Institute 2015). Although religious attendance and affiliation have declined with each successive generation, a significant proportion still pray regularly (63%), believe in God (38%), and believe in spirits or forces (40%) (Eurobarometer 2005, European Social Survey 2012).

1.6.2 Predictors of religiosity

There are many social and cultural factors which can be associated with religiosity throughout life. Sociologists suggest significant changes in life such as moving away from home, attending university, family ties, retirement and exposure stressful life events

are associated with a change in religiosity. Religiosity is also often patterned by gender, education and social class and likely to be influenced by parental and familial beliefs (Bengtson et al. 2009). A longitudinal study by McCullough et al. (2003) showed that stricter religious upbringing was associated with religiosity later in life. Another study, examining the intergenerational transmission of religiosity identified religious beliefs of not only parents but partners as important predictors of their own religiosity (Storm and Voas 2012).

Gender

Women are consistently reported to be more religious than men in most cultures and religions (Trzebiatowska and Bruce 2012). Francis (1997) reviewed the research on gender differences in religion and concluded that there are two main theories explaining why women might seem more religious than men: social and contextual influences, such as gender role socialisation and structural location theory, and differences in psychological characteristics between men and women. Gender role socialisation where personal qualities such as gentleness and nurturance are expected and encouraged in women are compatible with those required from religion and could, therefore lead to women identifying as religious. Traditionally, the role of socialising children and teaching moral values was the responsibility of women which could have required women to be more religion-oriented than men. There are differences in the psychological characteristics of men and women, with women experiencing more stress and having less personal control in life, which could be associated with being more religious.

Education

The associations between religiosity and education are complex. A worldwide poll by Gallup in 2015 found that the 80% of respondents with no qualifications reported themselves to be religious compared to 60% with secondary school or university level qualifications (WIN Gallup International 2015). However, the overall association between

low education and higher levels of religiosity does not seem applicable to a UK population sample. Results from the British Social Attitudes Survey show a U-shaped association between educational qualifications and reporting being religious and attending meetings (39% degree, 30% A-Level, 25% O-Level, 20% CSE and 28% no qualification). Interestingly, the pattern for those responding that they are religious but do not attend religious meetings was different: reporting religious beliefs but not attending meetings was inversely associated with educational qualifications (National Centre for Social Research 2012).

A possible explanation for these associations between religious practices and beliefs, and education is that education is positively associated with civic participation, of which religious attendance is a part, but negatively associated with religious beliefs such as belief in God (Glaeser and Sacerdote 2008, Voas and McAndrew 2012). Wadsworth and Freeman (1983) examined generational differences in beliefs by comparing religious upbringing to beliefs as adults and how beliefs differed between parents and children in the MRC National Survey of Health and Development (1946 British Birth Cohort Study). They found that many of the study members deviated from the religious affiliation they were brought up in and that higher education was a major contributing factor. Higher education may reduce religious beliefs by exposing people to new ideas and concepts which may not be compatible with religious beliefs. Another explanation is that religious upbringing is associated with better educational outcomes (Byfield 2008).

1.6.3 Summary

There is evidence that the observed secularisation seen in the UK is a cohort effect, rather than an age or period effect. This means that each successive generation is less religious than the previous one. There are many life course factors which are central to religiosity such as religious upbringing, social and cultural norms, and educational attainment. As religiosity is affected by many factors across the life course, such as

religious upbringing, social and cultural norms, and educational attainment, a life course approach should be taken to understand the relationship with mental health and wellbeing.

1.7 A life course approach to religiosity, and mental health and wellbeing

A "life course approach" has been defined by Kuh et al (2013) as one which "…investigates the biological, behavioural and social pathways that link physical and social exposures and experiences during gestation, childhood, adolescence and adult life, and across generations, to changes in health and disease risk in later life". NSHD is a nationally representative birth cohort from 1946 with 24 waves of data collection over 70 years and is a rich source of information on social and health variables across the life course. There is some evidence from the research reviewed in this chapter that religiosity may be important for mental health and wellbeing at different stages of life from childhood to older age, in marriage and in coping with stressful life events.

In addition to understanding how religiosity across life is associated with mental health and wellbeing in older age, longitudinal data is also necessary to investigate if there are accumulation effects or sensitive periods. Accumulation effects refer to the concept that the quantity of an exposure is related to the size of the association with the outcome. In the case of religiosity, it is possible to test if religiosity over a longer period has a stronger association with mental health and wellbeing than frequent attendance over a short period. Sensitive periods relate to the concept that associations might be stronger at specific periods in life, e.g. previous studies have indicated that religiosity is associated with better mental health and wellbeing for older populations only (Cooper et al. 2014).

1.8 Gaps in the literature

There is currently very little published research investigating longitudinal associations between religiosity, and mental health and wellbeing using data from UK populations. The longitudinal studies which do exist are on populations from the USA which are not

generalisable to the UK. Much of the current research in this area is reliant upon repeated cross-sectional surveys of religious practices and beliefs, which although are informative are not able to track changes within individuals and how individual changes are associated with health outcomes. There is only one relevant study using data from the UK, which has a relatively short follow-up period of just one year (Leurent et al. 2013). One of the few studies to use data from the life course is by Wink and Dillon (2008) who analysed data from 300 babies and children from California, in the USA following them between 1928 and 2000. Other longitudinal studies had much shorter periods of follow-up, tracking over a small portion of the life course. Few studies investigate the potential bi-directional associations between religiosity and mental health and wellbeing, which is one of the major challenges in this research area and life course epidemiology in general (VanderWeele et al. 2016). The associations between religiosity and wellbeing, and how this differs from associations between religiosity and mental health, are not well understood primarily due to the lack of research undertaken.

This thesis will address these gaps by using a life course approach to inform the aims and objectives of the thesis. To do this, data from a nationally representative British birth cohort will be used which has repeated measures of religiosity, mental health and wellbeing variables and a range of prospectively measures co-variates. These data enable analysis to test for potential bi-directional associations and to investigate how religiosity is associated differently with mental health and with wellbeing.

1.9 Aims, objectives and conceptual model

The aim of this thesis was to investigate associations between religiosity and mental health and wellbeing across the life course. The first step was to conduct a systematic review of longitudinal studies investigating this question (reported in Chapter 2, page 54). Figure 1.1 shows the conceptual model used as a framework for hypothesis testing in this PhD thesis.

1. Religious upbringing may be positively associated with religious attendance and beliefs in adulthood.
2. Religious attendance and beliefs across life may have a direct effect on mental health and wellbeing in early old age. There may also be bi-directional associations between religion, and mental health and wellbeing.
3. Religion may be associated with psychological, social and lifestyle factors such as personal mastery, personality, social networks, social support and alcohol consumption. These psychological, social and lifestyle factors may also be associated with mental health and wellbeing.
4. Stressful life events may be associated with later life religiosity.
5. Religion may modify the association between stressful life events and poor mental health and wellbeing in early old age.

The role of socio-economic factors are not shown in this model; however, it is important to acknowledge the socioeconomic context, and this will be considered at each stage of the analysis.

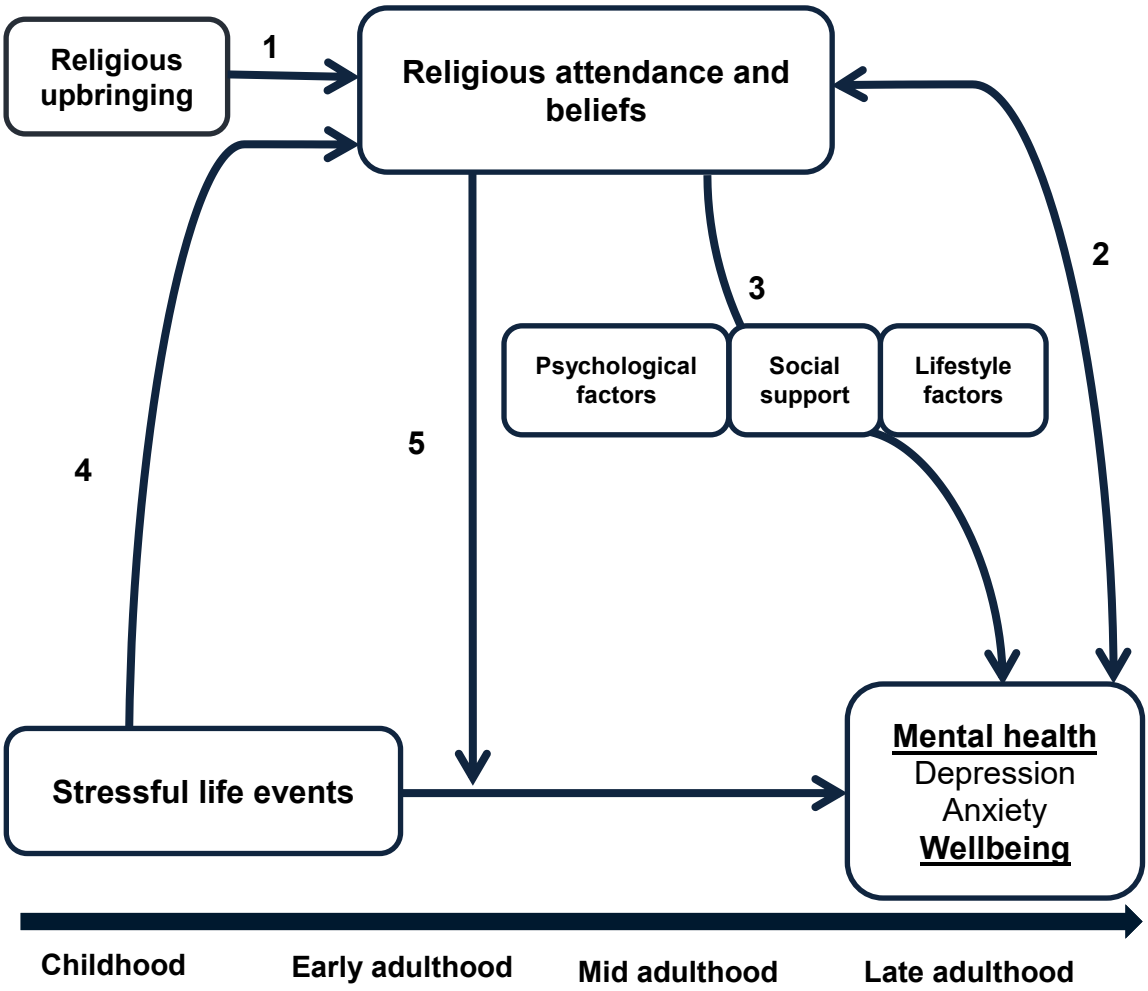


Figure 1.1. Conceptual model of the associations between religiosity, and mental health and wellbeing.

1.10 Structure of the thesis

The next chapter reports findings from a systematic review of longitudinal studies examining associations between religion, and mental health and wellbeing (page 54). This is followed by the methods chapter which describes the study, the variables of interest and the statistical analyses used (Chapter 3, page 100).

There are four analysis chapters in this thesis which address the hypothesised associations in the conceptual model (Figure 1.1, page 52). These chapters investigate

1. trends in religious practices and beliefs, socio-economic factors related to the religiosity of the study members since childhood to age 70 (late adulthood), and how religious upbringing is related to practices and beliefs in adulthood (Chapter 4, page 118);
2. associations between religiosity across the life course and mental health and wellbeing in older age, including the potential for bi-directional associations between religiosity, and mental health and wellbeing (Chapter 5, page 148);
3. how psychological, social and lifestyle factors are associated with religion, and mental health and wellbeing (Chapter 6, page 167);
4. and how stressful life events are associated with religiosity across the life course, and if religious practices and beliefs moderate the association between stressful life events, and mental health and wellbeing (Chapter 7, page 189).

Chapter 8 (page 223) summarises the main findings of the thesis and discusses the results in the context of previous research raising implications for public health and further directions.

2 A systematic review of religion, mental health and wellbeing

2.1 Introduction

As described in Chapter 1, most studies investigating the association between religiosity and health are based in the USA, are cross-sectional and are focused on clinical populations (Dein et al. 2012, Sessanna et al. 2011). Comparisons of religious practices and beliefs between the UK and USA show that the USA is more religious on every measure (Voas and Ling 2010). Cross-sectional studies are useful for understanding correlations between religiosity, and mental health and wellbeing but are not able to disentangle the potential for reverse causality (VanderWeele et al. 2016).

Recent reviews by Koenig (2012) and Bonelli and Koenig (2013) investigated how religiosity was associated with mental health and wellbeing. They found a majority of studies reported that religiosity was associated with a lower risk of depression and anxiety but found some studies indicating that religiosity is associated with higher risk of schizophrenia or bipolar depression. They also reported that most studies find positive associations between religiosity and wellbeing. A challenge with interpreting the findings from these systematic reviews is that different aspects of religiosity are treated interchangeably as 'religious involvement' due to poor definitions of religious beliefs and practices in the literature. However, this makes it difficult to understand the mechanisms through which religiosity may have an impact on mental health and wellbeing.

The aim of this systematic review was to summarise the findings of longitudinal studies investigating the associations between different aspects of religiosity, i.e. practice, beliefs, private practice, and denomination or affiliation, and mental health and wellbeing. The primary purpose of this review was to provide a foundation for, and to inform the research carried out in this thesis. For this reason, only longitudinal studies on adult community samples were included so they would be comparable to the MRC National

Survey of Health and Development (NSHD), which is a nationally representative British birth cohort study.

2.2 Methods

2.2.1 Identifying relevant articles

A systematic search was carried out to identify relevant studies published between 1st January 1990 and 31st March 2017, and written in English by searching Medline, PsychINFO and Web of Science. These databases were searched to identify articles containing terms and variants on mental health, wellbeing, religion, longitudinal and general population. Additional articles were found through searching the references of included articles and other reviews of research on religion and mental health or wellbeing. The search strategies used are in Appendices A and B (pages 259 and 261).

2.2.2 Inclusion criteria

The inclusion and exclusion criteria were defined in terms of population, exposure, outcomes and study design. This was adapted from the PICO (population, intervention, comparison and outcome) framework described in the Cochrane Handbook (Higgins and Green 2011).

Population

Studies on adults over the age of 18, residing in community samples were included and those using clinical populations, e.g. HIV, cancer or terminal illness, were excluded. Studies where the exposure (religiosity) was measured at <18 years old, and the outcome was measured in adulthood were also excluded. This was because religiosity in childhood and adolescence is most likely determined by parents and this review aimed to capture personal beliefs and practices.

Exposure: Religion and Spirituality

Studies measuring any aspect of religious practices and beliefs were included in the review and were categorised as follows:

- Religious attendance, e.g. at a place of worship
- Religious or spiritual beliefs, e.g. belief in God or a higher power
- Personal religious practice, e.g. prayer or reading religious texts
- Religious affiliation and denomination

Outcome

Studies measuring symptoms of depression and anxiety (either clinically diagnosed or self-rated), or mental wellbeing as an outcome were included in the review. Studies focusing on other mental health outcomes such as psychotic, bi-polar, personality and externalising disorders were excluded.

Study design

Longitudinal studies, cohort studies, prospective or follow-up studies were included in the review. As this thesis project will focus on associations between religiosity across the life course, and mental health and wellbeing, only longitudinal studies with at least one year of follow-up data were eligible for inclusion. Intervention studies were excluded from the review, as the findings may not be comparable to those from observational studies. Qualitative studies were also excluded.

2.2.3 Screening

All of the identified papers were checked for duplication, and the titles and abstracts of all remaining articles were screened against the inclusion and exclusion criteria. The articles identified at this stage were then subjected to a full-text screening. Data were extracted from all the articles which met the inclusion criteria.

2.2.4 Data extraction and study quality

Characteristics of the study, associations between the primary exposure and outcome measure, were extracted, and the quality of the articles was assessed using the Q-Coh (Jarde et al. 2013), a quality assessment tool designed specifically for cohort studies. The Q-Coh assesses the design of the study; selection bias, the measure used for the exposure and outcome, performance bias and potential bias due to attrition. Studies were rated as 'good', 'acceptable' or 'poor'.

2.2.5 Analysis

Narrative review

Studies were summarised and discussed according to different types of religious exposures (religious attendance, religious or spiritual beliefs, personal religious practice, and religious affiliation and denomination) and their associations with mental health and wellbeing.

Meta-analysis

Due to the heterogeneity of the articles, it was not possible to conduct a meta-analysis of all studies. However, a subset of four studies (Braam et al. 2004, Greenfield and Marks 2007, Li et al. 2016, Musick et al. 2000) reported unstandardized coefficients of the associations between religious attendance and depressive symptoms using the same measure of depression and comparable measures of religious attendance. A random-effects model which assumes heterogeneity between studies was fitted in STATA Version 14 (Kontopantelis and Reeves 2010, StataCorp 2015). Where standard errors were not reported, these were estimated using p-values or 95% confidence intervals (Altman and Bland 2011). A measure of I^2 was used to measure variation between studies due to heterogeneity, and a funnel plot was used to assess publication bias (Higgins et al. 2003).

2.3 Results

2.3.1 Identification, screening and summary of studies

Four-hundred and thirty-six studies were identified by searching the databases as described in the methods. An additional 30 studies were identified through other sources. After excluding duplicates, screening abstracts and screening full texts for eligibility, 36 papers were included in the analysis (Figure 2.1).

The majority of studies were conducted in the USA (67%) and had follow-up durations ranging from one to 41 years. All 36 papers were rated for quality; 13 of these papers were rated as good, and 23 were rated as acceptable. Table 2.1 summarises the characteristics of the studies included.

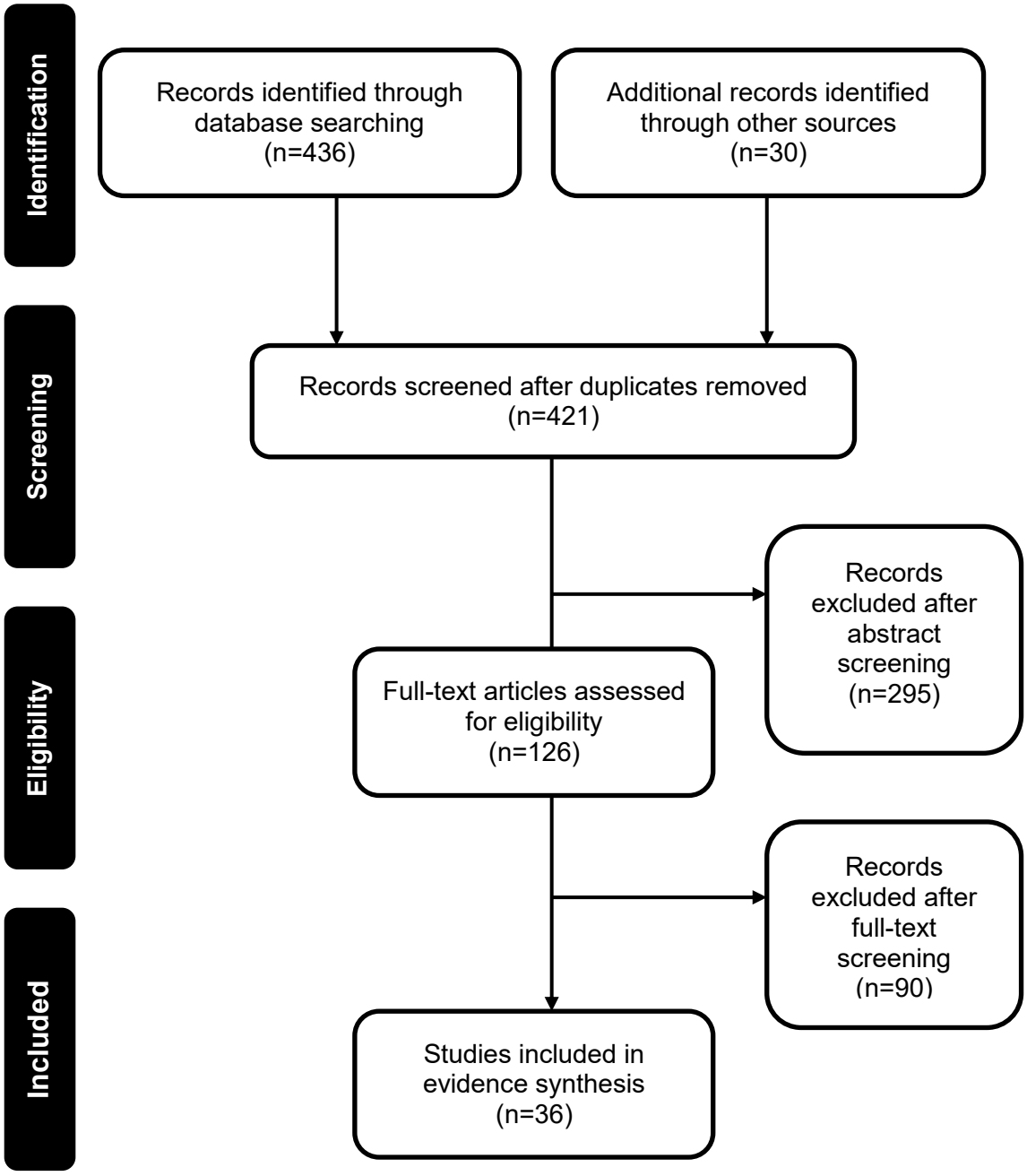


Figure 2.1. Flow chart of abstract and full-text screening

Table 2.1. Summary of studies included in the systematic review

Author	Country	Duration (years)	N	Age (years)	Gender	Ethnicity	Quality
Balbuena et al. (2013)	Canada	14	12,583	Grand mean=43.3	52% F	NR	Acceptable
Barton et al. (2013)	USA	20	173	Mean=29.5; SD = 6.3	59% F	NR	Acceptable
Braam et al. (1997)	The Netherlands	1	177	55-89	46% F	NR	Good
Braam et al. (2004)	The Netherlands	6	1,715	55-85	55% F	NR	Good
Braam et al. (2007)	The Netherlands	3	1,346-1,702	Mean=73.8; SD=8.0	54% F	NR	Good
Brown et al. (2004)	USA	2	103	38-92	90% F	89% White	Poor
Coleman et al. (2011)	Bulgaria	1	58	>60	52% F	NR	Acceptable
Croezen et al. (2015)	10 European countries	4	7,385	M=62.9; SD=8.8	45%F	NR	Good
Ellison and Flannelly (2009)	USA	4	607	NR	NR	100% Black	Acceptable
Fenix et al. (2006)	USA	1	175	M=57.0; SD=13.1	75% F	NR	Acceptable
Greenfield and Marks (2007)	USA	5	4,646	M=50;4 SD=12.7	61% F	78% White	Acceptable
Hayward and Krause (2014)	USA	1-7	195	>66	NR	NR	Acceptable
Kasen et al. (2014)	USA	20	91	Grand mean=28.7	59% F	NR	Acceptable
King et al. (2005)	USA	6	265	M=55; SD=8	100% F	53% White	Acceptable
Koenig and Vaillant (2009)	USA	23	456	47 at baseline	100% M	NR	Good
Krause (2006a)	USA	3	728-834	Mean= 74.3; SD=5.9	60% F	90% White	Acceptable
Krause (2009)	USA	2	818	Mean= 76.0; SD=6.6	60% F	90% White	Acceptable
Law and Sbarra (2009)	Australia	7-8	791	Mean=75.6; SD=5.8	58% F	NR	Acceptable

Author	Country	Duration (years)	N	Age (years)	Gender	Ethnicity	Quality
Lechner and Leopold (2015)	Germany	22	5,446	NR	NR	NR	Acceptable
Leurent et al. (2013)	6 European countries and Chile	1	8,318	18-76	67% F	73% European	Good
Levin and Taylor (1998)	USA	12-13	586	Mean=52.5; SD=14.5	68% F	100% Black	Good
Li et al. (2016)	USA	12	48,984	Mean=61.5; SD=7	100%F	97% White	Good
Lim and Putnam (2010)	USA	1	1,915	Mean=45.9; SD=17.3	48% F	73% White	Good
McIntosh et al. (2011)	USA	3	890	18-101	52% F	NR	Acceptable
Miller et al. (2012)	USA	10	114	Mean = 29; SD= 6	61% F	NR	Acceptable
Min et al. (2016)	Korea	4	4,098	Mean = 69.5; SD= 6.8	57% F	NR	Good
Musick et al. (2000)	USA	3	1,897	Mean=72.5; SD=6.2	67% F	61% Black	Good
Norton et al. (2008)	USA	3	2,989	Mean= 74; SD=6	58% F	NR	Acceptable
Rasic et al. (2011)	USA	8-12	1,014	18-65+	NR	41% White	Acceptable
Roh et al. (2015)	Korea	3	6,647	Mean=69.8; SD=6.1	56%F	NR	Good
Ronneberg et al. (2014)	USA	2	5,740	Mean=68.1; SD=1.39	59%F	78% White	Acceptable
Strawbridge et al. (2001)	USA	29	2,676	17-65	57% F	85% White	Acceptable
Sun et al. (2012)	USA	4	624	Mean= 75; SD = 6	50% F	89% White	Acceptable
Williams et al. (1991)	USA	2	720	Mean= 45; SD=17	56% F	89% White	Acceptable
Wink and Dillon (2008)	USA	38-41	300	60	53% F	98% White	Good
Yeager et al. (2006)	Taiwan	4	2,930	Mean=68.4; SD=8.8	46%F	NR	Acceptable

NR= Not reported; SD= Standard Deviation; F= Female; M=Male

2.3.2 Religious attendance

Out of the 36 studies included in this review, 28 (78%) investigated associations between religious attendance, and mental health or wellbeing. Religious attendance was measured by frequency of attendance ranging from daily to less than once a year and converted to a continuous scale, dichotomised at the median level or treated as a categorical variable. The results of these studies and the measures used for religious attendance, and mental health and wellbeing are summarised in Table 2.2.

Of the studies described in Table 2.2, 20 (71%) found that religious attendance was associated with better mental health and wellbeing. The majority of these studies investigated associations between religious attendance and mental health (n=24) rather than wellbeing (n=5). Of the studies investigating mental health, 17 found that attendance was associated with better mental health, six found no associations and one found that religious attendance was associated with more depressive symptoms. Of the studies investigating wellbeing, three found that religious attendance was associated with better wellbeing and two found no associations.

Table 2.2. Summary of studies assessing religious attendance

Author	**Outcome: Mental health and Wellbeing measure**	**Exposure: Religious attendance measure**	**Association between exposure and outcome**
Balbuena et al. (2013)	Composite International Diagnostic Interview—Short Form for Major Depression.	Frequency of religious attendance - Never - <monthly - ≥monthly Covariates: age, gender, marital status, income, education, family history of depression, perceived social support.	Attendance associated with lower risk of depression <u>Does not attend</u> HR=1 <u>Attends <monthly</u> HR=0.90, (0.76,1.09), p=0.3 <u>Attends ≥monthly</u> **HR=0.78, (0.63,0.95), p<0.01**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Barton et al. (2013)	Schedule for Affective Disorders and Schizophrenia-Lifetime Version.	Frequency of religious attendance - <monthly - ≥monthly Covariates: age, gender, history of depression (own and parental) and social adjustment.	Borderline association found between attendance and lower risk of depression **OR=0.4 (0.16,1.01), p=0.053**
Braam et al. (2004)	Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance - Once a year or less - Several times a year - Once a month - Three times a month - Weekly Covariates: age, denomination, religious salience, gender, education, marital status, chronic disease and functional limitations.	Church attendance negatively associated with a six-year course of depression symptoms **b=-0.44; SE=0.12, p<0.01**
Croezen et al. (2015)	Depressive symptoms measured by the EURO-D Scale.	Participation in religious organisations - Almost daily - Almost every week - Almost every month - Less often Covariates: social participation, age, time, household size, marital status, employment status, financial difficulties, self-rated health, long-term illness, activity limitations, and physician-diagnosed diseases.	Participation in religious organisations was associated with a decrease in depressive symptoms **β=-0.19; 95% CI=-0.37,-0.02**
Ellison and Flannelly (2009)	NIMH Diagnostic Interview Schedule (depression).	Frequency of religious attendance dichotomised at the median value - A few times a year or less - Once a month - 2-3 times a month - Weekly Covariates: baseline and pre-baseline depression gender, age, marital status, education, income major stressors self-esteem, personal mastery, and satisfaction with relationships.	No associations found between religious attendance and risk of depression. F=0.05, df=3, p=0.986

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Fenix et al. (2006)	Major Depression Disorder Module of the Structured Clinical Interview for the DSM-IV (SCID).	Frequency of religious attendance - Never - Less than a few times a year - Attends a few times a year - Attends monthly Covariates: none.	No associations found between frequency of attendance and major depressive disorder. Never (Ref) Less than a few times a year OR=0.24; 95% CI=0.02,2.31, p=0.2 Attends a few times a year OR=0.48; 95% CI=0.09,2.34, p=0.4 Attends monthly OR=0.29; 95% CI=0.07,1.24, p=0.10
Greenfield and Marks (2007)	Center for Epidemiologic Studies Depression scale (CES-D). Personal growth using Ryff's Personal Growth index.	Continuous participation in religious groups between T1 and T2 (5 years) - >monthly - monthly Covariates: baseline depression, ethnicity, education, employment status, household income, child younger than 19, marital status, age, gender, and development of functional limitations.	Continuous participation in religious groups was associated with lower mean depressive symptoms and higher mean personal growth Depressive symptoms **b= -0.05, p<0.01** Personal growth **b = 0.44, p<0.001**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
(Kasen et al. 2014)	The Global Assessment Scale.	Frequency of religious attendance. Continuous score - Never - 1-2 times a year - Once a month - Once a week Covariates: age, social class, and parental depression.	No association found between attendance and psychosocial function in those without a history of major depressive disorder. <u>Women</u> β=-1.12; SE=1.82 <u>Men</u> β =-1.26; SE=2.54 Attendance was positively associated with an improvement of psychosocial function for those with a history of major depressive disorder (women only) <u>Women</u> **β=3.49; SE=2.01, p<0.05** <u>Men</u> β =-2.10; SE=2.95
King *et al.* (2005)	SF-12 Mental Health Component Scores	Frequency of religious attendance - Never - Once or twice a year - Several times a year - Once a month - Nearly every week - Every week - Several times a week Covariates: baseline self-reported health status, ethnicity, and marital status.	Religious attendance was associated with higher mental component score compared to those attending less than once a week **β=0.15, p<0.05**
Koenig and Vaillant (2009)	Subjective well-being/life satisfaction: A combination of satisfaction with work, children, friends, and marriage, and the best score from community service, hobby, or sports.	Frequency of religious attendance. Continuous score ranging from 1-4 - Never - Occasionally - Monthly - Weekly or more Covariates: health, social class, years of education, mood, alcohol abuse/dependence, and smoking.	Attendance associated with higher mean subjective wellbeing **b=1.64, p=0.001**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Krause (2009)	Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance. Continuous score ranging from 1-9 - Never - Less than once a year - About once or twice a year - Several times a year - About once a month - Two to three time a month - Nearly every week - Every week - Several times a week Covariates: age, gender education, socioeconomic status, previous mental health, stressful life events, and marital status.	Attendance was associated with a decrease in depressive symptoms **b=-0.084; SE not reported; p<0.01**
Law and Sbarra (2009)	Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance - Never attending at both waves - Inconsistent (>monthly at one wave) - Consistent (>monthly at both waves) Covariates: age, gender, marital status, and self-rated health.	Not attending religious services was associated with the development of depressive symptoms compared to those attending consistently or inconsistently. **b=0.19; SE=0.06; p<0.01**
Lechner and Leopold (2015)	Life satisfaction measured by asking 'how satisfied are you with your life, all things considered' from 0 (completely dissatisfied) and 10 completely satisfied.	Frequency of religious attendance - Never - Less frequently - At least once a month - Weekly or more Covariates: migration background, marital status, period, and east/west Germany.	Weekly religious attendance was associated with higher levels of life satisfaction. This was moderated by the length of time unemployed. <u>Unemployed 0-1 years</u> **b=0.36; SE=0.13; p<0.01** <u>Unemployed 1-2 years</u> **b=0.47; SE=0.19; p<0.05** <u>Unemployed 2-3 years</u> **b=0.63; SE=0.23; p<0.01**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Levin and Taylor (1998)	Life satisfaction: In general, how satisfied are you with your life as a whole? (1-4 with 1=very dissatisfied and 4=very satisfied). Happiness: Taking all things together, how would you say things are these days? (1-3 with 1=not too happy and 3=very happy).	Frequency of religious attendance. Continuous - Never - Less than once a year - A few times a year - Monthly - Weekly - Daily Covariates: religion, health, age, gender, education, marital status, employment status, region of USA, and urbanicity.	Attendance was not associated with life satisfaction or happiness Life satisfaction β=0.01; SE not reported Happiness β=-0.03; SE not reported
Li et al. (2016)	Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance. - Never or almost never - Less than once a month - One to three times a month - Once a week - More than once a week Covariates: age, baseline depression, baseline religion, living alone, employment status, marital status, education, husband education, HRT use, ethnicity, geographic region, income, height, family history of heart attacks, family history of cancer, family history of diabetes, BMI, weight change, physical activity, hypertension, hypercholesterolemia, diabetes, diet quality, alcohol consumption, number of close friends, having someone close to talk to, smoking status, and physical /functional limitations.	Frequent religious attendance was associated with fewer depressive symptoms compared to those who never attend. Never (Ref) Less than once a week **b=-0.20; SE=0.08; p<0.05** Once a week **b=-0.48; SE=0.09; p<0.001** More than once a week **b=-0.53; SE=0.10; p<0.001**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Lim and Putnam (2010)	Life satisfaction measured by asking how satisfied participants were with their lives on a 10-point scale where 10 is 'extremely satisfied'.	Frequency of religious attendance on a 5-point scale ranging from never to more than once a week. This was translated into a measure of an approximate number of day's attendance per year and log-transformed for analysis. Covariates: age, gender, education, socio-economic status, physical health, previous mental health, marital status, and social support.	Religious attendance and increase in religious attendance was associated with higher levels of life satisfaction <u>Religious attendance</u> **b=0.15; SE=0.34, p<0.001** <u>Increase in religious attendance</u> **b=0.15; SE=0.05, p<0.01** These associations were attenuated by adjusting for the number of friends in the congregation <u>Religious attendance</u> b=0.03; SE=0.05 <u>Increase in religious attendance</u> b=0.09; SE=0.05
McIntosh et al. (2011)	Physician-diagnosed Anxiety Disorder and Depression. Positive affect: frequency of experiencing positive emotions in the past week.	Frequency of religious attendance on a 5-point scale ranging from - Never (1) - Sometimes (3) - All the time (5) Covariates: age, gender, ethnicity, income, baseline mental health, time since 9/11, and exposure to 9/11.	Religious attendance was associated with a lower risk for anxiety or depressive disorder, and higher positive affect. <u>Anxiety and depression</u> **IRR=0.88**; **95% CI=0.79,0.98, p<0.05** <u>Positive affect</u> **b=0.06 (0.03,0.08), p<0.001**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Miller et al. (2012)	Schedule for Affective Disorders and Schizophrenia.	Frequency of religious attendance - <monthly - >monthly Covariates: age, gender history of depression.	No association found between religious attendance and mental health for high (has a depressed parent) risk or low risk (does not have a depressed parent) groups <u>High risk</u> OR=0.62, (0.18,2.09), p=0.4 <u>Low risk</u> OR=0.9, (0.07,12.01), p=0.7
Min et al. (2016)	Korean version of the Center for Epidemiologic Studies Depression scale (CES-D).	Participation in religious services - No - Yes Covariates: age, gender, education, physical health, previous mental health problems, marital status, and social support.	Participation in religious services was associated with an increased in depressive symptoms **β=0.22; SE=0.01, p<0.001** This association was found for those without depression but not for those with depression at baseline <u>Not depressed at baseline</u> **β=0.19; SE=0.06, p<0.01** <u>Depressed at baseline</u> β=0.10; SE=0.13
Musick et al. (2000)	Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance measured with 6 responses options ranging from never/almost never to more than once a week. Covariates: depression at baseline, alcohol use at baseline, gender, ethnicity, age, marital status, education, income, functional impairment, social interactions, and social support.	Religious attendance was associated with fewer depressive symptoms but only in urban areas <u>Rural</u> b=-0.01 **<u>Urban</u>** **b=-0.05; p<0.01**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Norton et al. (2008)	NIMH Diagnostic Interview Schedule (DIS).	Frequency of religious attendance. Continuous measure - Never - Less than once a month - 1-2 times a month - Weekly - More than weekly Covariates: gender, marital status, education, age, activities of daily living problems, vascular health problems, non-psychotropic meds, and prior depression.	Attending church weekly or more often was associated with a lower risk for depression **OR=0.51; 95% CI=0.28,0.92**
Rasic et al. (2011)	Mood and anxiety disorders measured by Diagnostic Interview Schedule Version III-Revised.	Frequency of religious attendance - Never attends - Attends Covariates: gender, ethnicity, income, education, marital status, age, baseline mental disorders, social supports, and chronic conditions.	No associations found between religious attendance and depression or anxiety <u>Depression</u> OR=1.84; 95% CI=0.58,5.78 <u>Anxiety</u> OR=0.65; 95% CI=0.33,1.26
Roh et al. (2015)	Korean version of the 15-item Geriatric Depression Scale.	Frequency of religious participation - Less than once a week - Once a week or more Covariates: age, gender, education, quartiles of household income, smoking, alcohol intake, number of diseases, disability, cognitive function, and baseline depression score.	Frequent religious attendance was associated with fewer depression symptoms <u>Less than once a week (Ref)</u> <u>Once a week or more</u> **β=-0.34; SE=0.11; p=0.003**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Ronneberg et al. (2014)	8-item Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance - Low attendance - Moderate (2-3 times a month) - High (more than once a week) - Low (one or more times a year, or never) Covariates: age, gender, ethnicity, self-reported health and chronic conditions, alcohol use, marital status, education, adversity, and social support.	Low and high attendance was associated with lower odds of depression compared to moderate attendance for those with no depression at baseline. Low attendance **OR=0.75; p<0.035** Moderate: Ref High attendance **OR=0.65; p<0.001** No associations were found between religious attendance and depressive symptoms for those who had depression at baseline. Low attendance OR=1.36; p=0.6 Moderate: Ref High attendance OR=1.18; p=0.3

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Strawbridge et al. (2001)	Depression was measured using the 18-item scale of depressive symptoms developed by Roberts and O'Keefe.	Frequency of religious attendance - Less than weekly or never - Weekly attendance Covariates: age, gender, education, and self-rated health.	Religious attendance associated with improved mental health for women only. Men and women **OR=2.31; 95% CI=1.23,4.35** Men OR=0.81; 95% CI=0.27,2.45 Women **OR=3.56; 95% CI=1.64,7.73** No association found between religious attendance and onset of depression OR=0.76; 95% CI=0.55,1.05
Sun et al. (2012)	Short form (15-item) of the Geriatric Depression Scale (GDS).	Frequency of religious attendance. Continuous measure from never (1) to more than once a week (6). Covariates: age, ethnicity, health, social support, and income adequacy.	No linear or quadratic associations were found between attendance and depressive symptoms. Linear association b=0.01; SE=0.01 Quadratic association b=0.00; SE=0.04
Williams et al. (1991)	Psychological distress measured the Gurin symptom checklist scale.	Frequency of religious attendance. Continuous measure from never (1) to more than once a week (6). Covariates: age, education, marital status, gender, and ethnicity.	Attendance was not associated with psychological distress b=-0.32; SE=0.32

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious attendance measure	Association between exposure and outcome
Yeager *et al.* (2006)	10-item Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of religious attendance - Never - Rarely - Sometimes - Often Covariates: all religion variables, sociodemographic controls (age, gender, years of education, mainlander/Taiwanese), health-related behaviours, social networks and support, and self-reported health outcomes.	No association between religious attendance and depression Never (Ref) Rarely b=-0.94; SE not reported Sometimes b=-0.53; SE not reported Often b=-0.53; SE not reported

b=unstandardized regression coefficient; β=standardized regression coefficient; HR= Hazard ratio, OR= Odds Ratio, IRR= Incidence rate ratio

Figure 2.2 shows the results of a meta-analysis of four studies analysing associations between religious attendance and depression using the Center for Epidemiologic Studies Depression scale (CES-D). All of these studies found that religious attendance was associated with fewer depressive symptoms. Pooled association of these six studies was strong indicating that religious attendance is associated with fewer symptoms of depression (b=-0.25 (95% CI=-0.36, -0.13). The percentage of variation due to heterogeneity between studies was high (91.1%), and the funnel plot indicates that there is likely to be publication bias of studies on religious attendance and depression (Appendix C, page 262).

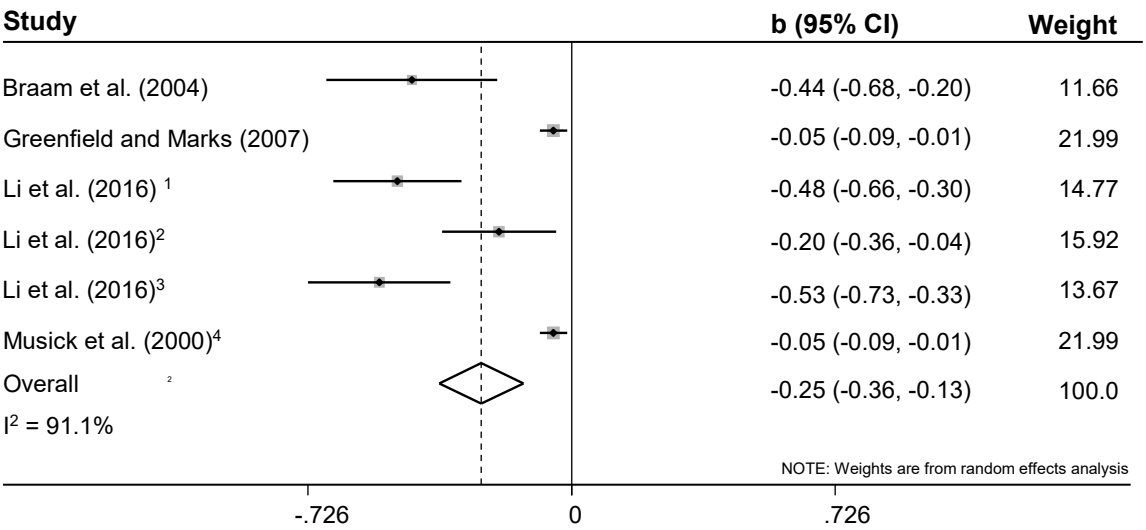


Figure 2.2 Forest plot of association between religious attendance and depressive symptoms.

[1] Less than once a week vs. never
[2] Once a week vs. never
[3] More than once a week vs. never
[4] Urban population only

2.3.3 Religious or spiritual beliefs

More than half of the studies (n=20; 56%) investigated religious and spiritual beliefs in relation to mental health. The results of these studies and the measures used for religious attendance, and mental health or wellbeing are summarised in Table 2.3. Religious and spiritual beliefs were measured by directly asking about religious or spiritual beliefs, including the strength and importance of the beliefs. Other measures investigated aspects of religious or spiritual beliefs such as the role of beliefs in guiding life, and religious doubts.

Of the studies described in Table 2.3, 11 (55%) found that religious beliefs were associated with better mental health and wellbeing. Many of these studies investigated associations between religious beliefs and mental health (n=16) rather than wellbeing (n=5). Of the studies investigating mental health, eight found that religious beliefs were associated with better mental health, seven found no associations and one found that spirituality was associated with more depressive symptoms (Leurent et al. 2013). Of the

studies investigating wellbeing, three found that religious beliefs were associated with better wellbeing and two found no associations.

Table 2.3. Summary of studies assessing religious or spiritual beliefs

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Balbuena et al. (2013)	Composite International Diagnostic Interview—Short Form for Major Depression.	Importance of spiritual values - No - Yes Identifying as a spiritual person - Not religious - Religious Covariates: age, gender, marital status, income, education, family history of depression, perceived social support.	No association found between the importance of religion or identifying as a spiritual person and risk of depression <u>Importance of spiritual values</u> HR=0.88, (0.72,1.07) <u>Identifying as a spiritual person</u> HR=1.14, (0.85,1.51)
Braam et al. (1997)	Center for Epidemiologic Studies Depression scale (CES-D).	Religious salience. Participants were considered to have religious salience if they selected 'strong faith' as one of three domains important in life from a list of 8 (strong faith, good income, harmonious family life, good health, meaningful pastimes, good marital life, many friends and acquaintances and good housing). Covariates: age, gender, marital status, education, income and physical health.	Lack of religious salience associated with increased risk of chronic depression but not 1-year incidence <u>1-year incidence</u> OR = 2.66 (0.94,7.55) <u>1-year chronic course</u> **OR = 5.85 (1.52,22.6)**
Braam et al. (2004)	Center for Epidemiologic Studies Depression scale (CES-D).	Religious orthodoxy measured by a 7-item continuous scale which asks about belief in life after death, heaven, purgatory, hell, the devil, the existence of Adam and Eve and the Bible as God's word. Religious salience measured by a 5-item scale asking about the relevance of religion in personal life. Covariates: age, denomination, religious salience, gender, education, marital status, chronic disease and functional limitations.	Religious orthodoxy not associated with a 6-year course of depressive symptoms. b=0.05; SE=0.09 Religious salience associated with an increased 6-year course of depressive symptoms. **b=0.09; SE=0.01, p<0.05**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Brown et al. (2004)	Centre for Epidemiologic Studies Depression scale (CES-D). The Symptoms Checklist 90 for anxiety. 5 Items developed by Bradburn (1969) on positive feelings such as joy and contentment.	Importance of religious/spiritual beliefs - Not at all important - Not too important - Fairly important - Very important Covariates: gender, age, education, ethnicity, personality, the locus of control, interpersonal dependency, physical health, marital satisfaction, emotional support from spouse, and equity with a spouse.	Increase in importance of religious/spiritual beliefs after becoming a widow was not associated with depression, anxiety or wellbeing. Effect sizes not reported <u>Depression</u> F3,99 <1 <u>Anxiety</u> F3,99 <1 <u>Subjective wellbeing</u> F3,99 =1.60
Coleman et al. (2011)	Hospital Anxiety and Depression scale (HADS).	The Royal Free Interview for Religious and Spiritual Beliefs which includes the strength of belief (5 questions on 0-10 Likert scale). Covariates: none.	The strength of religious belief was associated with a decline in mean depression and anxiety symptoms. **Mean difference= 9.66; 95% CI=0.65,18.66, p=0.036**
Ellison and Flannelly (2009)	NIMH Diagnostic Interview Schedule.	Religious guidance. How much guidance religion provides in day-to-day living. - < a great deal - A great deal Covariates: baseline and pre-baseline depression gender, age, marital status, education, income major stressors self-esteem, personal mastery, and satisfaction with relationships.	High levels of religious guidance were associated with reduced risk of depression. **OR=0.47, p<0.05**
Hayward and Krause (2014)	Center for Epidemiological Studies Depression Scale (CES-D).	Religious doubt measured by a 5-item scale with responses ranging from never to very often. Covariates: none.	A quadratic and linear (u-shaped) association was found between religious doubt and risk of depression. <u>Linear</u> **b=-1.07 (-2.03, -0.12), p=0.027** <u>Quadratic</u> **b=0.15 (0.03, 0.27), p=0.016**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Kasen et al. (2014)	The Global Assessment Scale.	Religious or spiritual importance - Not important at all - Slightly important - Moderately important - Highly important Covariates: age, social class, and parental depression.	No association found between religious or spiritual importance and change in psychosocial function without a history of major depressive disorder. Women β=2.04; SE=1.86 Men β=3.14; SE=2.35 Religious or spiritual importance was associated with an increase in psychological functioning in those with a history of major depressive disorder (men only). Women β=-1.89; SE=2.06 Men **β=4.60; SE=1.13, p<0.05**
King et al. (2005)	SF-12 Mental Health Component Scores.	Strength of religious beliefs - Not at all strong - Not very strong - Somewhat strong - Very strong Covariates: baseline self-reported health status, ethnicity, and marital status.	No association found between religious beliefs mental health component score. 53.4 vs. 51.7, p=0.11

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Krause (2006a)	Life satisfaction; self-esteem and optimism.	Religious doubt measured by a 5-item scale with responses ranging from never to very often. Items ask how often participants are experiencing a range of doubts about religious beliefs, what they have been taught in church, whether prayers make a difference. Higher scores indicate higher levels of religious doubt. Covariates: age, gender, marital status, education, ethnicity, baseline doubt, baseline life satisfaction, baseline self-esteem, baseline optimism, and doubt*education.	Religious doubt was associated with lower life satisfaction; self-esteem and optimism Life satisfaction **b=-0.04, p<0.05** Self-esteem **b=-0.06, p<0.01** Optimism **b=-0.06, p<0.005**
Leurent et al. (2013)	Major Depressive Disorder diagnosed using DSM-IV criteria	Royal Free Interview for Spiritual and Religious Beliefs. - Secular - Spiritual - Religious Covariates: age, gender, education, employment, social support, history of depression, and country.	No association found between religious belief and risk of onset of depression. Religious OR=1.14 (0.87,1.50) Spirituality was associated with increased risk onset of depression. Spirituality **OR=1.32 (1.02,1.70)**
Levin and Taylor (1998)	Life satisfaction: In general, how satisfied are you with your life as a whole? (1-4 with 1=very dissatisfied and 4=very satisfied). Happiness: Taking all things together, how would you say things are these days? (1-3 with 1=not too happy and 3=very happy).	Subjective religiosity measured by asking how religious a person is. - Not religious at all - Not too religious - Fairly religious - Very religious Covariates: religion, health, age, gender, education, marital status, employment status, a region of the USA, and urbanicity.	No association found between subjective religiosity and life satisfaction or happiness. Life satisfaction β=0.02; SE not reported Happiness β=-0.00; SE not reported

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Lim and Putnam (2010)	Life satisfaction measured by asking how satisfied participants were with their lives on a 10-point scale where 10 is 'extremely satisfied'.	Importance of religion in daily life and importance of religion in making decisions regarding career, family, or health ranging from not at all (0) to extremely important (3). Strong believer in religion, God or had a born-again experience - No - Yes Belief in afterlife, heaven and that scripture is the actual word of God from not at all (1) to absolutely (4). How often personally felt God's love, judgement or presence from never (0) to very often (3). Covariates: age, gender, education, socio-economic status, physical health, previous mental health, marital status, and social support.	No associations were found between any measure of personal religious practice and life satisfaction <u>Importance of religion in daily life</u> b=0.01; SE=0.05 <u>Importance of religion in decision making</u> b=0.07; SE=0.04 <u>Strong believer of own religion</u> b=0.09; SE=0.05 <u>Belief in God</u> b=0.04; SE=0.10 <u>Belief in afterlife</u> b=-0.03; SE=0.03 <u>Belief in heaven</u> b=0.01; SE=0.03 <u>Experience God's presence</u> b=0.01; SE=0.08 <u>Feel God's love</u> b=0.14; SE=0.06 <u>Feel God's judgement</u> b=0.06; SE=0.05 <u>Inerrancy of scripture</u> b=0.21; SE=0.13 <u>Has a born-again experience</u> b=0.05; SE=0.10

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
McIntosh et al. (2011)	Physician-diagnosed Anxiety Disorder and Depression. Positive affect: frequency of experiencing eight positive emotions in the past week.	Spirituality measured using the 2-items from the Religious Orientation Scale asking if life is lived according to spiritual or religious beliefs rated from 1 (strongly disagree) to 5 (strongly agree). Covariates: age, gender, ethnicity, income, baseline mental health, time since 9/11, and exposure to 9/11.	Spirituality associated with improved positive affect but not the onset of anxiety or depressive disorder. Onset of anxiety or depressive disorder IRR=1.04; 95% CI= 0.92,1.17 Positive affect **b=0.05 (0.02,0.08), p<0.01**
Miller et al. (2012)	Schedule for Affective Disorders and Schizophrenia.	The importance of religious belief. A 4-item scale ranging from not at all important to very important. Covariates: age, gender history of depression.	Importance of religious beliefs was associated with lower odds of affective disorders for the high risk (has a depressed parent) group but not the low-risk group (does not have a depressed parent). High risk **OR=0.10, (0.01,0.92), p<0.05** Low risk OR=0.70, (0.06,8.20), p=0.9
Rasic et al. (2011)	Mood and anxiety disorders measured by Diagnostic Interview Schedule Version III-Revised.	Frequency of seeking spiritual comfort - Never - Rarely - Sometimes - Often - Always Covariates: Gender, ethnicity, income, education, marital status, age, baseline mental disorders, social supports, and chronic conditions.	No association found between seeking spiritual comfort and depression or anxiety. Depression OR=2.27; 95% CI=0.65,7.95 Anxiety OR=0.81; 95% CI=0.41,1.59

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Ronneberg et al. (2014)	8-item Center for Epidemiologic Studies Depression scale (CES-D).	Importance of religiosity - Very important - Somewhat - Not important Index of Religiosity: Four items ranging from strongly disagree (1) to strongly agree (6) - Belief in God watching over - Events unfold according to a divine plan - Carry religious belief into dealings in life - Finding strength and comfort in religion Covariates: age, gender, ethnicity, self-reported health and chronic conditions, alcohol use, marital status, education, adversity, and social support.	No association between the importance of religiosity and depression for those not depressed at baseline and for those depressed at baseline. *Not depressed at baseline* Not important (Ref) Very important OR=1.23; p=0.3 Somewhat important OR=1.01; p=0.98 *Depressed at baseline* Not important (Ref) Very important OR=0.81; p=0.3 Somewhat important OR=1.00; p=0.1 Index of Religiosity not associated with depression for those not depressed at baseline and for those depressed at baseline. *Not depressed at baseline* OR=1.00, p=0.9 *Depressed at baseline* OR=1.10, p=0.05

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Sun *et al.* (2012)	Short form (15-item) of the Geriatric Depression Scale (GDS).	Intrinsic religiosity - Low - Moderate - High Covariates: age, ethnicity, health, social support, and income adequacy.	A quadratic (n-shaped) association was found between high intrinsic religiosity and depressive symptoms, but no linear association was found. <u>Linear association</u> b=0.07; SE=0.04 <u>Quadratic association</u> **b=-0.21; SE=0.009** **p<0.01**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Wink and Dillon (2008)	Ryff's Positive Relations with Others scale and Personal Growth Scale.	Religiousness and spirituality were assessed from qualitative interviews and was defined in terms of their importance in life - No part of life - Peripheral role in life - Somewhat importance - Important - A central role in life Covariates: gender, age and social class.	Religiousness in early and mid-late adulthood associated with wellbeing from positive relations in late adulthood Early adulthood **β=0.22, p<0.05** Middle-late adulthood **β=0.22, p<0.05** No associations were found between religiousness in early and late middle adulthood with wellbeing from personal growth in late adulthood Early adulthood β= 0.15 Middle-late adulthood β-=0.11 No associations were found between spirituality in early and late middle adulthood with wellbeing from positive relations in late adulthood Early adulthood β=-0.05 Middle-late adulthood β=0.03 Spirituality in mid-late adulthood, but not early adulthood was associated with wellbeing from personal growth in late adulthood Early adulthood β=0.06 Middle-late adulthood **β=0.25, p<0.01**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious or spiritual beliefs measure	Association between exposure and outcome
Yeager et al. (2006)	10-item Center for Epidemiologic Studies Depression scale (CES-D).	Religious beliefs index based on four items on belief in life after death. Covariates: all religion variables, sociodemographic controls (age, gender, years of education, mainlander/Taiwanese), health-related behaviours, social networks and support, and self-reported health outcomes.	No association between religious beliefs index and depression b=0.01; SE not reported

b=unstandardized regression coefficient; β=standardized regression coefficient; OR= Odds Ratio

2.3.4 Personal religious practice

Only seven of the 36 (19%) studies investigated associations between personal religious practice, and mental health or wellbeing. The results of these studies and the measures used for religious attendance, and mental health and wellbeing are summarised in Table 2.4. Personal practice included the frequency of prayer, religious reading, listening to religious TV or radio. Of the studies described in Table 2.4, five investigated associations between religious beliefs and mental health and two investigated associations between religious beliefs and wellbeing. Of the studies investigating mental health, one found that private religious practice was associated with better mental health, three found no associations and one found that private practice was associated with more depressive symptoms. Both of the studies investigating private religious practice and wellbeing found no associations.

Table 2.4. Summary studies assessing personal religious practice

Author	Outcome: Mental health and Wellbeing measure	Exposure: Personal religious practice measure	Association between exposure and outcome
Braam et al. (2007)	Center for Epidemiological Studies Depression Scale (CES-D).	Frequency of prayer or meditation measured on a scale from 1 (never) to 8 (more than once a day). Covariates: age, gender, education, income, marital status, functional limitations, chronic diseases and cognitive function.	No association found between prayer and depressive symptoms (n=1,702) b=0.02; SE=0.054, p=0.709 Or change in depressive symptoms (n=1,346) b=0.021; SE=0.055, p=0.698
Levin and Taylor (1998)	Life satisfaction: In general, how satisfied are you with your life as a whole? (1-4 with 1=very dissatisfied and 4=very satisfied). Happiness: Taking all things together, how would you say things are these days? (1-3 with 1=not too happy and 3=very happy).	The frequency of prayer, reading religious books, listening to religious TV/radio, and asking for prayer. Continuous measure. - Never - A few times a year a - A few times a month - At least once a week - Nearly every day Covariates: religion, health, age, gender, education, marital status, employment status, a region of the USA, and urbanicity.	No associations were found between any personal religious practices and life satisfaction or happiness. *Life satisfaction* <u>Prayer</u> β=0.03; SE not reported <u>Asking for prayer</u> Beta=0.02; SE not reported <u>Reading religious books</u> β=0.06; SE not reported <u>Listening to religious TV/Radio</u> β=0.00; SE not reported *Happiness* <u>Prayer</u> β=0.06; SE not reported <u>Asking for prayer</u> β=-0.02; SE not reported <u>Reading religious books</u> β=-0.04; SE not reported <u>Listening to religious TV/Radio</u> β=-0.01; SE not reported

Author	Outcome: Mental health and Wellbeing measure	Exposure: Personal religious practice measure	Association between exposure and outcome
Lim and Putnam (2010)	Life satisfaction measured by asking how satisfied participants were with their lives on a 10-point scale where 10 is 'extremely satisfied'.	Frequency (logged) per week of - Prayer - Reading scripture - Saying grace Religious service at home - Yes - No How often talk about religion (logged). No further details provided Covariates: age, gender, education, socio-economic status, physical health, previous mental health, marital status, and social support.	No associations were found between any measure of personal religious practice and life satisfaction <u>Prayer</u> b=-0.73; SE=0.04 <u>Reading scripture</u> b=-0.15; SE=0.12 <u>Saying grace</u> b=-0.02; SE=0.05 <u>Religious service at home</u> b=-0.10; SE=0.04 <u>Talk religion</u> b=-0.02; SE=0.04
Musick *et al.* (2000)	Center for Epidemiological Studies Depression Scale (CES-D).	The frequency of private religious activities, e.g. prayer, meditation or Bible study on a 6-point scale ranging from never to more than once a week. The frequency of watching/listening religious services or religious programs on TV/radio on a 6-point scale ranging from never to more than once a week. Covariates: Depression at baseline, alcohol use at baseline, gender, ethnicity, age, marital status, education, income, functional impairment, social interactions, and social support.	No associations were found between frequency of prayer, meditation or Bible study and depressive symptoms. <u>Rural</u> b=-0.01 <u>Urban</u> b=-0.00 Watching or listening to religious services on TV or Radio was associated with more depressive symptoms. **<u>Rural</u>** **b=0.05; p<0.05** **<u>Urban</u>** **b=-0.04; p<0.05**
Ronneberg *et al.* (2014)	8-item Center for Epidemiologic Studies Depression scale (CES-D).	Frequency of private prayer from 1-8 with 8 representing very frequent prayer. Covariates: age, gender, ethnicity, self-reported health and chronic conditions, alcohol use, marital status, education, adversity, and social support.	No association between private prayer and depression for those not depressed at baseline OR=0.98, p=0.5 Prayer was associated with fewer depressive symptoms at follow-up for those who were depressed at baseline. **OR=0.93, p<0.05**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Personal religious practice measure	Association between exposure and outcome
Sun *et al.* (2012)	Short form (15-item) of the Geriatric Depression Scale (GDS).	The frequency of private religious activities, e.g. prayer, meditation or Bible study on a 6-point scale ranging from never to more than once a week. Covariates: age, ethnicity, health, social support, and income adequacy.	No linear or quadratic associations were found between prayer and depressive symptoms. <u>Linear association</u> b=-0.01; SE=0.06 <u>Quadratic association</u> b=0.00; SE=0.01
Yeager *et al.* (2006)	10-item Center for Epidemiologic Studies Depression scale (CES-D).	The frequency of religious practice based on prayer, reading scripture, listening to/watching programs and prayer to cope with times of difficulty and guidance. Covariates: all religion variables, sociodemographic controls (age, gender, years of education, mainlander/Taiwanese), health-related behaviours, social networks and support, and self-reported health outcomes.	No association between religious practice index and depression b=0.01; SE not reported

b=unstandardized regression coefficient; β=standardized regression coefficient; OR= Odds Ratio

2.3.5 Religious affiliation and denomination

Of the 36 studies included in this review, 10 (28%) investigated associations between religious affiliation or denomination, and mental health or wellbeing. The results of these studies and the measures used for religious attendance, and mental health and wellbeing are summarised in Table 2.5. Most of the studies were on Christian populations although some studies included Jewish participants.

Eight of the studies investigated how religious denomination was associated with mental health and two studies investigated associations with wellbeing. Out of the eight studies investigating differences in mental health by denomination, six found no differences. One study found that being a member of the Latter-Day Saints was associated with a higher risk of depression compared to all other participants (Norton et al. 2008). Another study

found that Jewish participants had a higher risk of depression compared to Catholic participants (Ronneberg et al. 2014). Neither of the two studies investigating associations between wellbeing and religious denomination or affiliation found any significant associations.

Table 2.5. Summary of studies assessing denomination

Author	**Outcome: Mental health and Wellbeing measure**	**Exposure: Religious denomination**	**Association between exposure and outcome**
Braam *et al.* (2004)	Center for Epidemiologic Studies Depression scale (CES-D).	Religious denomination - Not a member - Catholic - Protestant Covariates: age, denomination, religious salience, gender, education, marital status, chronic disease and functional limitations.	No association found between denomination and risk of depression compared to non-church members. Not a member (Ref) Catholic b=-0.13; SE=0.45 Protestant b=-0.20; SE=0.45
Fenix *et al.* (2006)	Major Depression Disorder Module of the Structured Clinical Interview for the DSM-IV (SCID).	Church or synagogue membership - No - Yes Covariates: none.	No associations found between church or synagogue membership and major depressive disorder. No (Ref) Yes OR=0.42; 95% CI=0.13,1.36, p=0.1

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious denomination	Association between exposure and outcome
Kasen *et al.* (2014)	The Global Assessment Scale.	Religious denomination - Catholic - Protestant - Other Covariates: age, social class, and parental depression.	No association found between denomination and psychosocial function in men or women with or without a history of major depressive disorder. *Women (no history of depression)* <u>Catholic (Ref)</u> <u>Protestant</u> β=2.53; SE=3.77 <u>Other affiliation</u> β=6.85; SE=4.41 *Men (no history of depression)* <u>Catholic (Ref)</u> <u>Protestant</u> β=3.04; SE=6.62 <u>Other affiliation</u> β=-0.10; SE=3.89. *Women (history of depression)* <u>Catholic (Ref)</u> <u>Protestant</u> β=-2.10; SE=4.50 <u>Other affiliation</u> β=4.86; SE=4.73 *Men (history of depression)* <u>Catholic (Ref)</u> <u>Protestant</u> β=-1.36; SE=3.69 <u>Other affiliation</u> β=-5.56; SE=3.95

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious denomination	Association between exposure and outcome
Levin and Taylor (1998)	Life satisfaction: In general, how satisfied are you with your life as a whole? (1-4 with 1=very dissatisfied and 4=very satisfied). Happiness: Taking all things together, how would you say things are these days? (1-3 with 1=not too happy and 3=very happy).	Church membership - Not a member - Member Covariates: religion, health, age, gender, education, marital status, employment status, region of USA, and urbanicity.	No association found between the denomination and life satisfaction or happiness. <u>Life satisfaction</u> β=0.03; SE not reported <u>Happiness</u> β=-0.02; SE not reported

Lim and Putnam (2010)	Life satisfaction measured by asking how satisfied participants were with their lives on a 10-point scale where 10 is 'extremely satisfied'.	Religious denomination - No religion - Catholic - Mainline Protestant - Evangelical Protestant - Black Protestant - Jewish - Mormon - Other non-Christian traditions - Other Christian traditions Covariates: age, gender, education, socio-economic status, physical health, previous mental health, marital status, and social support.	Religious groups, apart from Black Protestant and Other non-Christian Traditions reported higher life satisfaction compared to those reporting no religious group No religion (reference) Catholic b=0.43 SE=0.12, p<0.001 Mainline Protestant b=0.17 SE=0.12, p<0.001 Evangelical Protestant b=0.48 SE=0.11, p<0.001 Black Protestant b=0.55 SE=0.15 Jewish b=0.30; SE=0.25, p<0.05 Mormon b=0.52; SE=0.26, p<0.05 Other non-Christian traditions b=-0.02 SE=0.21 Other Christian traditions b=0.31 SE=0.19, p<0.001 These associations were attenuated after adjusting for religious attendance No religion (reference) Catholic b=0.21 SE=0.12 Mainline Protestant b=-0.48 SE=0.13 Evangelical Protestant b=0.20 SE=0.13 Black Protestant b=0.24 SE=0.17 Jewish b=0.20 SE=0.25 Mormon b=0.20 SE=0.27 Other non-Christian traditions b=-0.22 SE=0.21 Other Christian traditions b=0.09 SE=0.20

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious denomination	Association between exposure and outcome
Miller et al. (2012)	Schedule for Affective Disorders and Schizophrenia.	Religious denomination - Protestant - Catholic Covariates: age, gender history of depression.	No association found between denomination and risk of major depressive disorder in high risk (has a depressed parent) or low-risk group (does not have a depressed parent). *High risk group* Protestant (Ref) Catholic OR=0.96, (0.20,4.64), p=0.96 *Low risk group* Protestant (Ref) Catholic OR=1.82, (0.07,46.01), p=0.7
Norton *et al.* (2008)	NIMH Diagnostic Interview Schedule.	Religious denomination - Not Latter-Day-Saint - Latter-Day-Saint Covariates: gender, marital status, education, age, activities of daily living problems, vascular health problems, non-psychotropic meds, and prior depression.	Affiliation to Latter Day Saints associated with increased risk of depression compared to all other participants. Not Latter-Day Saint (Ref) Latter Day-Saint **OR=2.56; 95% CI=1.07,6.08**

Author	Outcome: Mental health and Wellbeing measure	Exposure: Religious denomination	Association between exposure and outcome
Ronneberg *et al.* (2014)	8-item Center for Epidemiologic Studies Depression scale (CES-D).	Religious denomination - Catholic - Protestant - Jewish - None/other Covariates: age, gender, ethnicity, self-reported health and chronic conditions, alcohol use, marital status, education, adversity, and social support.	No association found between religious denomination and depression for those not depressed at baseline. Catholic (Ref) Protestant OR=1.03; p=0.8 Jewish OR=1.30; p=0.4 None/other OR=1.19; p=0.3 Being Jewish was associated with higher odds of depression at follow-up compared to Catholics for those depressed at baseline. Catholic (Ref) Protestant OR=0.91; p=0.5 Jewish **OR=2.05; p<0.05** None/other OR=0.91; p=0.6
Williams *et al.* (1991)	Psychological distress measured by the Gurin symptom checklist scale.	Religious affiliation - Not affiliated - Affiliated - Covariates: age, education, marital status, gender, and ethnicity.	No association found between the denomination and psychological distress. b=-0.65; SE=0.60
Yeager *et al.* (2006)	10-item Center for Epidemiologic Studies Depression scale (CES-D).	Religious denomination - Taoist/traditional folk - Buddhist - Other - None Covariates: all religion variables, sociodemographic controls (age, gender, years of education, region), health-related behaviours, social networks and support, and self-reported health outcomes.	No association between religious denomination and depression Taoist/traditional folk (ref Buddhist b=0.169; SE not reported Other b=0.136; SE not reported None b=.001; SE not reported

b=unstandardized regression coefficient; β=standardized regression coefficient; OR= Odds Ratio

2.3.6 Composite measures of religiosity

A combined measure of religiosity including denomination, the frequency of attendance, and belonging to a church or synagogue was used in only one study (Fenix et al. 2006). Using this composite measure of religiosity, the authors reported that religiosity was associated with a lower risk of major depressive disorder one year later (OR=0.74, 95%CI=0.59-0.91), adjusted for major depressive disorder at baseline and age.

2.4 Summary of results and discussion

2.4.1 Summary of evidence

Twenty-eight out of 36 studies (78%) showed at least one positive association between religion and mental health or wellbeing. By analysing different aspects of religion separately, evidence was found that religious attendance and beliefs were associated with better mental health, but there was less evidence for denomination, affiliation or prayer. A limited number of studies investigated wellbeing as an outcome with roughly half of the studies showing a positive association between religious attendance and religious beliefs, and wellbeing. No studies found that personal religious practice, denomination or affiliation was associated with wellbeing. Three studies reported findings where religion appeared to show a negative association with mental health. The majority of the studies included in this review were on USA based, and Christian populations.

2.4.2 Religious attendance

Religious attendance is the most common religious measure researched in relation to mental health and wellbeing. The majority of studies on mental health found that religious attendance was associated with lower risk of depression or anxiety. Only five studies investigated religious attendance and wellbeing, with three showing positive associations and two showing no association. The meta-analysis on the sub-sample of studies testing

associations between religious attendance and the CES-D score showed an overall negative association although this finding may be due to publication bias.

Several studies investigated how the associations between religious attendance and mental health and wellbeing varied depending on gender and mental health at baseline. Strawbridge et al. (2001) found that religious attendance was associated with an improvement in mental health but only for women. Similarly, Kasen et al. (2014) found that religious attendance was associated with improvement in psychosocial function, but only for women who had a previous history of depressive disorder. These findings suggest that religious attendance may be particularly beneficial for women rather than men, and for those with a history of depressive disorder. The finding by Kasen that religious attendance is associated with better mental health for depressed groups was not consistently found in this review. Ronneberg et al. (2014) found the opposite: religious attendance was associated with better mental health but only for those without depression at baseline. This finding could suggest that religious attendance may be of particular benefit to vulnerable populations such as those with a previous history of depression. This is supported by Lechner and Leopold (2015) who found that the positive association between religious attendance and life satisfaction increased with the number of years the participant was unemployed.

Only one study in this review directly assessed the potential for bi-directional associations with the remaining studies addressing this by stratifying based on depression at baseline or to include baseline depression as a covariate. Li et al. (2016) investigated associations between religious attendance and later depressive symptoms, and change in religious service attendance and subsequent depression. They found that those with depression at baseline were less likely to attend religious services and that attending religious services was associated with lower risk of depression.

One of the possible explanations for how religious attendance could be associated with better mental health and wellbeing is through social support. Although many of the studies found these associations independent of socioeconomic position, education, marital status, and social support, Lim and Putnam (2010) found that the number of friends in the congregation completely attenuated the association between religious attendance and life satisfaction. From the measures used for attendance, it is not possible to tell if it is the act of religious attendance or potential social support which may drive these associations. Other factors which were not assessed by these studies such as volunteering could account for the apparent benefits of religious attendance for mental health and wellbeing.

2.4.3 Religious beliefs

Around half of the studies investigating religious beliefs, and mental health and wellbeing found a positive association and one study found that spiritual beliefs were associated with an increased risk of depression (Leurent et al. 2013). The measures of religious belief varied considerably by study and captured different aspects of religious beliefs. It is difficult to compare different measures across studies, e.g. religious orthodoxy, a measure of the acceptance of the central tenants of Christianity, vs religious salience, a measure of how important religion is in life (Braam 2004). Lim and Putnam used several measures of religious beliefs but found no associations with any of the measures and mental health.

A couple of studies examined how the association between religious beliefs and mental health and wellbeing varied by gender and depressive symptoms at baseline. Miller et al. (2012) found that religious beliefs were associated with a lower risk of depression but only in those who were at high risk of depression due to having a depressed parent. Kasen et al. (2014) also found that importance of religion or spirituality was associated with better mental health but only for men who were depressed at baseline. This

indicates that there may be different pathways between religiosity and mental health depending on gender and that religious belief might be more important for people with a vulnerability to depression.

Two studies showed that the associations between religious beliefs and depression might not be linear. Both Hayward and Krause (2014) and Sun et al. (2012) found quadratic associations between religious beliefs and depression. For example, Hayward and Krause (2014) found a u-shaped association with religious doubt indicating that very high and very low levels of religious doubt were associated with a higher risk of depression, whereas moderate levels of religious doubt were associated with a lower risk. Sun et al. (2012) found an n-shaped association indicating that low and high intrinsic religiosity was associated with lower risk of depressive symptoms.

2.4.4 Personal religious practices

None of the studies included in this review found positive associations between personal religious practices, and mental health and wellbeing. One study found that watching or listening to religious services on TV or radio was associated with more depressive symptoms (Musick et al. 2000). These studies examined various aspects of personal religious practices such as prayer, reading religious books, listening to religious radio or watching religious TV. Braam et al. (2007) showed no overall association between prayer and depressive symptoms but did find by analysing sub-groups that prayer among widows was associated with more depressive symptoms. It is possible that private religious practices are more common among people who are unable to attend religious services due to functional limitations or health problems. As both of these studies controlled for functional limitations, this is unlikely to be the underlying cause.

2.4.5 Denomination

Several studies examined differences in mental health and wellbeing by religious denomination or affiliation. None of these studies found any benefit of a particular religion or religious denomination or affiliation to mental health and wellbeing although one study found that those affiliated with the Latter Day Saints (Mormons) were at increased risk of depression (Norton et al. 2008). This association may be due to some of the strict rules and regulations common in this religion (Bergin et al. 1988).

2.4.6 Strengths and limitations

The main strength of this systematic review is that it was able to examine and analyse different aspects of religiosity in relation to mental health and wellbeing separately. Although there is considerable heterogeneity in the measures of religiosity, general patterns about how these relate to mental health and wellbeing can be seen.

The quality of the studies was high. Studies rated as acceptable were classified as such primarily because of the potential for response bias caused by loss of participants to follow-up; a common issue in longitudinal studies (Wolke et al. 2009). In this review, the majority of studies investigating religion, and mental health and wellbeing were from the USA where fundamental religious beliefs are more common than in the UK, limiting the generalisability of findings (Cooperman et al. 2015). A broad range of age groups, are represented in this review; however, only a couple of studies included non-Christian populations. It was not possible to conduct a meta-analysis on all of the studies due to the heterogeneity of the exposure and outcome measures. The meta-analysis conducted on the sub-sample provides a visual representation of the associations; however, results are likely to be subject to publication bias. It is difficult to conclude the associations with wellbeing as there were very few studies to date. Most of them used measures of life satisfaction rather than wellbeing and did not appear to use validated instruments, but simply asked how satisfied people were with their lives.

2.4.7 Conclusions

This review shows there is considerable evidence from the longitudinal studies that religious attendance and beliefs are positively associated with subsequent mental health. No evidence was found for benefits of personal religious practice or specific denominations on mental health or wellbeing. However, there are very few studies investigating associations between religiosity and wellbeing.

There is some evidence that religious attendance and beliefs may be more beneficial for vulnerable groups such as those with a history of depression or unemployed. This suggests potential bi-directional associations between religious attendance and beliefs and mental health. It is also possible that religiosity could be used as a coping mechanism rather than having a protective effect for those who are religious for other reasons.

Future research should attempt to disentangle the possibility of bi-directional associations between religiosity and mental health and wellbeing, and to assess whether there are different mechanisms for those experiencing stressful life events.

3 Methods

3.1 Research objectives and hypotheses

3.1.1 Objective 1

The first objective was to describe religious practices and beliefs across the life course, specifically:

- How religious practices and beliefs vary across the life course
- How earlier religious practices and beliefs are associated with later religiosity
- How partners' religious beliefs are related to the study member's religiosity
- How frequency of religious attendance is associated with social factors such as having children and retirement

3.1.2 Hypotheses relating to objective 1

It was hypothesised that religious practices and beliefs would decline across the life course as outlined in the secularisation thesis (Bruce 2002, Gill et al. 1998). As religious practices and beliefs are social constructs, it is likely to be influenced by parents' education and social class, and partners' beliefs. Therefore, it was hypothesised that having a religious upbringing, being religious in early adulthood, and having a religious partner would be positively associated with later religious practices and beliefs (Bengtson et al. 2009). Furthermore, it was also expected that study members with children would be more likely to attend religious services compared to those without children and that retirement may be associated with the frequency of religious attendance.

3.1.3 Objective 2

The second objective was to analyse associations between religiosity, and mental health and wellbeing in early old age, specifically:

- Associations between religiosity across the life course, and mental health and wellbeing at age 68-69
- Associations between mental health and wellbeing at age 60-64 and religiosity at age 68-69
- Bi-directional associations between religious attendance and mental health

3.1.4 Hypotheses relating to objective 2

It was hypothesised that religious beliefs and religious attendance would be associated with mental health and wellbeing, but that religious denomination and prayer would not be. These hypotheses are based on the findings of the systematic review (Chapter 2, page 54) which found stronger evidence for associations between religious attendance and beliefs than for denomination or private practices. Other studies have indicated the potential for bi-directional associations between religious attendance and mental health (Li et al. 2016, Maselko and Kubzansky 2006) therefore it was hypothesised that bi-directional associations between religiosity and mental health and wellbeing would be found.

3.1.5 Objective 3

The third objective investigated how psychological, social and lifestyle factors are associated with religiosity, mental health and wellbeing at age 68-69, specifically:

- How religiosity is associated with psychological, social and lifestyle factors
- How psychological, social and lifestyle factors are associated with mental health and wellbeing
- How psychological, social and lifestyle factors explain some of the associations between religiosity, mental health and wellbeing at age 68-69

3.1.6 Hypotheses relating to objective 3

It was hypothesised that religiosity would be associated with psychological, social and lifestyle factors associated with better mental health. It was also hypothesised that these psychological, social and lifestyle factors might be an explanation for associations between religiosity, and mental health and wellbeing. These hypotheses are based on previous research identifying psychological, social and lifestyle pathways between mental health and wellbeing (George et al. 2002, Levin 2009, Woźniak 2015).

3.1.7 Objective 4

The final objective was to examine how religiosity is involved in the associations between stressful life events (SLEs) across the life course, and mental health and wellbeing, specifically:

- How SLEs are associated with mental health and wellbeing at age 68-69
- How SLEs are associated with religious practices and beliefs in adulthood
- If religious practices and beliefs moderate the association between SLEs, and mental health and wellbeing

3.1.8 Hypotheses relating to objective 4

It was hypothesised that more SLEs would be associated with worse mental health and wellbeing. This is based on well-established research demonstrating the association between SLEs, and mental health and wellbeing (Hatch et al. 2009, Stafford et al. 2015, van Os et al. 2001). Previous research also suggests that religion can be utilised as a coping mechanism in response to stress (Ano and Vasconcelles 2005, Park 2006). Therefore, it was hypothesised that SLEs would be associated with higher levels of religiosity and that religiosity would moderate, i.e. buffer the association between SLEs, and mental health and wellbeing.

3.2 Data and participants

The National Survey for Health and Development (NSHD) is unique in that it has repeated measures of religious attendance and mental health across the life course which allows investigation of the relationships between these variables in older age. Data from NSHD were used for all the analyses presented in this thesis. NSHD is a nationally representative birth cohort of Britain selected from all births in one week of March 1946 and stratified by father's social class (Kuh et al. 2011). It follows 5,362 single births to married women in England, Wales and Scotland. The original purpose of the study was to investigate maternal health and child development with the focus of the study evolving as the study members grew up, reflecting their changing life stages. Study members are currently 72 years old, and so the focus of NSHD is now on healthy ageing.

Study members have been assessed 24 times approximately every two years in childhood and then at ages 26, 36, 43, 53, 60-64 and 68-69. Measures of health development with data collected from mothers and teachers in childhood, and later from the study member themselves. Details of the data collection and response rates have been previously described (Kuh et al. 2016, Stafford et al. 2013, Wadsworth et al. 2006).

Figure 1 shows the target sample for and the response to the 24th data collection conducted between 2014 and 2015 when study members were aged 68-69. Study members were asked to complete a postal questionnaire at age 68 and then invited to have a home visit by a research nurse at age 69. Of the 2,924 people in the target sample, 2,450 (84%) completed a postal questionnaire. No attempt was made to contact the remaining 2,420 study members: 957 (18%) had already died, 620 (12%) had previously withdrawn from the study, 448 (8%) had emigrated and were no longer in contact with the study, and 395 (7%) had been untraceable for more than five years. At age 69, study members still living in Great Britain at the last known address or traced to a new address (n=2,698) were invited to have a home visit by a research nurse: 2,148

(80%) completed a visit, and a further 55 (2%) completed a brief postal questionnaire instead. In total, 2,638 study members (93.7%) provided information on the postal questionnaire and/or completed a home visit.

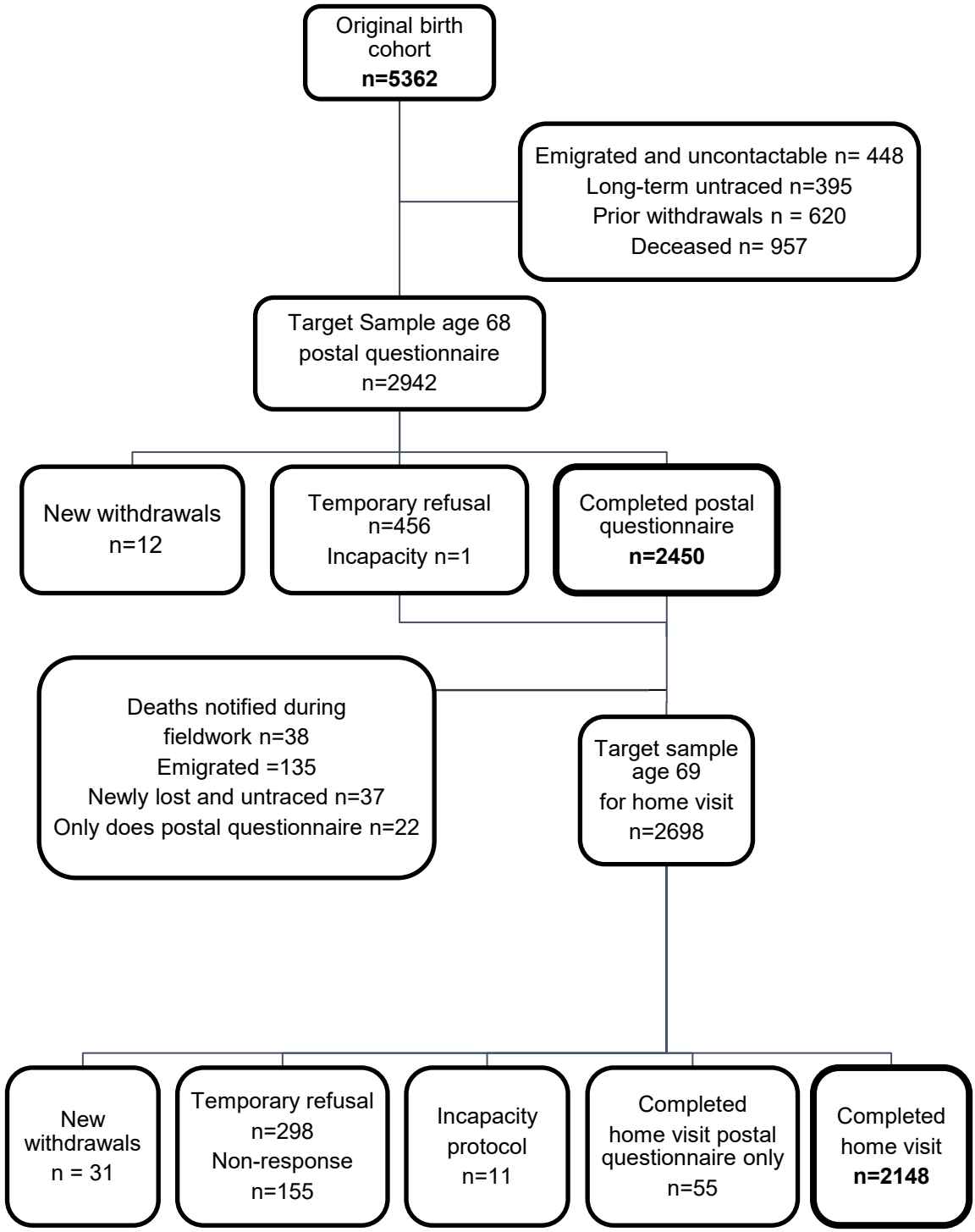


Figure 3.1. Target samples and response to the postal questionnaire at age 68 and the home visit at age 69 in NSHD.

Figure adapted from Kuh *et al* (2016).

3.3 Measures

3.3.1 Mental health

Symptoms of anxiety and depression were measured by self-complete questionnaire during nurse visits at ages 53, 60-64 and 68-69 using the 28-item General Health Questionnaire (GHQ-28; Goldberg and Hillier 1979). The GHQ-28 contains four sub-scales; somatic symptoms, anxiety and insomnia, social dysfunction and severe depression. Each item was scored from 0-3 giving a minimum total score of 0 and a maximum score of 84 with a higher score indicating higher psychological distress. The GHQ-28 had a skewed distribution in this sample and was, therefore, log-transformed for use in linear regression models. A list of all 28 questions can be found in Table 3.1. The response options for each question are described in Appendix D (page 263).

Table 3.1. Items comprising the 28-item General Health Questionnaire

Have you recently:	
1. Been feeling perfectly well and in good health?	15. Been managing to keep yourself busy and occupied?
2. Been feeling in need of a good tonic?	16. Been taking longer over the things you do?
3. Been feeling run down and out of sorts?	17. Felt on the whole you were doing things well?
4. Felt that you are ill?	18. Been satisfied with the way you've carried out your task?
5. Been getting any pains in your head?	19. Felt that you are playing a useful part in things?
6. Been getting a feeling of tightness or pressure in your head?	20. Felt capable of making decisions about things?
7. Been having hot or cold spells?	21. Been able to enjoy your normal day-to-day activities?
8. Lost much sleep over worry?	22. Been thinking of yourself as a worthless person?
9. Had difficulty in staying asleep once you are off?	23. Felt that life is entirely hopeless?
10. Felt constantly under strain?	24. Felt that life isn't worth living?
11. Been getting edgy and bad-tempered?	25. Thought of the possibility that you might make away with yourself?
12. Been getting scared or panicky for no good reason?	26. Found at times you couldn't do anything because your nerves were too bad?
13. Found everything getting on top of you?	27. Found yourself wishing you were dead and away from it all?
14. Been feeling nervous and strung-up all the time?	28. Found that the idea of taking your own life kept coming into your mind?

3.3.2 Wellbeing

Mental wellbeing was measured at ages 60-64 and 68-69 using the Warwick Edinburgh Mental Wellbeing Scale by postal questionnaire (WEMWBS;Tennant et al. 2007). The WEMWBS comprises 14 questions and was developed for use in population surveys to measure positive mood, interpersonal relationships and positive functioning. Table 3.2 lists the 14 positively worded questions and the response options of the WEMWBS. Study members were asked if they felt these ‘none of the time’, ‘rarely’, ‘some of the time’, ‘often’ or ‘all of the time’. WEMWBS items are scored 1-5 giving a minimum score of 14 and a maximum score of 70 with a higher score indicating better mental wellbeing. The WEMWBS demonstrates good construct validity, criterion validity and test-retest reliability (Tennant et al. 2007).

Table 3.2. Items comprising the Warwick-Edinburgh Mental Wellbeing Scale

3.3.3 Religiosity variables

Table 3.3 summarises the religiosity variables used in the analysis. This is followed by a more detailed description of the variables.

Table 3.3. Summary of religion variables used in the analysis

Age	Religious upbringing	Religious beliefs	Religious practice
11	Sunday school attendance and denomination		
26	Religious upbringing and denomination	Religious belief and denomination	
	Partner upbringing and denomination	Strength of religious beliefs	
		Partner belief and denomination	
		Partner strength of religious beliefs	
36	Religious upbringing and denomination	Religious belief and denomination	Frequency of attendance
	Effect of upbringing on life	Partner's religious beliefs (same or different to SM)	
43			Frequency of attendance
60-64			Frequency of attendance
68-69		Importance of religion/faith	Frequency of attendance
		Religion/faith provides meaning/purpose in life	Frequency of prayer/meditation

Religious upbringing

Religious upbringing was assessed at ages 11, 26 and 36. At age 11 parents were asked if the study member attended Sunday school (yes/no) and its denomination. At age 26 study members were asked if they were 'brought up in any faith or religious denomination' and the specific denomination. At age 36, study members were asked

again if they were ‘brought up in any faith or religious belief’ (yes/no), the specific denomination and if they felt that their upbringing had any effect on the way they led their lives (yes, has an effect/no, had no effect). These two variables were combined to create four categories (religious upbringing; no effect on life; religious upbringing, has an effect on life; no religious upbringing, no effect on life, and no religious upbringing, has an effect on life).

Religious beliefs

Religious beliefs were assessed at ages 26, 36 and 68-69. At age 26 study members were asked how strong their religious beliefs were (very strong/ moderately strong/little or no belief/ no religious belief). For some analyses, this variable was dichotomised (none or little belief/moderate or very strong belief). Study members were asked at age 36 if they had any religious beliefs or faith, the denomination of their faith and whether or not they went to a place of worship. A new variable was created by combining information on religious upbringing and religious beliefs at age 36. This new variable captured the change in religious belief from upbringing to adulthood and had four categories (same (not religious), same (religious), religious to not religious, and not religious to religious). At age 68-69, study members were asked two questions about religious and spiritual beliefs. They were first asked if a religious or spiritual faith was important to them (yes, very important/yes, somewhat important/no, not particularly important/no, not important at all). They were then asked if they look to a religion or faith to provide meaning or purpose in life (yes, a lot/yes, a little/no, not much/no, not at all).

Partner religious beliefs

Questions about the religious beliefs of the study members’ partners were asked at ages 26 and 36. At age 26, all study members who reported being married were asked if their partner was brought up in any faith, what their partner’s denomination was at the time and how strongly they thought their partner held their beliefs (none/little or not at

all/moderately strongly/very strongly). A multinomial variable was created using data at age 26 on marital status (no partner/none or little belief/moderate or very strong belief). At age 36, study members were asked a second time about the religious beliefs of their partners (yes, same belief/ no other belief at all/ other). Using the information on marital status at age 36, this variable was re-coded into three groups: no partner, same belief or different belief.

Religious practice

Religious practices were assessed at ages 36, 43, 60-64 and 68-69. At age 36, study members were asked how often they went to church/chapel/another place of worship (once a week or more often/once a fortnight or once a month/less than once a month but several times a year/only go for weddings, funerals or Christmas). At age 43 study members were asked if they helped run church activities or participate in religious services and if so, how often they took part (weekly/monthly/less often/never). This question was repeated at age 60-64, when they were asked how often they participated in church-related groups or religious activities (weekly/monthly/less often/never). At age 68-69 study members were again asked how often they took part in church-related groups or religious activities (weekly or more often/fortnightly/monthly/less often/never). For comparison with religious attendance at age 36, 43 and 60-64, the fortnightly and monthly groups were combined. At age 68-69, study members were asked if they pray or meditate (yes, daily or almost daily/regularly, but not daily/occasionally/never).

A variable was created which sums religious attendance across adulthood using data from ages 36, 43, 60-64 and 68. Attendance was dichotomised (due to the relatively small number of study members attending weekly) into frequent attendance scored 1 (weekly or monthly), and infrequent attendance scored 0 (never or less than monthly), then summed for those who had a measure of attendance at all four-time points. This resulted in a score from 0-4 with 0 representing little or no attendance, 1 low attendance,

2 moderate attendance, 3 frequent attendance, and 4 representing very frequent attendance across adulthood.

3.3.4 Socio-economic variables

Education

Educational attainment was measured as the highest level of qualification obtained by age 26 based on the Burnham scale. This was grouped into no qualification, up to ordinary ('O') level (including vocational courses, sub GCE), advanced ('A') level or equivalent, and higher (degree or higher).

Mother's education was measured when study members were 6 years old. There were eight categories of education which were re-coded into primary only, more than primary but no qualification, secondary only (primary & tech or course diploma/ primary & professional degree, diploma/secondary only/secondary & no diploma) and secondary and higher (secondary & tech or course diploma/ secondary & professional degree, diploma).

Social Class

Head of household social class at 53 was derived from data available at age 53 (or using ages 43, 36 or 26 if missing). This used the study member's social class if they were male and the partner's social class if female. Social class was categorised into professional, intermediate, skilled (non-manual), skilled (manual), semi-skilled manual or unskilled, according to the UK Registrar General's Classification of Occupations (Office of Population 1970).

Father's social class was measured when study members were four years old and categorised as professional, intermediate, skilled (manual), skilled (non-manual), semi-skilled manual or unskilled, according to the UK Registrar General's Classification of Occupations (Office of Population 1970).

Family composition

At age 36 and 43, study members were asked about who lived in their household and what their age was. This data was used to create a variable to describe if the study member had someone aged 18 or less living in their household (yes/no) at ages 36 and 43. The ages of 36 and 43 were chosen because they are the typical age for having children, and concurrent data on religious attendance was also available.

Employment Status

Employment status was measured asking if study members were in paid work at 60-64 and 68-69 (yes/no). As many people in the UK retire between the age of 60 and 70, a variable was created which identified study members who had gone from paid employment to no paid employment between age 60-64 and 68-69 to assess associations with religiosity.

3.3.5 Psychological, social and behavioural variables

Psychological factors

Mastery was measured at age 68-69 by Pearlin's Mastery scale which measures "the extent to which one regards one's life-chances as being under one's control" (Pearlin et al. 2007). The scale comprises 5 negatively worded questions and 2 positively worded questions. The response options for these questions are 'strongly disagree', 'disagree', 'agree' and 'strongly agree'. The negatively worded items are reverse coded giving a scale ranging from 7-28, with a higher score indicating a greater level of mastery. Pearlin's Mastery scale can be found in Appendix E (page 263).

Personality was measured at age 68-69 using questions developed for Big-Five (Goldberg 1992) to assess levels of agreeableness, extraversion and conscientiousness. Neuroticism was also measured at age 26 using items developed by Eysenck (1958). Each personality trait was assessed with 10 statements for which study members had to respond how much they felt that statement was very inaccurate, moderately inaccurate,

neither inaccurate or accurate, moderately accurate or very accurate. These 10 statements were summed to form a score from 10-50 with a higher score indicating a higher level of agreeableness, extraversion or conscientiousness. The questions used to assess neuroticism, agreeableness, extraversion or conscientiousness can be found in Appendices F and G.

3.3.6 Social factors

Social support was measured using the Close Person Questionnaire (Stansfeld and Marmot 1992). This measure was comprised of 7 questions which identified the person the study member felt closest to in the last 12 months. The original Close Person Questionnaire has five subscales (confiding, practical emotional, wanting more support and worsening), however, factor analysis on data from NSHD revealed two subscales; positive and negative (Stafford et al. 2017). Positive social support assess the extent to which the relationship was confiding and emotionally supportive ('make you feel good about yourself', 'share interests, hobbies and fun' and 'confide in this person'), or negative ('give you worries, problems and stress', 'liked to have confided more' and 'make things worse'). These 6 questions were answered using a Likert scale from 0-3 (0=not at all, 1= a little, 2=quite a lot and 3= a great deal) and summed to create a score for emotionally supportive and for negative (both ranging 0-9).

Loneliness was measured at age 68-69 using the University of California, Los Angeles (UCLA) 3-item loneliness scale (Hughes et al. 2004). It comprises three questions which ask how often people lack companionship, feel left out and feel isolated from others. The response options are 'hardly ever', 'some of the time' and 'often'. The score ranges from 3 to 9 with a higher score indicating a higher level of loneliness.

Lifestyle factors

Alcohol was measured at age 68-69 using the Alcohol Use Disorder Identification Test (AUDIT;Saunders et al. 1993) which was developed by the World Health Organization

to identify harmful, hazardous or dependent alcohol drinking behaviours. The 3-item consumption subscale of AUDIT was used in this analysis. The three questions ask how often alcohol is consumed, how many units are consumed on a typical day, and how often they exceed the recommended daily allowance (six units for women and eight units for men). All three items are scored from 0-4 and combined with a higher score representing higher alcohol consumption. A complete description of AUDIT can be found in Appendix H (page 268).

3.3.7 Stressful life events

Stressful life events (SLEs) were measured using variables available in NSHD representing discrete life events in the domains of social, health and employment from childhood to age 68-69. All variables were re-coded into binary variables (yes/no) and summed to form a total score. Each life event contributes 1 point to the score, so a higher score indicates a great er number of stressful life events. The total stressful life event score ranges from 0-65 and the scales for the domains for social, health and employment range from 0-39, 0-12 and 0-14 respectively. The development of this checklist was based on guidelines by Turner and Wheaton (1995). Details of the items on the checklist can be found in Table 3.4. The coding decisions made for each SLE is described in Appendix I (page 269).

Table 3.4 Stressful life event items

Age	Social	Health	Employment
<15 years	1. Parental divorce 2. Parent died before the age of 15 3. Changed school 4. Moved home 5. Maternal separation 6. Father ill (0-15) 7. Mother ill (0-15)	1. Ill (11-15) 2. Ill (5-11) 3. Ill (0-5)	
15-20		4. Illness	
20-25		5. Illness	
26	8. Sibling death <26 years	6. Disability from accident	
26-31			
36	9. Family crisis 10. Friend/relative ill 11. Friend/relative died 12. Friend/relative divorced 13. Robbery		1. Work crisis
43	14. Spouse/partner disagreement 15. Friend/relative died 16. Lost contact with friend/relative ill 17. Moved house 18. Spouse/partner accident or illness 19. Difficulties with children 20. Robbery	7. Injury from accident 8. Illness	2. Work crisis 3. Spouse/partner work crisis 4. Lost or thought would lose a job 5. Spouse/partner lost or thought would lose job
53	21. Spouse/partner disagreement 22. Spousal/partner accident or illness 23. Friend/relative ill 24. Friend/relative died 25. Friend/relative disagreement/ betrayal 26. Lost contact with friend/relative ill 27. Moved house 28. Difficulties with children 29. Robbery	9. Injury from accident 10. Illness	6. Work crisis 7. Redundancy reason for retirement 8. Spouse/partner work crisis 9. Lost or thought would lose job 10. Spouse lost or thought would lose job
60-64	30. Spouse/partner disagreement 31. Spousal/partner accident or illness 32. Friend/relative ill 33. Friend/relative died 34. Friend/relative disagreement/ betrayal 35. Lost contact with friend/relative ill 36. Moved house 37. Difficulties with children 38. Robbery	11. Injury from accident 12. Illness	11. Work crisis 12. Spouse/partner work crisis 13. Lost or thought would lose job 14. Spouse/partner lost or thought would lose job
68	39. Divorced, separated or widowed		

3.4 Analyses

Each analysis chapter begins with a detailed analysis plan relevant to that chapter. The sections below outline the general approach to the analyses.

3.4.1 Analytical sample

Study members who had data available on wellbeing (n=2402) or mental health (n=2125) at age 68-69 formed the core samples for the data analysis. The details of how these samples were derived are outlined in Figure 3.1 (page 104).

Appendix J (page 275) summarises the amount of missing data for all variables analysed in this thesis. Missing data for exposure variables and co-variates was handled by using Full Information Maximum Likelihood (FIML), a method of parameter estimation using all available data rather than limiting the analysis to those with complete data as in listwise deletion (Dong and Peng 2013). As listwise deletion may produce biased estimates, FIML is a preferable method for dealing with missing data (Enders 2001). One of the assumptions of FIML is that data is missing at random. Although it is often the case that missing data in research studies are not missing at random, violation of this assumption has been found not to alter estimates significantly (Collins et al. 2001).

Previous research using NSHD has found that lower educational attainment, lower childhood cognition, not owning your own house, lifelong smoking, being male, and not being married were associated with non-response at age 53 and 60-64 (Stafford et al. 2013, Wadsworth et al. 2006). Further analyses were carried out for the sample used in this thesis. Differences between study members who had complete data on religion, mental health and wellbeing and those who did not, were analysed by gender, social class and educational attainment. Men were more likely than women to have missing data on religious variables in this study ($p<0.001$). Lower educational attainment was associated with missing data for upbringing ($p<0.001$), beliefs ($p<0.05$) and attendance ($p<0.001$). Having a lower social class was also associated with having missing data on

religious variables ($p<0.05$). Study members with missing data on mental health at age 68-69 were more likely to be men, have a lower social class and have lower educational attainment ($p<0.001$). Study members with missing data on wellbeing at age 68-69 were more likely have a lower social class than those who responded to the self-completion questionnaire ($p<0.001$).

3.4.2 Descriptive analyses

All continuous variables were checked for normality by plotting histograms. Means and standard deviations medians and inter-quartile ranges were presented for all continuous variables. Data on categorical variables were presented as percentages.

3.4.3 Regression modelling

Regression models were used to test the majority of associations in this thesis. Linear regression models were used to model the continuous outcomes of mental health (GHQ-28) and wellbeing (WEMWBS) at age 68-69. Ordered logistic regression models were used to test associations with ordered categorical outcomes (strength of religious belief), logistic regression for binary outcomes (e.g. religious belief) and multi-nominal regression for non-ordered categorical outcomes (e.g. religious denomination). An auto-regressive cross-lagged model was used to model bi-directional associations between religious attendance and mental health over three waves of data collection.

Associations were described using unstandardized regression coefficients, odds ratios, relative risk ratios and 95% confidence intervals. The regression coefficients for models with GHQ-28 as the outcome represent percentage difference in the GHQ-28 scale due to the log-transformation of the variable. Standardised regression coefficients were used to describe the auto-regressive cross-lagged model only.

To determine which variables to use as covariates in the regression models, all religiosity, mental health, wellbeing and stressful life event variables were mutually

tested for associations with gender, education and social class. Variables which were independently associated with the exposure and outcome were included in the model as covariates.

All regression models were tested for gender interactions. Where significant interactions were found, and likelihood ratio tests suggested that the interaction improved the model fit, results were presented for men and women separately.

The majority of analyses were conducted in STATA version 14 (StataCorp 2015). STATA version 14 is not able to model non-continuous data using FIML, and so Mplus13 was used for the auto-regressive cross-lagged model presented in Chapter 5 and for models in Chapter 7 with binary, categorical or multinomial outcomes (Muthén and Muthén 1998-2010).

3.4.4 Multiple testing

Due to the large number of statistical tests presented in this thesis, there was potential risk for type I error i.e. the null hypothesis being incorrectly rejected. When a p-value of 0.05 is used as a threshold for statistical significance, it is expected that 1 out 20 findings would be a type I error. Therefore the larger the number of tests conducted, the larger the risk of type I error (Bender and Lange 2001). It is possible to employ a method to account for multiple testing such as the Bonferroni correction; however this can considerably increase the rate of type II errors, when the null hypothesis is falsely accepted. The decision to use a correction for multiple testing depends on the context and the purpose of the research, and as much of this thesis is novel and exploratory in nature, it was not deemed appropriate to do so. This decision also reflects the approach that it is preferable to pursue potentially erroneous findings (which can then be confirmed or refuted in future research) than to ignore potentially important findings (Rothman 1990).

4 Religious practices and beliefs across the life course

4.1 Introduction

This chapter aims to describe how religious upbringing, practices and beliefs are associated with each other and how they change across the life course using the MRC National Survey of Health and Development. The analysis in this chapter relates to research objective 1 described in the methods chapter (Chapter 3, page 100).

4.2 Analysis plan

4.2.1 Analytical sample

The analytical sample in this chapter was restricted to those who had complete data on all religion variables and socio-economic factors as described in Figure 4.1 (n=1,111). Appendix J (page 275) provides a summary of the percentage of missing data for each variable. FIML was not used to address missing data in order to allow comparisons of outcomes at different ages among the same sample.

4.2.2 Descriptive analyses

To investigate how religious practices and beliefs vary across the life course, descriptive statistics for all religiosity variables were presented as proportions. Differences in religiosity by gender were analysed using chi-squared tests.

4.2.3 Co-variates

Multi-variable logistic ordered logistic and multinomial regression models were used to analyse how gender, educational attainment, social class, mother's education and father's social class were associated with different measures of religiosity. The socio-economic variables associated with religiosity were used as covariates in subsequent models in this chapter.

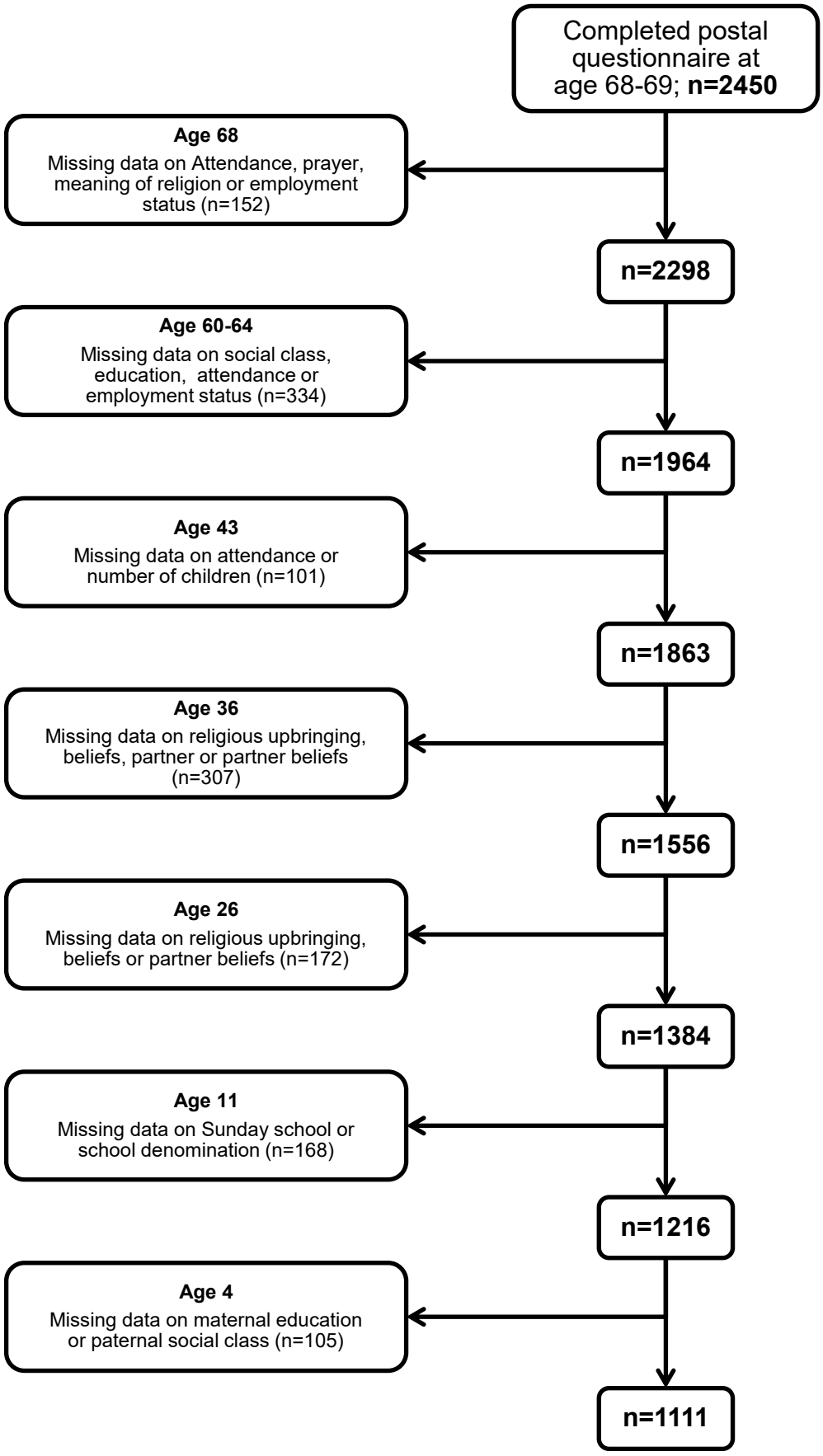


Figure 4.1. Flow chart for the analytical sample used in Chapter 4

4.2.4 Regression models

Ordered logistic and logistic regression models were used to analyse how earlier religious practices and beliefs are associated with later religiosity, and if religiosity is associated with partner's religiosity. The conceptual model for these analyses outlined in Figure 4.2.

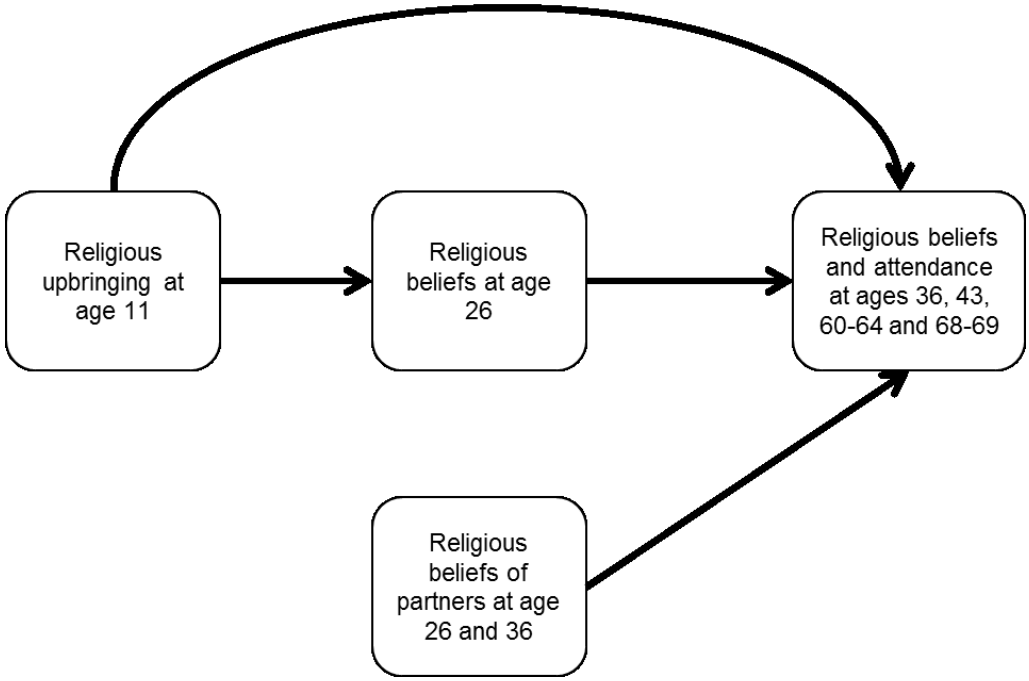


Figure 4.2 Conceptual model for analysis of religiosity across the life course

Logistic regression models were used to analyse cross-sectional and longitudinal associations between the number of children in the household and religious attendance at age 36 and 43. These analysis aimed to test if having children was associated with religious attendance. Analyses were restricted to these ages as ages 36 and 43 was a typical time for child-rearing for study members in NSHD, and earlier measures of attendance were not available.

Logistic regression models were also used to analyse cross-sectional and longitudinal associations between employment status at age 60-64 and 68-69 and religious attendance. As many study members stopped paid work between the ages of 60-64 and

68-69, additional analyses were carried out to investigate if transitioning from working to not working was associated with religious attendance and change in religious attendance.

All regression model results were presented as odds ratios or relative risk ratios, and 95% confidence intervals. Tests for gender interactions were conducted for all analyses and checked for model fit using likelihood ratio tests. Where gender interactions were found, results were presented for men and women separately.

4.3 Results

4.3.1 Religious upbringing

Table 4.1 shows the details of religious upbringing of study members. The majority of study members went to non-denominational schools (66%), although around 82% of study members attended Sunday school. Attendance at Sunday schools and in particular Church of England Sunday schools was more common for girls than boys at age 11 (86% vs 78%, and 46% vs 39% respectively). At age 26, 90% of study members reported a religious upbringing, but at age 36 this dropped to 80%. Around half of the study members reported that their religious upbringing (religious or not) affected the way they lived their lives.

Table 4.1. Religious upbringing of study members by gender

n=1111	Men %	Women %	Total %	P (χ^2)
Denomination of school at age 11				
Non-denominational	66	66	66	
Church of England	18	17	18	
Roman Catholic	7	7	7	0.4
Scottish schools	8	9	9	
Other	1	0	0	
Sunday school at age 11				
Did not attended	22	14	18	**<0.001**
Attend	78	86	82	
Denomination Sunday school at age 11				
Church of England	39	46	43	
Roman Catholic	8	7	8	
Non-conformist	21	23	22	**<0.05**
Jewish	1	0	0	
Other	9	10	9	
Did not attend	22	14	18	
Religious upbringing reported at age 26				
No	12	9	11	**<0.05**
Yes	88	91	90	
Religious upbringing reported at age 36				
No	23	17	20	**<0.01**
Yes	77	83	80	
Effect of upbringing (religious or not) on life				
No, has no effect	53	49	51	0.2
Yes, has an effect	47	51	49	

Free text comment analysis show that the main reasons for study members reporting that their religious upbringing had an effect on their lives were, ‘giving certain standards’, ‘principles’, ‘values (controls moral behaviour and conscience)’, ‘general outlook on life’ and ‘being more aware of one’s conduct with others’. A complete list of the free-text responses given to this question, organised by religious upbringing can be found in Appendix K (page 277).

Table 4.2 shows the cross-tabulation of religious upbringing reported at age 36 with religious upbringing reported at age 26 and whether it affected their lives. This shows that consistency between religious upbringing recalled at ages 26 and 36 was high (84%), but 13% of study members who reported a religious upbringing at age 26 went on to report at age 36 that they had no religious upbringing. Conversely, 3% of study

members reported no religious upbringing at age 26 but then went on to report a religious upbringing at age 36.

Around half of the study members (46%) reported having a religious upbringing and that it affected their life, compared to 3% who reported that they did not have a religious upbringing and this did have an effect on their life.

Table 4.2. Religious upbringing by the effect of upbringing on life and religious upbringing at age 26

n=1111	**Religious upbringing reported at age 36**	
	No **%**	Yes **%**
Religious upbringing at age 26		
No	7	3
Yes	13	77
Effect on upbringing on life at age 36		
No	17	34
Yes	3	46

4.3.2 Religious beliefs

Table 4.3 shows frequencies of religious beliefs, including the strength of belief at age 26, whether or not the study member had a religious belief at age 36, and their denomination at age 36. More than half of study members reported a moderately strong or very strong religious belief at age 26. The most common denomination reported at age 36 was Church of England. At age 68-69, 42% of study members reported that religious or spiritual faith was ‘somewhat’ or ‘very important’ and around one-third reported that it provides ‘a little’ or ‘a lot’ of meaning or purpose in life. Religion was reported to be more important and provide more meaning in life for women compared to men (41% vs 30% and 46% vs 36% respectively). At all ages, women were more likely to be religious than men.

Table 4.3. Religious beliefs and denomination by gender

n=1111	Men %	Women %	Total %	P (χ^2)
The strength of religious belief at age 26				
No religious belief	36	25	30	**<0.01**
Little or none	18	18	18	
Moderately strong	37	46	46	
Very strong	9	10	10	
Religious belief at age 36				
No	42	26	34	**<0.001**
Yes	58	74	66	
Religious denomination at age 36				
Roman catholic	8	8	8	**<0.05**
Church of England	45	53	49	
Methodist/Baptist	10	12	11	
Some other belief	13	10	12	
No religious belief	23	17	20	
Is religious or spiritual faith important at age 68-69				
Not important at all	35	20	27	**<0.001**
Not particularly important	30	33	31	
Yes, somewhat	19	23	21	
Yes, very important	17	24	21	
How much religion/faith provides meaning/purpose in life at age 68-69				
Not at all	45	32	38	**<0.001**
Not much	25	26	26	
A little	15	23	19	
A lot	15	18	16	

4.3.3 Changes in religious belief from upbringing to adulthood

Table 4.4 describes changes in religious belief from their upbringing to adulthood. The largest category of study members is those who had religious beliefs in adulthood and had a religious upbringing (60%). The second largest group went from a religious upbringing but no longer has religious beliefs in adulthood (20%). Fewer study members had no religious upbringing in childhood and went to have religious beliefs (7%) or continued to have no religious beliefs. Women were more likely than men to maintain the religious belief they were brought up in or to become religious in adulthood.

Table 4.4. Change in religious beliefs from upbringing to adulthood

n=1111	Men %	Women %	Total %	P (χ^2)
Change in religious beliefs from upbringing to adulthood				
Same (not religious)	17	10	13	**<0.001**
Same (religious)	53	66	60	
Religious to non-religious	24	17	20	
Non-religious to religious	6	8	7	

Table 4.5 shows the cross-tabulation of the religious denomination at age 36 with religious upbringing by a denomination which was also reported at age 36. The cells shaded in the grey colour show the proportion of study members who reported having the same religious beliefs as they were brought up with. Two-thirds of study members who were raised in the Roman Catholic Church or the Church of England reported this as their personal belief at age 36. The study members who did change their religious affiliation were most likely to change to 'Church of England', 'Other' or 'No Belief'.

Table 4.5. Denomination of religious upbringing by religious denomination at age 36

n=1111		Personal religious belief at age 36 %					
Religious upbringing reported at age 36 %		Roman Catholic	Church of England	Methodist or Baptist	Other	No belief	Total
	Roman Catholic	63	4	0	8	25	100
	Church of England	0	66	2	6	25	100
	Methodist or Baptist	1	18	46	17	19	100
	Other	1	5	5	57	33	100
	No religious upbringing	2	16	3	10	69	100
	Total	6	39	7	14	34	100

4.3.4 Partner beliefs

Table 4.6 shows the responses about religious beliefs of study members' partners. When study members were aged 26, 81% of the study members had a partner or spouse. As with study members, the most common denomination to be brought up in was the Church of England (43%). At age 36, the majority of the study members had a partner with the same belief (65%). Consistent with gender differences seen with religious beliefs, men were more likely than women to report their partner was religious. No gender differences were found for whether religious beliefs differed between partners.

Table 4.6. Partner's religious upbringing and beliefs by gender

n=1111	**Men %**	**Women %**	**Total %**	**P (χ^2)**
Partner religious upbringing				
Roman Catholic	9	9	9	
Church of England	40	53	43	
Scottish Episcopalian & Presbyterians	5	5	5	
All other non-conformists	13	11	12	**<0.001**
Other religions	1	1	1	
No religion	7	9	8	
No partner or spouse	26	13	19	
Partner beliefs at age 26				
Roman Catholic	7	6	7	
Church of England	34	36	35	
Scottish Episcopalian & Presbyterians	4	4	4	
All other non-conformists	11	9	10	**<0.001**
Other religions	1	1	1	
No religion	17	29	23	
No partner or spouse	26	14	20	
The strength of partner belief at age 26				
No religion	17	29	23	
Little or none	13	17	15	
Moderately strong	32	33	33	**<0.001**
Very strong	11	7	9	
No partner or spouse	26	14	20	
Partner belief at age 36				
Partner has no/different belief	26	24	25	
Partner has the same belief	64	66	65	0.8
No partner or spouse	10	10	10	

4.3.5 Religious practice

Table 4.7 shows the frequencies for religious practice at ages 36, 43, 60-64 and 68-69, and prayer or meditation. The proportion of study members reporting no religious attendance increased from age 36 to 43 and 60-64 (42% to 81% and 80% respectively) but decreased at age 68-69 to 69%. This decrease was accompanied by an increase in the proportion of study members who attended less than once a month (+6%), monthly (+1%) and weekly (+4%). Just under half of the study members (43%) reported never praying or meditating with 24% reporting that they pray or meditate regularly or daily at age 68-69. Women consistently reported more frequent attendance and prayer/meditation than men.

Table 4.7. Religious practices by gender

n=1111	Men %	Women %	Total %	P (χ^2)
Frequency of religious attendance at age 36				
Never	49	35	42	
< Once a month	34	36	35	**<0.001**
Once a month	7	10	9	
Once a week	11	18	15	
Frequency of religious attendance at 43				
Never	84	78	81	
< Once a month	1	4	2	**<0.05**
Once a month	4	4	4	
Once a week	12	14	13	
Frequency of religious attendance at age 60-64				
Never	83	78	80	
< Once a month	3	5	4	0.06
Once a month	3	5	4	
Once a week	11	13	12	
Frequency of religious attendance at age 68-69				
Never	73	65	69	
< Once a month	9	11	10	**<0.05**
Once a month	4	5	5	
Once a week	13	18	16	
Sum of religious attendance[1]				
Never	73	63	68	
Low attendance	10	13	12	
Moderate attendance	4	8	6	**<0.001**
Frequent attendance	5	7	6	
Very frequent attendance	8	10	9	
Prayer or meditation				
Never	55	32	43	
Occasionally	26	38	32	**<0.001**
Regularly	8	12	10	
Almost daily	10	18	14	

[1] Sum of attendance calculated by summing binary values of attendance (<monthly and at least once a month) at age 36, 43, 60-64 and 68-69.

4.3.6 Socio-economic factors associated with religiosity

Table 4.8 to show the results from mutually adjusted regression models of religion variables by gender, educational attainment, adult social class, mother's education and father's social class. Results from bi-variate associations between socioeconomic factors, and religiosity variables are shown in Appendix L (page 278). Controlling for education and social class, women were more likely to attend Sunday school, report a religious upbringing and report that their upbringing affected their life at age 36, have stronger religious beliefs at age 26, report a religious belief at age 36 (Table 4.8). Women were also less likely to have changed their religious beliefs from their upbringing (Table 4.9). Women were more likely to report more frequent religious attendance (Table 4.10).

Compared to study members with no qualifications, study members with up to O-level, A-level or higher education were more likely to attend Sunday school, report a religious upbringing, and report that it affected their life. Study members with qualifications up to O-level and A-level were more likely to have stronger religious beliefs than those with no qualifications (Table 4.8). O-level and A-level qualifications were associated having a religious upbringing and religious beliefs in adulthood compared to the other groups apart from religious to not religious (Table 4.9). There was a positive association between educational attainment and religious attendance (Table 4.10). Having O-level, A-level or higher education qualifications was associated with more frequent religious attendance in adulthood. For frequency of prayer and reporting that religion provides meaning in life, positive associations were only found for those who had up to A-level qualifications compared to study members without qualifications. There were no associations between any of the religion variables and social class adjusted for gender and education.

Independently of other socioeconomic factors, mother's educational attainment was positively associated with reporting that religious (or non-religious) upbringing had an effect on their life at age 36. There was some evidence that mothers with

secondary level education attended church more frequently compared to mothers with primary level education. No associations were found between mother's education and any of the other religious variables.

There was little evidence found that father's social class was associated with religiosity independently of gender, own education, own social class and mother's education. The exceptions were having a father who has a partly skilled or skilled (manual) social class increasing likelihood to report a religious upbringing at age 36 compared to fathers in the unskilled group. Having a father with a professional social class was associated with more frequent religious attendance in adulthood.

Table 4.8. Religious upbringing, beliefs and attendance by gender, education and social class

n=1111	**Sunday school attendance at age 11**[1] • No • Yes	**Strength of belief at age 26**[2] • None • Little • Moderate • Strong	**Religious upbringing reported at age 36**[1] • No • Yes	**Effect of upbringing on life at age 36** [1] • No • Yes
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Gender				
Male	1.0	1.0	1.0	1.0
Female	**2.0 (1.4,2.8)**	**1.3 (1.1,1.7)**	**1.4 (1.1,2.0)**	1.3 (1.0,1.6)
Education				
No qualifications	1.0	1.0	1.0	1.0
O-levels	1.4 (0.9,2.1)	1.3 (1.0,1.8)	**2.0 (1.3,3.0)**	**1.5 (1.1,2.1)**
A-levels	**2.3 (1.4,3.7)**	1.2 (0.9,1.7)	**3.0 (1.9,4.8)**	**2.5 (1.7,3.6)**
Higher education	**3.3 (1.6,7.1)**	0.8 (0.5,1.3)	**2.2 (1.2,4.2)**	**2.4 (1.4,4.1)**
Social class at age 53				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	2.0 (0.8,5.2)	1.3 (0.6,2.9)	1.2 (0.4,3.2)	0.9 (0.4,2.3)
Skilled (manual)	2.1 (0.9,5.0)	1.0 (0.5,2.1)	1.0 (0.4,2.4)	0.8 (0.4,1.9)
Skilled (non-manual)	2.3 (0.9,5.8)	1.3 (0.6,2.7)	1.3 (0.5,3.4)	0.6 (0.3,1.5)
Intermediate	1.6 (0.7,3.8)	1.3 (0.6,2.6)	1.3 (0.5,3.2)	1.0 (0.4,2.3)
Professional	2.3 (0.8,6.3)	1.8 (0.8,3.8)	1.2 (0.4,3.3)	1.2 (0.5,2.8)
Mothers education				
Primary	1.0	1.0	1.0	1.0
Secondary	1.4 (0.8,2.4)	1.0 (0.7,1.5)	1.0 (0.6,1.6)	**1.6 (1.1,2.3)**
Tech course diploma	1.3 (0.6,2.9)	1.0 (0.6,1.6)	1.0 (0.5,2.0)	**1.8 (1.1,3.2)**
Degree	0.7 (0.3,1.6)	1.2 (0.7,2.3)	0.7 (0.3,1.6)	**2.1 (1.0,4.3)**
Father's social class				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	1.0 (0.5,2.0)	1.5 (0.9,2.5)	**2.0 (1.1,3.9)**	1.5 (0.8,2.9)
Skilled (manual)	0.9 (0.4,1.7)	1.2 (0.7,1.9)	**1.9 (1.0,3.5)**	1.5 (0.8,2.8)
Skilled (non-manual)	1.2 (0.6,2.5)	1.6 (0.9,2.7)	2.0 (1.0,3.9)	1.8 (0.9,3.4)
Intermediate	1.3 (0.6,2.9)	1.3 (0.8,2.3)	1.5 (0.7,3.0)	1.6 (0.8,3.1)
Professional	1.6 (0.5,4.9)	1.4 (0.7,2.9)	1.8 (0.7,4.7)	2.1 (0.9,4.8)

[1] Logistic regression
[2] Ordered logistic regression
OR=Odds ratio; CI=Confidence intervals

Table 4.9. Change in religious beliefs from upbringing to adulthood by gender, education and social class

n=1111	**Same (not religious)**	**Same (religious)**	**Religious to not religious**	**Not religious to religious**
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Gender				
Male	1.0	Base outcome	1.0	1.0
Female	**0.5 (0.3,0.7)**		0.6 (0.4,0.8)	1.0 (0.6,1.7)
Education				
No qualifications	1.0		1.0	1.0
O-levels	**0.5 (0.3,0.9)**	Base outcome	1.1 (0.7,1.7)	**0.4 (0.2,0.9)**
A-levels	**0.3 (0.2,0.6)**		1.3 (0.8,2.1)	**0.4 (0.2,0.8)**
Higher education	0.5 (0.2,1.1)		1.3 (0.7,2.4)	0.4 (0.1,1.1)
Social class at age 53				
Unskilled	1.0		1.0	1.0
Partly skilled	1.2 (0.3,4.3)		1.3 (0.4,4.1)	0.7 (0.2,2.7)
Skilled (manual)	1.2 (0.4,3.8)	Base outcome	0.8 (0.3,2.4)	0.8 (0.2,2.7)
Skilled (non-manual)	1.0 (0.3,3.6)		1.1 (0.4,3.3)	0.5 (0.1,1.9)
Intermediate	1.0 (0.3,3.2)		0.8 (0.3,2.5)	0.5 (0.1,1.7)
Professional	1.0 (0.3,3.7)		0.6 (0.2,1.9)	0.5 (0.1,2.1)
Mothers education				
Primary	1.0	Base outcome	1.0	1.0
Secondary	0.9 (0.5,1.6)		1.4 (0.9,2.1)	1.8 (0.8,3.9)
Tech course diploma	0.8 (0.3,1.9)		1.0 (0.6,2.0)	1.7 (0.6,4.6)
Degree	1.1 (0.4,3.0)		0.8 (0.3,1.9)	1.8 (0.5,6.7)
Father's social class				
Unskilled	1.0		1.0	1.0
Partly skilled	0.4 (0.2,0.9)	Base outcome	0.7 (0.3,1.5)	0.5 (0.1,1.4)
Skilled (manual)	0.4 (0.2,0.9)		0.8 (0.4,1.7)	0.8 (0.3,2.2)
Skilled (non-manual)	0.4 (0.2,0.8)		0.5 (0.2,1.2)	0.6 (0.2,2.0)
Intermediate	0.6 (0.3,1.4)		0.7 (0.3,1.6)	0.6 (0.2,2.1)
Professional	0.5 (0.2,1.6)		0.7 (0.3,1.7)	0.5 (0.1,2.4)

Multinomial logistic regression
RRR=Relative Risk Ratio; CI=Confidence intervals

Table 4.10. Religious practices and beliefs by gender, education and social class

n=1111	**Sum attendance of age 36, 43, 60-64 and 68-69[2]** • Never • Low • Moderate • Frequent • Very frequent	**Prayer/meditation at age 68-69[2]** • Never • Occasionally • Regularly • Almost daily	**Importance of religion at age 68-69[2]** • Not at all important • Not particularly important • Somewhat important • Very important	**How much religion provides meaning in life at age 68-69[2]** • Not at all • Not much • A little • A lot
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Gender				
Male	1.0	1.0	1.0	1.0
Female	**1.6 (1.2,2.1)**	**2.3 (1.8,2.9)**	**1.7 (1.4,2.1)**	**1.5 (1.2,1.9)**
Education				
No qualifications	1.0	1.0	1.0	1.0
O-levels	**1.7 (1.1,2.4)**	1.2 (0.9,1.7)	1.1 (0.8,1.5)	1.2 (0.9,1.6)
A-levels	**1.9 (1.3,2.8)**	**1.4 (1.0,1.9)**	1.2 (0.8,1.6)	**1.4 (1.0,2.0)**
Higher education	**1.8 (1.1,3.0)**	1.1 (0.7,1.7)	0.9 (0.6,1.4)	1.0 (0.6,1.5)
Social class at age 53				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	1.3 (0.4,3.9)	**0.9 (0.4,2.1)**	1.1 (0.5,2.5)	1.1 (0.5,2.3)
Skilled (manual)	1.2 (0.4,3.4)	1.0 (0.4,2.1)	1.3 (0.6,2.6)	1.1 (0.6,2.3)
Skilled (non-manual)	1.7 (0.6,4.9)	1.0 (0.5,2.3)	1.3 (0.6,2.7)	1.2 (0.6,2.4)
Intermediate	1.8 (0.7,4.9)	0.9 (0.4,1.9)	1.1 (0.5,2.3)	1.0 (0.5,2.1)
Professional	1.9 (0.6,5.4)	1.2 (0.5,2.7)	1.4 (0.7,3.2)	1.1 (0.5,2.4)
Mothers education				
Primary	1.0	1.0	1.0	1.0
Secondary	**1.4 (1.0,2.0)**	1.3 (1.0,1.9)	1.4 (1.0,1.9)	1.4 (1.0,2.0)
Tech course diploma	1.3 (0.8,2.1)	0.9 (0.6,1.4)	1.0 (0.6,1.6)	1.1 (0.7,1.8)
Degree	1.6 (0.8,2.9)	1.1 (0.6,2.0)	1.2 (0.6,2.1)	1.2 (0.7,2.2)
Father's social class				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	0.8 (0.4,1.5)	1.3 (0.7,2.3)	1.2 (0.7,1.9)	1.1 (0.6,1.8)
Skilled (manual)	0.9 (0.5,1.6)	1.4 (0.8,2.4)	1.1 (0.7,1.8)	0.9 (0.6,1.5)
Skilled (non-manual)	1.3 (0.7,2.5)	1.6 (0.9,2.8)	1.2 (0.7,2.0)	1.0 (0.6,1.6)
Intermediate	1.1 (0.6,2.2)	1.4 (0.8,2.6)	1.1 (0.6,1.8)	1.0 (0.6,1.7)
Professional	1.5 (0.7,3.2)	**2.1 (1.0,4.3)**	1.6 (0.8,3.2)	1.2 (0.6,2.3)

[1] Logistic regression
[2] Ordered logistic regression
OR=Odds ratio; CI=Confidence intervals

4.3.7 Associations between religious upbringing and later religious beliefs

Table 4.11 show associations between religious upbringing and strength of religious beliefs at age 26. Study members who attended Sunday school or reported a religious upbringing at age 36 were more likely to have moderate or very strong religious beliefs at age 26 than study members who did not attend Sunday school or have a religious upbringing. The same association was found for those who reported that their upbringing affected their life.

Table 4.11. Associations between religious upbringing and strength of religious beliefs at age 26

n=1111	**The strength of religious beliefs at age 26[1]**
	OR (95% CI)
Sunday school at age 11	
Did not attend	1.0
Attended	**2.2 (1.6,3.1)**
Religious upbringing reported at age 36	
No	1.0
Yes	**4.4 (3.1,6.2)**
Effect of upbringing on life at age 36	
No effect	1.0
Has effect	**3.1 (2.4,4.1)**

OR=Odds ratio of ordered logistic regression; CI=Confidence intervals
Adjusted for gender and education
[1]Outcome categories: None, little, moderately strong or very strong

Table 4.12 shows the associations between religiosity, and the importance of religious or spiritual faith, and how much religion provides meaning in life at age 68-69. Attending Sunday school, reporting a religious upbringing, having strong religious beliefs and reporting that upbringing affected the way study members lead their lives were all strongly associated with reporting that religion is important in life and that religion provides meaning in life at age 68-69.

Table 4.12. Associations between early religiosity and beliefs at age 68-69

n=1111	**Importance of religious or spiritual faith at age 68-69[2]**	**How much religion provides meaning in life at age 68-69[3]**
	OR (95% CI)	OR (95% CI)
Sunday school at age 11		
Did not attend	1.0	1.0
Attended	**1.9 (1.4,2.5)**	**1.7 (1.3,2.3)**
Strength of religious belief at age 26		
Not religious of Little	1.0	1.0
Moderate or very strong	**4.9 (3.9,6.3)**	**4.5 (3.6,1.6)**
Religious upbringing reported at age 36		
No	1.0	1.0
Yes	**2.2 (1.7,2.9)**	**2.3 (1.7,3.1)**
Effect of upbringing on life at age 36		
No effect	1.0	1.0
Has effect	**2.8 (2.2,2.6)**	**2.8 (2.2,3.6)**
Religious belief at age 36		
No	1.0	1.0
Yes	**9.4 (7.2,12.5)**	**7.7 (5.8,10.1)**
Change in religious beliefs from upbringing to adulthood		
Same (not religious)	1.0	1.0
Same (religious)	**8.5 (5.9,12.3)**	**7.5 (5.1,10.9)**
Religious to not religious	0.8 (0.6,1.2)	0.9 (0.6,1.4)
Not religious to religious	**7.5 (4.4,12.7)**	**5.2 (3.0,8.8)**
Sum of religious attendance[1]	**3.9 (3.4,4.5)**	**3.5 (3.1,4.0)**

OR=Odds ratio of ordered logistic regression; CI=Confidence intervals
Adjusted for gender and education
[1] Sum religious attendance modelled as a continuous variable due to categorical models resulting in extremely wide confidence intervals.
[2] Outcome categories: Not at all important, not particularly important, somewhat important and very important.
[3] Outcome categories: Not at all, not much, a little and a lot.

4.3.8 Associations between religious upbringing and later religious practice

Table 4.13 shows the association between religious upbringing and beliefs and frequency of prayer or meditation at age 68-69. Attending Sunday school, reporting a religious upbringing, having strong religious beliefs and reporting that upbringing affected the way study members lead their lives were all associated with praying or meditating more regularly at age 68-69.

Table 4.13 Associations between religious upbringing, the strength of religious beliefs, and frequency of prayer at age 68-69

n=1111	**Prayer or Meditation at age 68-69[2]**
	OR (95% CI)
Sunday school at age 11	
Did not attend	1.0
Attended	**1.8 (1.3,2.5)**
The strength of religious belief at age 26	
Not religious of Little	1.0
Moderate or very strong	**4.7 (3.6,6.2)**
Religious upbringing reported at age 36	
No	1.0
Yes	**2.0 (1.5,2.7)**
Effect of upbringing on life at age 36	
No effect	1.0
Has effect	**2.8 (2.2,3.6)**
Religious belief at age 36	
No	1.0
Yes	**7.0 (5.3,9.3)**
Change in religious beliefs from upbringing to adulthood	
Same (not religious)	1.0
Same (religious)	**6.2 (4.2, 9.2)**
Religious to not religious	0.8 (0.5, 1.3)
Not religious to religious	**5.3 (3.0, 9.4)**
Sum of religious attendance[1]	**3.7 (2.9,4.8)**

OR=Odds ratio of ordered logistic regression; CI=Confidence intervals
Adjusted for gender and education
[1] Sum religious attendance modelled as a continuous variable due to categorical models resulting in extremely wide confidence intervals.
[2] Adjusted for gender and education; Outcome categories: Never, occasionally, regularly and almost daily.

Table 4.14 shows the associations between religious upbringing, the strength of religious belief and religious attendance at ages 36, 43, 60-64 and 68-69. Attending Sunday school at age 11, having moderate or strong religious belief at age 26, reporting a religious upbringing at age 36 and reporting that their upbringing had an effect on the way they lived their life at age 36 were all strongly positively associated with religious attendance (once a month or more) at various ages across mid and later life 36, 43, 60-64 and 68-69.

Table 4.14. Associations between religious upbringing, the strength of religious beliefs, and frequency of religious attendance at age 36, 43, 60-64 and 68-69

n=1111	**Religious attendance at age 36**	**Religious attendance at age 43**	**Religious attendance at age 60-64**	**Religious attendance at age 68-69**
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Sunday school at age 11				
Did not attend	1.0	1.0	1.0	1.0
Attended	**2.8 (1.6,4.7)**	**2.8 (1.5,1.2)**	**2.7 (1.4,5.2)**	**2.4 (1.4,4.1)**
The strength of religious belief at age 26				
Not religious	1.0	1.0	1.0	1.0
Little or none	1.1 (0.6,2.1)	0.7 (0.3,1.4)	1.5 (0.7,2.9)	1.3 (0.7,2.5)
Moderate	**4.1 (2.6,6.5)**	**2.8 (1.7,4.5)**	**2.8 (1.6,4.6)**	**2.8 (2.4,6.2)**
Very strong	**30.4 (16.4,56.2)**	**14.0 (7.9,25.0)**	**15.8 (8.6,28.8)**	**22.0 (12.2,39.9)**
Religious upbringing reported at age 36				
No	1.0	1.0	1.0	1.0
Yes	**2.9 (1.7,4.8)**	**2.7 (1.5,4.8)**	**2.4 (1.3,4.3)**	**3.3 (1.9,5.8)**
Effect of upbringing on life at age 36				
No effect	1.0	1.0	1.0	1.0
Has effect	**4.6 (3.3,6.7)**	**5.1 (3.4,7.7)**	**4.4 (2.9,6.7)**	**4.1 (2.9,5.9)**
Religious belief at age 36				
No	-	1.0	1.0	1.0
Yes	-	**14.0 (6.8,28.9)**	**8.8 (4.6,16.5)**	**13.1 (7.0,24.5)**
Change in religious beliefs from upbringing to adulthood				
Same (not religious)	-	1.0	1.0	1.0
Same (religious)	-	**24.4 (6.0, 100.2)**	**7.0 (3.2, 15.4)**	**5.4 (3.2, 9.2)**
Religious to not religious	-	1.8 (0.4, 8.9)	0.9 (0.3, 2.3)	0.6 (0.3,1.2)
Not religious to religious	**-**	**22.9 (5.0, 103.8)**	**3.4 (1.2, 9.6)**	**3.4 (1.6,6.9)**

OR= Odds ratio of logistic regression; CI=Confidence intervals; Adjusted for gender and education
Missing estimates (-) due to insufficient variation in outcome by exposure.

4.3.9 Associations between partner belief and study member religion

Table 4.15 shows associations between partners' religious beliefs (measured when study members were aged 26 and 36) and study member's religiosity throughout life. Having no partner, or a partner with moderate or strong religious belief was associated with higher levels of religious attendance, prayer, the importance of religion and religion, providing meaning in life at age 26, compared to study members whose partner has none or little religious beliefs. For men, having no partner or a partner with the same belief was associated with more frequent religious attendance at age 36, 43, 60-64 and 68-69, prayer or meditation at age 68-69 and reporting that religion provides meaning in life at age 68-69 compared to study members without a religious belief or a different belief . These associations were not found for women.

Table 4.15. Associations between partner beliefs and religiosity

n=1111	**Religious attendance at age 36[1]**	**Religious attendance at age 43 [1]**	**Religious attendance at age 60-64[1]**	**Religious attendance at age 68-69[1]**	**Prayer or meditation[2]**	**Is religious or spiritual faith important[2]**	**Does religion provide meaning in life[2]**
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Strength of partner belief							
Total (n=1,111)							
No partner	**1.5 (1.1,2.0)**	**2.4 (1.5,3.8)**	**1.8 (1.2,2.9)**	**1.8 (1.3,2.6)**	**2.1 (1.5,2.9)**	**1.9 (1.4,2.6)**	**1.9 (1.4,2.6)**
None or little	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Moderate or strong	**2.9 (2.3,3.8)**	**3.7 (2.5,5.4)**	**2.5 (1.7,3.5)**	**2.5 (1.9,3.4)**	**2.7 (2.1,3.5)**	**3.0 (2.4,3.9)**	**2.9 (2.3,3.8)**
Partner beliefs							
Men (n=535)							
No partner	**2.3 (1.2,4.6)**	**3.8 (1.4,10.1)**	**3.7 (1.6,8.8)**	**2.1 (1.0,4.4)**	**2.3 (1.2,4.2)**	1.6 (0.9,3.0)	**2.4 (1.3,4.3)**
No/different belief	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Same belief	**4.4 (2.8,6.8)**	**3.6 (1.7,7.5)**	**2.3 (1.2,4.3)**	**2.0 (1.2,3.2)**	**1.9 (1.3,2.8)**	**2.2 (1.5,3.1)**	**2.6 (1.7,3.8)**
Women (n=576)							
No partner	0.8 (0.5,1.5)	1.2 (0.6,2.5)	1.0 (0.5,2.2)	0.7 (0.3,1.4)	0.7 (0.4,1.2)	0.7 (0.4,1.3)	0.8 (0.5,1.5)
No/different belief	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Same belief	1.0 (0.7,1.4)	1.2 (0.8,2.0)	1.3 (0.8,2.2)	1.2 (0.8,1.8)	**0.7 (0.5,1.0)**	0.9 (0.6,1.2)	0.9 (0.7,1.3)

OR=Odds ratio; CI=Confidence intervals
Sex-stratified models adjusted education and total models adjusted to gender and education
[1]Logisitc regression [2]Ordered logistic regression

4.3.10 Family structure and religious attendance

The variation in the frequency of religious attendance at different ages may be due to age effects such as having children. It was tested whether having children (measured by someone living in the household under the age of 18) at age 36 and 43 is associated with religious participation cross-sectionally and longitudinally. It was found that study members who have children at age 36 had higher odds of religious attendance at age 36 and 43 (Table 4.16). A similar association was found for study members who had children in the household at age 43.

Table 4.16. Having someone aged <18 years old and religious attendance in the household at age 36 and 43

n=1111	**Religious attendance at age 36**	**Religious attendance at age 43**
	OR (95% CI)	OR (95% CI)
Children at age 36		
No one <18 years old in the household	1.0	1.0
Has <18 years old in household	**1.7 (1.1,2.6)**	**1.7 (1.1,2.6)**
Children at age 43		
No one <18 years old in the household	-	1.0
Has <18 years old in household	-	**1.7 (1.2,2.4)**

OR=Odds ratio of logistic regression; Adjusted for gender and education

4.3.11 Employment status and religious attendance

It is possible that the increase in religious attendance from age 60-64 and 68-69 is due to study members leaving paid work. To test this, associations between change in employment status at the age of 60-64 and 68-69 (from working to not working) were associated with religious attendance cross-sectionally and longitudinally

At age 60-64, study members who were not employed were more likely to attend religious services more frequently. When analysing study members who exited paid work between age 60-64 and 68-69, there was an association with religious attendance at age 68-69. There was no association between change in employment status and change in religious attendance.

Table 4.17 Employment status and religious attendance at age 60-64 and 68-69

n=1111	**Religious attendance at age 60-64**	**Religious attendance at age 68-69**	**Increase in religious attendance**
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Employment status at age 60-64			
Not employed	1.0	-	-
Employed	**0.7 (0.5,1.0)**	-	-
Employment status at age 68-69			
Not employed	-	1.0	-
Employed	-	**0.9 (0.6,1.3)**	-
Exited work between 60-64 and 68-69			
No	-	1.0	1.0
Yes	-	0.8 (0.6,1.1)	1.1 (0.6,1.8)

OR=Odds ratio for logistic regression; Adjusted for gender and education

4.4 Summary of results and discussion

This chapter confirms findings from previous research that religious practices and beliefs in adulthood are strongly influenced by religious upbringing, although there was evidence for a u-shaped pattern of religious attendance over life. A novel finding from this chapter is that having a religious partner is associated with higher levels of religiosity for men but not women. Gender and education were identified as important socio-demographic factors associated with religious practices and beliefs. Women were more religious than men on all measures, and higher levels of educational attainment were associated with more frequent religious attendance but not for other measures of religiosity.

4.4.1 Religion across the life course

Religious upbringing was strongly associated with having religious beliefs and with frequent religious attendance in adulthood. Sunday school attendance and reporting a religious upbringing at age 36 were also strongly associated with all measures of religious practices and beliefs independently of gender, education, mother's education and father's social class. Religious practices and beliefs appear to track across the life course with previous religiosity strongly predictive of later religiosity. These findings are in line with the conceptual model for the thesis (Chapter 1, page 52).

Sixty-six percent of study members were affiliated with a religious denomination at age 36. Most study members had the same religious beliefs in adulthood as they were brought up, although a small proportion reported religious beliefs in adulthood although they had no religious upbringing. The most represented denomination reported was Protestant (38%), which was expected of a sample drawn from people born in England, Scotland and Wales in 1946. It was also found that 42% of study members reported that religious or spiritual faith is important in life and 35% reported that religion provides meaning in life.

There was a decline in religious attendance between age 36 (1982) and 68-69 (2014-2015). This is particularly notable for study members who changed from attending a few times a year at age 36 to never at age 43 and 60-64. Regular attendance by study members was stable from age 36 to 60-64 although this only represented 11% of the sample.

These findings illustrate the complex patterns of religious practices across the life course. Previous research using data from cross-sectional surveys and other cohort studies indicate a decline in the rates of religious attendance and belief in God across cohorts (Gill et al. 1998, NatCen 2012). However, in this sample there appears to be a slight increase after the age of 60. It is not possible to draw any strong conclusions about precisely why religious beliefs change across life due to different measures used at different ages.

Nearly a quarter of study members reported praying or meditating regularly or daily at age 68-69. The European Social Survey (2012) found that 63% people in the UK reported praying at least once a month, which is significantly higher than reported in this study and indicates that many people pray despite not identifying as religious or attending religious services.

4.4.2 Gender, education and social class

Analysis of religiosity by gender, education and social class found that women were more likely to report a religious upbringing, religious affiliation, strong religious beliefs and frequent attendance across life. This is consistent with previous research showing that women in almost all cultures and religions are more likely to be religious than men (Trzebiatowska and Bruce 2012). This gender difference in upbringing implies differential emphasis towards boys and girls on the importance of religion in childhood or that girls were encouraged to take part in church-related activities more than boys. Similarly, it is

interesting that although men were less religious in all aspects of religiosity than women, female study members did not report weaker beliefs among their partners than male study members, which can indicate differences between perceived religious beliefs in others and actual beliefs. There are various explanations of gender differences in religion, such as different social roles for men and women, differences in exposure to secular ideas and differences in psychological characteristics, e.g. agreeableness and conscientiousness, although it could be argued that personality is partly due to gender role socialisation. (Francis 1997).

Higher levels of educational attainment were positively associated with Sunday school attendance, religious upbringing, and religious upbringing affecting life, and attendance. There was, however, weaker or no associations between education with the strength of religious belief, the importance of religion and how much religion provides meaning in life. Similar associations to these were observed in the 1970 British Birth Cohort study which found that educational attainment was positively associated with being actively religious, i.e. someone who identifies with religion believes in God and the afterlife and attends services (Voas 2015). There were no associations found between religiosity and social class after adjusting for gender and education.

Mother's education was positively associated with reporting that religious (or non-religious) upbringing affected study members' lives. The most common free-text response regarding about how study member's upbringing has had an effect on their life concerns moral principles, values, behaviour and conscience (Appendix K, page 277). It is possible that mothers with higher educational attainment had stricter requirements for behaviour which had a long-lasting perceived impact on life. There was some evidence that increasing father's social class was associated with higher levels of religiosity. Religious upbringing and frequency of religious attendance were positively associated with higher father's social class.

4.4.3 Partner beliefs

Partners' religious beliefs were positively associated with study members' practices and beliefs. Stronger partner beliefs and having the same beliefs as their partners was associated with more frequent attendance, prayer and reporting that religion is important and provides meaning in life. In most models but not all, there were gender interactions found with stronger associations for men than for women. The impact of partners beliefs ha been previously investigated by Storm and Voas (2012) who carried out an analysis of social factors affecting attendance in the USA and UK. They found that having a partner with a different religious belief was negatively associated with religious attendance. It is not possible to know if these associations are due to religious study members being more likely to meet potential partners through religious, social contacts and being more selective in their choice of partner based on religion or whether religious beliefs of partners have sway over own practices and beliefs.

4.4.4 Family structure

There was some evidence that having children in the household at age 36 was associated with religious attendance at age 36 and 43 and having children at age 43 was associated with religious attendance at the same age. This finding is supported by previous research which indicates that having children is associated with increased religiosity (Baker and Smith 2009). Sherkat and Wilson (1995) suggest that social ties such as relationships with parents, partners and children are important factors which influence religious choices such as affiliation, belief and attendance. It is difficult to ascertain causality in these associations as people with stronger religious beliefs may be more likely to have children.

4.4.5 Employment status

It was found that religious attendance increases between 60-64 and 68-69. After analysing if religious attendance was associated with employment status, only the cross-

sectional associations at age 60-64 were found. This association was only found for men and only just reached statistical significance. There is very little research on how retirement is associated with religiosity. However, a small study of 51 industrial workers in the United States found that religious attendance increases after retirement and that the association between attendance and beliefs is stronger after retirement than before (Glamser 1988). The author suggests that retirement is associated with a "reduction in normative career pressures" which enables greater freedom in religious expression. It is also possible that retirement is associated with an increase in religious practice due to a sense of impending older age, accompanied by thoughts about mortality and meaning in life (Braam et al. 2006).

4.4.6 Strengths and limitations

A major strength of the analysis presented in this chapter is the rich longitudinal data on religiosity across the life course. By utilising repeated measures of religiosity from age 11 to 68-68, this chapter has been able to explore how religiosity changes across the life course and the relationship with socio-economic factors. The majority of the data were collected prospectively which allowed analysis of religiosity across the life course and limits the potential for recall bias.

A limitation of this analysis is the missing data. Of the 2,450 study members who responded to the questionnaire at 68-69, only 45% had complete data on all religion variables and covariates used for this analysis.

As shown, perceptions of religious upbringing and religious affiliation can change over time (Voas 2015). Recording religious attendance at one point in time, e.g. at age 36 does not indicate how long study members were engaging in religious practices or what their religious practices were in between data collection periods. The analysis was conducted in a predominately Christian sample and so may not generalise to all faiths represented in Britain today.

4.4.7 Summary

Religious attendance shows a slight decline over the mid-life period, and a small proportion of study members maintain the religious beliefs they were brought up with. There is some evidence that religiosity tracks across the life course with religiosity in mid-life strongly predictive of later religiosity. The next chapter will analyse how religion across the life course is associated with mental health and wellbeing at age 68-69 and investigate the potential for bi-directional associations.

5 Associations between religiosity, and mental health and wellbeing

5.1 Introduction

The aim of this chapter was to investigate longitudinal and cross-sectional associations between religiosity, and mental health and wellbeing using data from the National Survey of Health and Development. The analysis in this chapter relates to research objective 2 described in the methods chapter (Chapter 3, page 100).

5.2 Analysis plan

5.2.1 Analytical sample

The analytical samples in this chapter were limited to study members who had complete data on the outcomes of interest. For mental health and wellbeing at age 68-69 this was n=2125 and n=2402 respectively. Where religiosity variables at age 68-69 were modelled as the outcome, these samples were again limited to study members who had complete data on religious attendance (n=2395), religious beliefs (n=2403), and prayer or meditation (2404) at age 68-69. Missing data on exposures and co-variates were addressed using Full Information Maximum Likelihood (FIML). Further details of FIML are described in Chapter 3 (page 115).

5.2.2 Descriptive analyses

The mean, range and standard deviation of the measures for mental health (GHQ-28) and wellbeing (WEMWBS) at age 68-69 were described in addition to histograms. As the GHQ-28 had a skewed distribution in this sample, it was log-transformed for use in linear regression models.

5.2.3 Co-variates

Linear regression models were used to analyse how gender, educational attainment and social class were associated with mental health and wellbeing at age 68-69. This chapter

presents the mutually adjusted models. The variables which were associated with religiosity (reported in Chapter 4), and mental health and wellbeing, were used as covariates in subsequent models in this chapter.

5.2.4 Regression models

Linear regression models were used to test the association between all religiosity variables (upbringing, beliefs, partner beliefs and practices), and mental health and wellbeing. Ordered logistic regression models were then used to assess bi-directional associations between religiosity, and mental health and wellbeing. This was done by testing associations between mental health and wellbeing at age 60-64 and religiosity outcomes (attendance, prayer, the importance of religion and religion providing meaning in life) at age 68-69. Figure 5.1 outlines the conceptual model for these analyses.

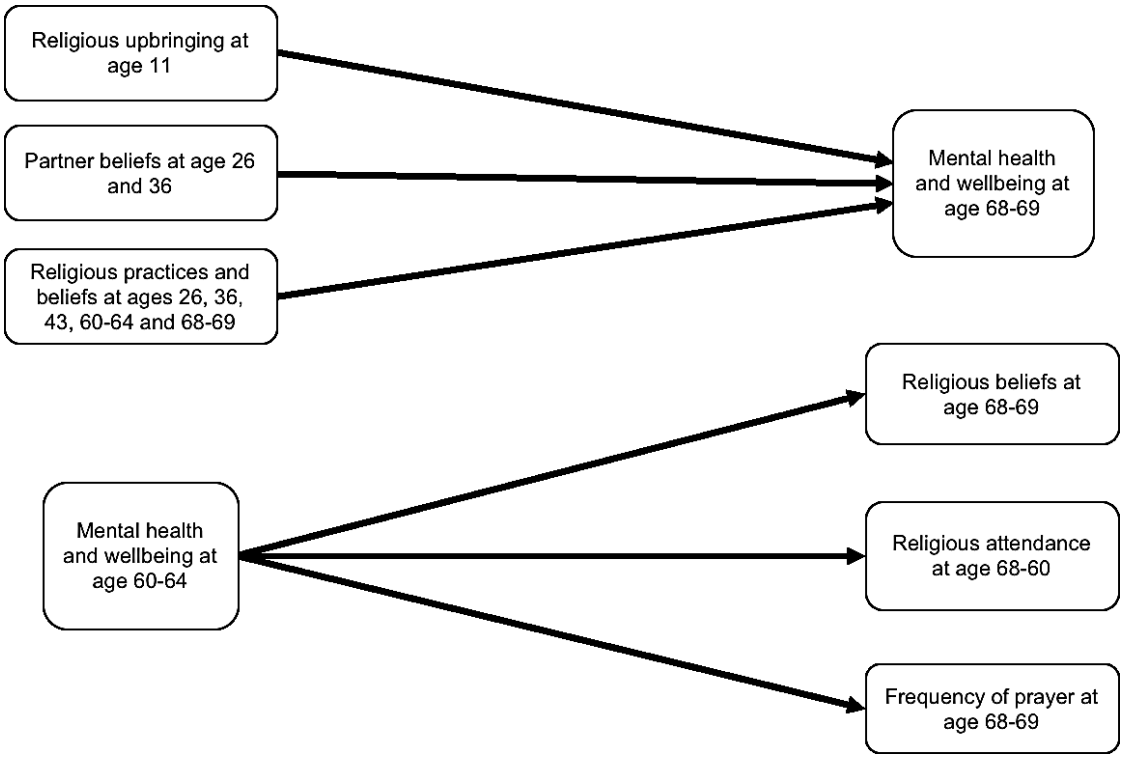


Figure 5.1 Conceptual model for analysis between religiosity, and mental health and wellbeing

All regression model results were presented as unstandardized coefficients and 95% confidence intervals. All regression models were tested for gender interactions and improved model fit using likelihood ratio tests. If gender interactions were found, results were presented for men and women separately.

5.2.5 Auto-regressive cross-lagged model

An auto-regressive cross-lagged model was used to simultaneously assess reciprocal longitudinal associations between mental health and religious attendance over three-time points. These models can be used to better understand the direction of the association between two variables of interest that have repeated measures. In this analysis, religious attendance at ages 43, 60-64 and 68-69 was analysed with the GHQ-28 score at ages 53, 60-64 and 68-39. The single-headed diagonal arrows in Figure 5.3 represent the prospective associations between religious attendance and later mental health and vice versa. The model was applied with equality constraints across waves (a=b and c=d), which is recommended if there is no loss of model fit (Berrington et al. 2006). Double-headed arrows represent cross-sectional associations between variables measured at the same time. Religious attendance and GHQ-28 score were all modelled as continuous variables in the model (weekly=3, monthly=2, less than monthly=1 or never=0). The auto-regressive cross-lagged analysis was only possible for mental health and religious attendance as these were the only variables with repeat measures at three-time points in the available data.

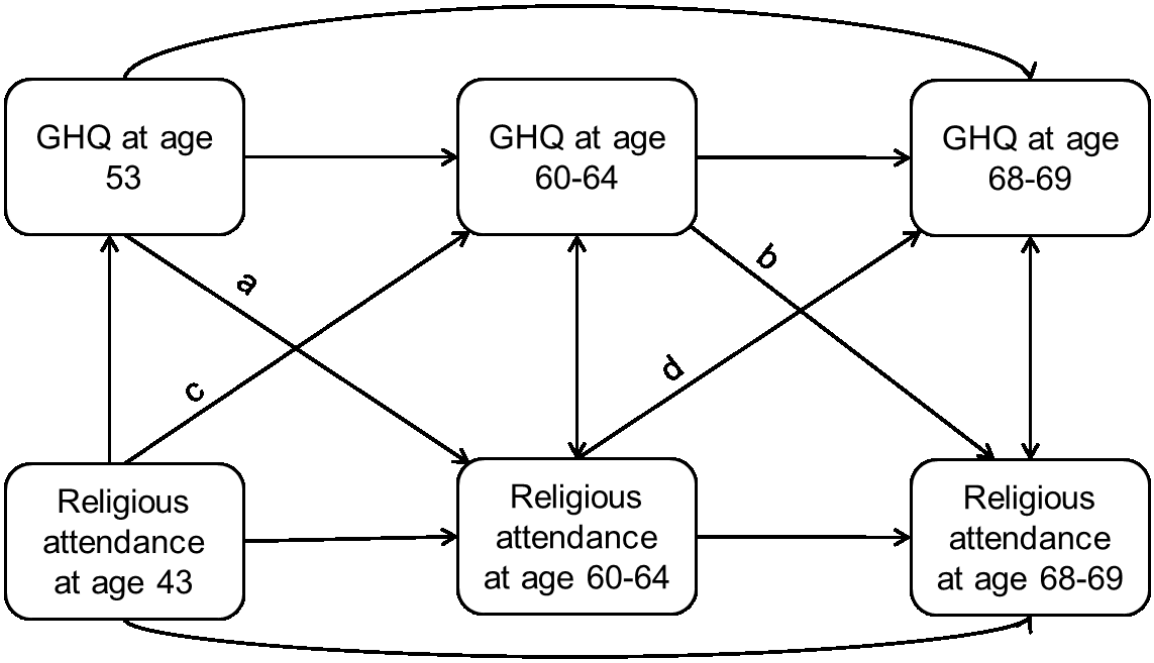


Figure 5.2 The conceptual auto-regressive cross-lagged model based on the repeat measures of religious attendance and mental health (GHQ) at ages 43/53, 60-64, and 68-69 in NSHD

5.3 Results

5.3.1 Mental health and wellbeing

Table 5.1 describes the mean mental health and wellbeing scores at age 68-69 by gender. The average GHQ-28 score in the sample was 15.2 (SD=7.9). GHQ-28 scores were higher for women than men (14.1 vs 16.2). The average score for WEMWBS at age 68-69 was 53.1(SD=8.8), with very little difference between men and women. The distributions of the GHQ-28 and WEMWBS scores are shown in Figure 5.3.

Table 5.1 Descriptive statistics of mental health and wellbeing at age 68-69 by gender

	GHQ-28	WEMWBS
Total		
N	2125	2402
Mean (SD)	15.2 (7.9)	53.1 (8.8)
Range	0-82	14-70
Men		
N	1041	1154
Mean (SD)	14.1 (7.4)	53.5 (8.8)
Range	0-82	14-70
Women		
N	1084	1248
Mean (SD)	16.2 (8.2)	52.8 (8.8)
Range	0-62	21-70

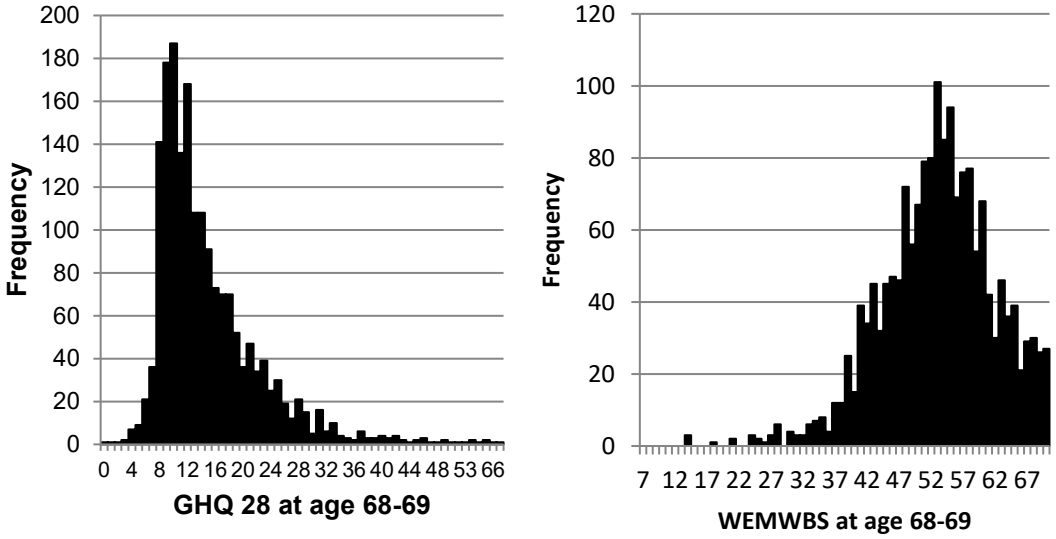


Figure 5.3 Distribution of GHQ-28 and WEMWBS at age 68-69

5.3.2 Socio-economic factors associated with mental health and wellbeing

Table 5.2 shows the results of linear regression models testing the associations between mental health and wellbeing, and gender, education and social class. After adjusting for education and social class, women had worse mental health than men and having at least advanced educational qualifications were associated with better mental health. No differences at the 5% level in mental health or wellbeing were found by social class, except for higher wellbeing in intermediate social classes than study members in the unskilled social class. There were no differences in wellbeing by gender or level of education. Results from bi-variate associations between socioeconomic factors, and mental health and wellbeing are shown in Appendix M (page 281).

Table 5.2 Associations between mental health and wellbeing at age 68-69, and gender, education and social class

	GHQ-28 (n=2125) b (95% CI)	**WEMWBS (n=2402)** b (95% CI)
Gender		
Male	Ref	Ref
Female	**0.11 (0.08,0.15)**	-0.46 (-1.18,0.26)
Education		
No qualification	Ref	Ref
O-levels	-0.02 (-0.07,0.03)	0.42 (-0.56,1.39)
A-levels	**-0.07 (-0.13,-0.02)**	0.71 (-0.32,1.73)
Higher education	**-0.09 (-0.17,-0.02)**	0.81 (-0.59,2.20)
Social class (head of household) at age 53		
Unskilled	Ref	Ref
Partly skilled	-0.01 (-0.12,0.14)	0.08 (-2.30,2.46)
Skilled (manual)	-0.03 (-0.09,0.14)	1.20 (-0.95,3.35)
Skilled (non-manual)	-0.01 (-0.11,0.14)	1.10 (-1.17,3.36)
Intermediate	-0.01 (-0.12,0.11)	**2.58 (0.43,4.72)**
Professional	-0.06 (-0.20,0.07)	2.07 (-0.29,4.43)

Mutually adjusted linear regression models
b = Unstandardized coefficients; CI= Confidence Intervals

5.3.3 Religiosity, and later mental health and wellbeing

Religious upbringing, and mental health and wellbeing in at age 68-69

Table 5.3 shows associations between religious upbringing and mental health and wellbeing at age 68-69. No associations were found between Sunday school attendance, religious upbringing, the denomination of religious upbringing or whether their upbringing affected their life, and mental health and wellbeing in later life.

Table 5.3 Associations between religious upbringing, and mental health and wellbeing at age 68-69

	GHQ-28 b (95% CI) n=2125	**WEMWBS b (95% CI) n=2402**
Sunday school		
No	Ref	Ref
Yes	-0.03 (-0.09,0.02)	-0.04 (-1.01,0.94)
Religious upbringing		
No	Ref	Ref
Yes	0.01 (-0.04,0.06)	0.04 (-0.91,0.99)
Religious upbringing have an effect on life		
No	Ref	Ref
Yes	0.02 (-0.03,0.06)	0.39 (-0.39,1.18)
Religious upbringing and effect on life		
No religious upbringing, no effect on life	Ref	Ref
Religious upbringing, no effect on life	-0.02 (-0.08,0.05)	-0.34 (-1.46,0.79)
Religious upbringing, effect on life	0.01 (-0.05,0.07)	0.19 (-0.93,1.30)
No religious upbringing, effect on life	-0.03 (-0.16,0.10)	-0.24 (-2.78,2.30)
Denomination of religious upbringing		
No religion	Ref	Ref
Catholic	0.01 (-0.07,0.09)	-0.11 (-0.17,1.44)
Protestant	0.00 (-0.05,0.06)	0.09 (-0.88,1.07)
Other	0.04 (-0.04,0.11)	-0.16 (-1.59,1.27)

Linear regression models adjusted for education and gender
b = Unstandardized coefficients; CI= Confidence Intervals

Religious beliefs, and mental health and wellbeing at age 68-69

Table 5.4 shows associations between religious beliefs across the life course and mental health or wellbeing at age 68-69. No associations were found between religious beliefs at age 26 and 36 and mental health or wellbeing at ages 68-69. Study members who had no religious upbringing but reported religious beliefs at age 36 had higher wellbeing scores compared to those with no religious upbringing and no religious belief at age 36. There were also no cross-sectional associations between the importance of religion and wellbeing at age 68-69. Study members who reported that religion provided meaning in life had higher GHQ-28 scores than study members who responded, 'not at all'.

Table 5.4 Associations between religious beliefs, and mental health and wellbeing at age 68-69

	GHQ-28 b (95% CI) n=2125	**WEMWBS b (95% CI) n=2402**
The strength of belief at age 26		
None or little	Ref	Ref
Moderate or strong	-0.04 (-0.10,0.02)	0.08 (-0.02,1.18)
Religious belief at age 36	0.01 (-0.04,0.06)	0.50 (-0.43,1.42)
No	Ref	Ref
Yes	0.00 (-0.05,0.04)	0.72 (-0.08,1.52)
Religious denomination at age 36		
No religion	Ref	Ref
Catholic	0.01 (-0.08,0.10)	0.55 (-1.18,2.29)
Protestant	-0.02 (-0.07,0.03)	0.81 (-0.05,1.67)
Other	0.02 (-0.04,0.08)	0.43 (-0.77,1.64)
Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	0.01 (-0.05,0.07)	0.84 (-0.31,2.01)
Religious to not religious	0.02 (-0.05,0.08)	0.41(-0.91,1.73)
Not religious to religious	0.01 (-0.08,0.10)	**2.01 (0.24,3.79)**
Importance of religious or spiritual belief at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.02 (-0.03,0.08)	0.57 (-0.36,1.49)
Somewhat important	0.04 (-0.02,0.10)	0.14 (-0.88,1.16)
Very important	0.05 (-0.01,0.11)	1.06 (-0.00,2.12)
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	**0.08 (0.02,0.13)**	-0.50 (-1.41,0.40)
A little	**0.06 (0.01,0.12)**	-0.12 (-1.10,0.86)
A lot	**0.10 (0.04,0.16)**	0.18 (-0.91,1.26)

Linear regression models adjusted for education and gender
b = Unstandardized coefficients; CI= Confidence Intervals

Table 5.5 shows associations between the religious beliefs of the study members and later mental health and wellbeing. There were no associations between the strength of partner beliefs, and mental health or wellbeing. Having a partner with the same belief was associated with better mental health. A gender interaction was found was between partner belief and wellbeing, and so these results are shown separately. For men, having a partner with the same religious belief was strongly associated with higher wellbeing scores at age 68-69, than having a partner with little or no belief. No association was found for women.

Table 5.5 Associations between partner beliefs, and mental health and wellbeing at age 68-69 by gender

	GHQ-28 b (95% CI) n=2125	**WEMWBS b (95% CI) n=2402 m=1,154 | w=1,248**
The strength of partners belief at age 26		
Total		
No partner	0.04 (-0.01,0.09)	-0.98 (-2.02,0.07)
Partner with little or no religion	Ref	Ref
Partner with moderate or very strong belief	0.02 (-0.02,0.06)	0.15 (-0.72,1.02)
Partner belief at age 36		0.15
Men		
No partner	-	-1.79 (-0.38,0.25)
No/different belief	Ref	Ref
Same belief	-	**2.11 (0.84,3.38)**
Women		
No partner	-	0.59 (-0.136,2.54)
No/different belief	Ref	Ref
Same belief	-	0.55 (-0.72,1.81)
Total		
No partner	-0.03 (-0.10,0.04)	-
No/different belief	Ref	Ref
Same belief	**-0.06 (-0.10,-0.01)**	-

Linear regression models adjusted for education and gender
b = Unstandardized coefficients; CI= Confidence Intervals

Religious practices, and mental health and wellbeing

Table 5.6 show associations between religious practices and later mental health and wellbeing. Religious attendance at age 36 was associated with higher wellbeing scores at age 68-69, and there was a borderline non-significant association between very frequent religious attendance across the life course, and wellbeing at age 68-69. Occasional and daily prayer or meditation at age 68-69 was associated with worse mental health at age 68-69. No associations were found between religious attendance and mental health and wellbeing at other ages.

Table 5.6 Associations between religious practices, and mental health and wellbeing at age 68-69

	GHQ-28 b (95% CI) n=2125	**WEMWBS b (95% CI) n=2402**
Attendance at age 36		
Never	Ref	Ref
<Monthly	-0.03 (-0.08,0.02)	**0.90 (0.04,1.75)**
Monthly	0.03 (-0.05,0.10)	0.42 (-1.01,1.85)
Weekly	0.02 (-0.04,0.09)	**1.38 (0.15,2.61)**
Attendance at age 43		
Never	Ref	Ref
<Monthly	0.01 (-0.12,0.13)	-0.14 (-2.49,2.21)
Monthly	-0.05 (-0.16,0.06)	0.74 (-1.34,2.83)
Weekly	0.02 (-0.05,0.08)	0.64 (-0.54,1.82)
Attendance at age 60-64		
Never	Ref	Ref
<Monthly	0.08 (-0.03,0.19)	-0.28 (-2.23,1.71)
Monthly	0.00 (-0.11,0.11)	0.20 (-1.81,2.20)
Weekly	0.02 (-0.05,0.09)	1.24 (0.05,2.52)
Attendance at age 68-69		
Never	Ref	Ref
<Monthly	0.03 (-0.04,0.10)	0.67 (-0.47,1.81)
Monthly	-0.02 (-0.12,0.07)	1.37 (-0.30,3.04)
Weekly	0.04 (-0.02,0.10)	0.45 (-0.60,1.49)
Sum attendance at ages 36,43, 60-64 and 68-69		
Never	Ref	Ref
Low attendance	0.01 (-0.06,0.08)	0.85 (-0.46,2.17)
Moderate attendance	-0.10 (-0.20,-0.00)	-0.19 (-1.98,1.59)
Frequent attendance	0.08 (-0.01,0.18)	-0.41 (-2.22,1.41)
Very frequent attendance	0.02 (0.08,0.15)	1.65 (0.00,3.31)
Prayer or meditation at age 68-69		
Never	Ref	Ref
Occasionally	**0.07 (0.02,0.12)**	-0.24 (-1.07,0.60)
Regularly	0.03 (-0.04,0.11)	0.91 (-0.34,2.15)
Daily	**0.10 (0.03,0.16)**	-0.60 (-1.69,0.50)

Linear regression models adjusted for education and gender
b = Unstandardized coefficients; CI= Confidence Intervals

5.3.4 Mental health and wellbeing, and later religiosity

Table 5.7 shows associations between mental health and wellbeing at age 60-64 and religious practices and beliefs at age 68-69. Worse mental health at age 60-64 was associated with more frequent prayer or meditation, increasing the importance of religion and religious meaning at age 68-69, but not with religious attendance. There were no associations between wellbeing at age 60-64 and religious practices and beliefs at age 68-69.

Table 5.7 Associations between mental health and wellbeing at age 60-64, and religious practices and beliefs at age 68-69

	Attendance (n=2395)	**Prayer or meditation (n=2404)**	**Importance of religion (n=2403)**	**Religious meaning (n=2403)**
GHQ-28 at age 60-64	0.08 (-0.03,0.20)	**0.14 (0.04, 0.24)**	**0.13 (0.03,0.24)**	**0.15 (0.05,0.29)**
WEMWBS at age 60-64	0.00 (-0.01,0.01)	-0.00 (-0.01,0.01)	0.00 (-0.00,0.01)	0.00 (-0.00,0.01)

Ordered regression models adjusted for education and gender
b = Unstandardized coefficients; CI= Confidence Intervals

5.3.5 Testing bi-directional associations between religious attendance and mental health

Table 5.8 and Figure 5.4 show the results of the auto-regressive cross-lagged analysis between religious attendance and mental health at three-time points. Previous religious attendance was strongly related to later attendance. Similarly, mental health at baseline was strongly associated with later mental health scores. Poorer mental health at age 53 and 60-64 was associated with more frequent religious attendance at age 60-64 (b=0.08, SE=0.04, p<0.05) and at age 68-69 (b=0.09, SE=0.04, p<0.05) respectively. There was no evidence that religious attendance was associated with later or concurrent mental health.

Table 5.8 Auto-regressive cross-lagged model of religious attendance and mental health from age 43 to 68-69

	β (95% CI) (n=2125)
GHQ-28 at age 68-69	
ON GHQ-28 at age 60-64	**0.422 (0.388,0.456)**
ON Attendance at age 60-64	-0.009 (-0.014,0.032)
WITH Attendance at age 68-69	-0.021 (-0.061,0.018)
ON GHQ-28 at age 53	**0.218 (0.183,0.252)**
Attendance at age 68-69 ←	
ON GHQ-28 at age 60-64	**0.031 (0.013,0.050)**
ON Attendance at age 60-64	**0.589 (0.560,0.617)**
ON Attendance at age 43	**0.237 (0.206,0.268)**
GHQ-28 at age 60-64 ←	
ON GHQ-28 at age 53	**0.474 (0.443,0.504)**
ON Attendance at age 43	0.009 (-0.013,0.032)
WITH Attendance at age 60-64	-0.028 (-0.068,0.012)
Attendance at age 60-64 ←	
ON Attendance at age 43	**0.601 (0.576,0.626)**
ON GHQ-28 at age 53	**0.037 (0.016,0.059)**
GHQ-28 at age 53 ←	
ON Attendance at age 43	0.013 (-0.024,0.050)

β = Standardized beta coefficients; CI= Confidence Intervals

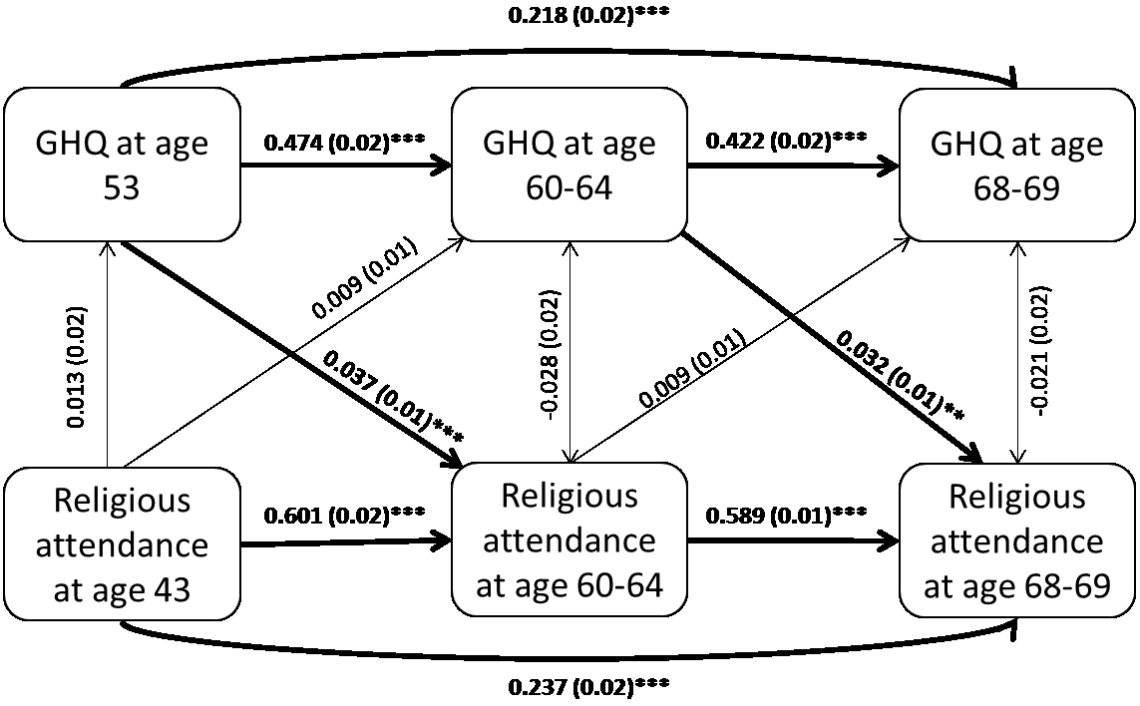


Figure 5.4 Auto-regressive Cross-lagged model testing bi-directional associations between religious attendance and GHQ score, adjusted for gender and education.

Figures represent standardised regression coefficients and standard errors.

5.4 Summary of results and discussion

This chapter provides evidence that some aspects of religiosity such as frequency of prayer or meditation and how much religion provides meaning in life, are cross-sectionally associated with worse mental health at age 68-69. Contrary to the conceptual model set out in Chapter 1 (page 52), no associations were found between religiosity and subsequent mental health; however a borderline association was found between very frequent religious attendance across life and higher wellbeing. Furthermore, investigations of whether associations between religiosity and mental health and wellbeing are bi-directional suggests that poor mental health is associated with later religiosity. This was tested using a cross-lagged analysis of religious attendance and mental health which indicated that poor mental health was associated with an increase in later religious attendance, but that religious attendance was not associated with subsequent mental health.

5.4.1 Religiosity and later mental health and wellbeing

Upbringing

No prospective associations were found between religious upbringing, and mental health and wellbeing at age 68-69. There is currently very little published research investigating associations between religious upbringing, and mental health and wellbeing in older age. A study by Nooney (2005) using data from the National Longitudinal Study of Adolescent Health in the USA found that religious involvement, as measured by attendance, prayer and beliefs, was associated with fewer depressive symptoms in adolescence. Similar findings were reported by Chen and VanderWeele (2018) using data from the USA. It is possible that religiosity in earlier life is associated with contemporaneous mental health but that in older age proximal social factors become more relevant. It is also possible that associations between religious upbringing and later mental health are dependent on

whether study members remain affiliated to the religion they were brought up in, or if they transition to another religion or out of any religious affiliation.

Beliefs

Study members who described themselves as religious at age 36 despite not having a religious upbringing had higher wellbeing scores at age 68-69 compared to study members with no religious upbringing and no religious beliefs at age 36. There was a cross-sectional association between reporting that religion provides meaning in life and worse mental health at age 68-69. Reporting that religion provides 'a lot' of meaning in life was associated with having 6-10% higher scores on the GHQ-28 scale compared to those who reported that religion does not provide any meaning at all in life. As this is a cross-sectional association, it is not possible to infer if religious meaning leads to poor mental health or if poor mental health leads to stronger religious beliefs. However, by using mental health and wellbeing variables collected at age 60-64, it was possible to show that poor mental health was associated with stronger religious beliefs, religion providing meaning and religion being important in life, 4-9 years later.

No associations were found for other measures of religious beliefs, and mental health or wellbeing at age 68-69. The systematic review presented in Chapter 2 (page 54) showed that more than half of the 19 studies examined found that religious beliefs and spirituality were associated with better mental health and wellbeing. A reason for the null findings in this chapter could be the different measures of religious beliefs utilised in these studies. For example, measures of religious guidance (how much religion provides meaning in life and rules to live by) and religious doubt (uncertainty about religion) which have been associated with better mental health and wellbeing Chapter 2 (page 54) are conceptually different to the strength of belief or importance of beliefs.

There is some evidence that the beliefs of study members' partners are associated with wellbeing but not mental health. Among men only, having a partner who has moderate

or very strong religious beliefs was associated with higher wellbeing compared to study members whose partners have little or no religious beliefs. Having a partner with the same belief was associated with better mental health compared to those having a different religious belief to their partner. This finding is supported by previous research demonstrating the benefits of marriage, particularly for men (Willitts et al. 2004). Although the estimate for wellbeing is lower for study members whose partners have weaker religious beliefs or a different or no beliefs the confidence intervals for these groups overlap with those with stronger religious beliefs and the same religious belief, which indicates there is no significant difference.

Practices

Religious attendance at age 36 was associated with higher wellbeing at age 68-69 for study members who reported attending less than once a month and weekly but not for those attending at least once a month. The non-linear association between religious attendance and wellbeing could be due to real differences in the way that frequency of attendance is associated with wellbeing. It could also be an artefact of the relatively low sample in the 'monthly' group compared to the other groups (Table 4.7, page 128). It is not clear why these associations are found at age, 36 but not at later ages. Analysis of the sum attendance variable indicates that there is no accumulation effect of attendance across the life course on wellbeing. However, the association between very frequent attendance (attending at least once a month at ages 6, 43, 60-64 and 68-69) is borderline significant. Post-hoc analysis of lifetime religious attendance and the individual items of WEMWBS show that this association is driven by 'being interested in other people', 'feeling loved', 'feeling close to others', 'feeling useful' and feeling optimistic about the future (Appendix N, page 282).

There were no associations found between religious attendance across the life course and mental health at age 68-69. This is surprising as the systematic review of longitudinal

studies investigating religiosity, and mental health and wellbeing (Chapter 2, page 54) found the majority of included papers reported a positive association between religious attendance and mental health. It is possible that this lack of association is due to cultural differences in the relationship people have with religious organisations between the UK and USA, where the majority of previous research has taken place.

Daily prayer or meditation was associated with a 10% higher GHQ-28 score than never praying. As with the finding between religious meaning in life and GHQ-28, this association is only cross-sectional, but could suggest a plausible coping mechanism in response to stress, i.e. stress could lead to an increase in religious attendance as a way to cope (Kidwai et al. 2014). There is significant overlap between social factors which can contribute to poor mental health and for which people resort to daily prayer or meditation such as illness or bereavement. Analysis of associations between mental health at age 60-64 and prayer or meditation at age 68-69 supports this idea with a strong association between poor mental health and frequency of prayer or meditation 4-9 years later. It is not yet possible to examine prospective associations between frequency of prayer or meditation and later mental health and wellbeing as this measure was first included at age 68-69. A study by Levin and Taylor (1998) found no significant associations between prayer, and life satisfaction and happiness. Braam et al. (2016) also found no association between frequency of prayer and the course of depressive symptoms over six years in the Longitudinal Ageing Study Amsterdam. However, they did find higher levels of depressive symptoms in widows who although have no religious affiliations (i.e. not being a member of a religious organisation), still reported praying daily. This interaction could also explain the overall association found between prayer and poorer mental health as this analysis did not take denomination into account.

5.4.2 Mental health and wellbeing and later religiosity

Results from the investigation of associations between mental health and wellbeing and later religiosity suggest that more symptoms of depression and anxiety at age 60-64 were positively associated with prayer, the importance of religion and religious meaning at age 68-69. This suggests that poor mental health is a stronger predictor of religious practices and beliefs than religious practices beliefs are a predictor of later mental health. This hypothesis is supported by the results of the auto-regressive cross-lagged model of religious attendance and mental health, which suggests that religious attendance is not associated with subsequent mental health, but that mental health is predictive of later religious attendance.

No associations were found between wellbeing at age 60-64 and later religiosity. If religious practice and beliefs do indeed change as a result of poor mental health, it may be that the characteristics of poor mental health have more of a functional impact than low wellbeing or that study members seek non-religious coping mechanisms for low wellbeing.

5.4.3 Strengths and limitations

The analyses presented in this chapter are the first examination of prospective associations between religiosity, and mental health and wellbeing in the UK. Longitudinal data also allowed an investigation of bi-directional associations between religiosity, and mental health and wellbeing. This is important as the potential for reverse causation has been identified as an important methodological consideration in research relating to religiosity and health (Maselko et al. 2012, VanderWeele et al. 2016). When subsequent waves of data are collected on mental health in NSHD, it will be possible to further explore the associations between religious beliefs, and mental health and wellbeing.

Analysis of several religiosity variables across the life course allows comparison of different aspects of religiosity with mental health and wellbeing. Furthermore, by using two different outcome measures, it was possible to explore and understand the mechanisms through which religiosity can be important for mental health and wellbeing separately.

As described in Chapter 3 (page 115), study members with complete data were more likely to be religious and have better mental health and wellbeing. The complete-case analysis would most likely over-estimate associations between religiosity, and mental health and wellbeing. Therefore, the use of FIML in the regression models may go some way to reducing this risk of bias.

One of the main limitations of this analysis is in the measure of religious upbringing collected in NSHD. This measure was collected retrospectively, and it is possible that the recollection of religious upbringing could have been influenced by life experience in adulthood or factors which could affect perceptions around upbringing. Recall bias of religious upbringing has been previously demonstrated in NSHD (Chapter 4, Table 4.2, page 123) and in the National Child Development Survey (Voas 2015). The measures of religiosity are also relatively crude compared to other studies of religiosity and health (King and Crowther 2004). For example, the question pertaining to frequency of prayer also includes meditation. Prayer and meditation are likely to operate in different ways, but it is not possible to disentangle these two activities in this analysis. Prayer is a religious practice, but it is possible for meditation to be completely secular.

Additionally, there are different types of prayer which could be associated with mental health and wellbeing in different ways. Praying for direct intervention has been associated with worse mental health and wellbeing but praying for others or to express gratitude may be associated with better outcomes (Pargament et al. 2000). Although the time between data collection is about ten years, the questions related to religious

attendance only ask about the last 12 months, and so it is difficult to build up an accurate picture of religious participation across the life course.

Similarly, for the additional analyses using the auto-regressive cross-lagged model it would have been ideal to have repeated measures of other aspects of religiosity, e.g. beliefs but unfortunately, these have not been collected consistently across the life course.

5.4.4 Summary

There is evidence that that poorer mental health is related to later religiosity but not vice versa, which could be a sign of an adaptive coping mechanism. The hypothesis that religiosity is used as a coping mechanism in relation to stressful life events is investigated in Chapter 7 (page 189) where the relationship between religiosity and stressful life events are examined. The next chapter will consider psychological, social and behavioural factors which may be involved in the relationship between religion, and mental health and wellbeing.

6 Psychological, social and lifestyle factors associated with religiosity, and mental health and wellbeing

6.1 Introduction

The aim of this chapter was to explore psychological, social and lifestyle factors which may be involved in the associations between religiosity and mental health and wellbeing. Although very few direct associations were found between religiosity and subsequent mental health and wellbeing in Chapter 5, it is still of interest to understand the role of psychological, social and lifestyle factors with religiosity, and mental health and wellbeing. The analysis in this chapter relates to research objective 3 described in the methods chapter (Chapter 3, page 101).

6.2 Analysis plan

6.2.1 Analytical sample

As with the previous chapter, the analytical samples were limited to study members who had complete data on outcome measure. For mental health and wellbeing at age 68-69, these were n=2125 and n=2402 respectively. For psychological, social and lifestyle factors the samples varied from n=2127 to n=3716. Missing data on exposures and co-variates were addressed using Full Information Maximum Likelihood (FIML). Further details of FIML are outlined in Chapter 3 (page 115).

6.2.2 Descriptive analyses

The mean, standard deviation, median, range and inter-quartile range of the social, psychological and lifestyle measures analysed in this chapter were described in addition to histograms.

6.2.3 Co-variates

Analyses in Chapters 4 and 5 identified gender and education as factors associated with religiosity, and mental health and wellbeing and were therefore included as covariates in all regression models.

6.2.4 Regression models

Linear regression models were used to first test the associations between religiosity, and psychological, social and lifestyle factors. Second, the association between psychological, social and lifestyle factors, and mental health and wellbeing were tested (Figure 6.1).

These models were tested for gender interactions. Where gender interactions were found, and likelihood ratio tests indicated the interaction improved the model fit, model results were shown for men and women separately.

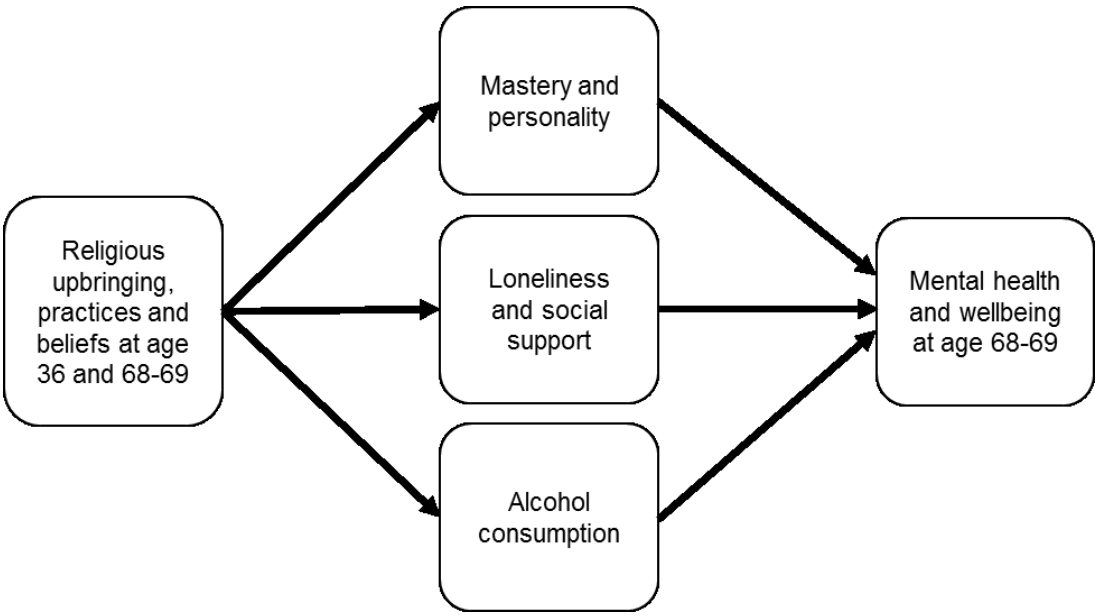


Figure 6.1 Conceptual model for associations between religiosity, mental health and wellbeing, and psychological, social and lifestyle factors.

All psychological, social and lifestyle factors which were associated with religiosity, and mental health or wellbeing were then added as covariates one at a time to linear

regression models between religiosity, and mental health and wellbeing. All regression model results were presented as unstandardized coefficients and 95% confidence intervals.

6.3 Results

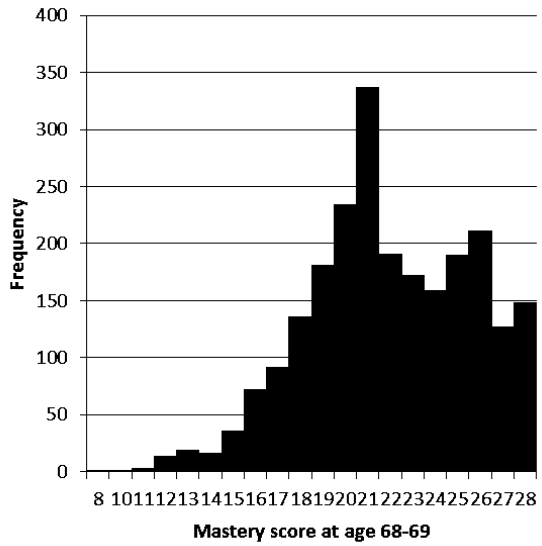
6.3.1 Description of psychological, social and lifestyle factors

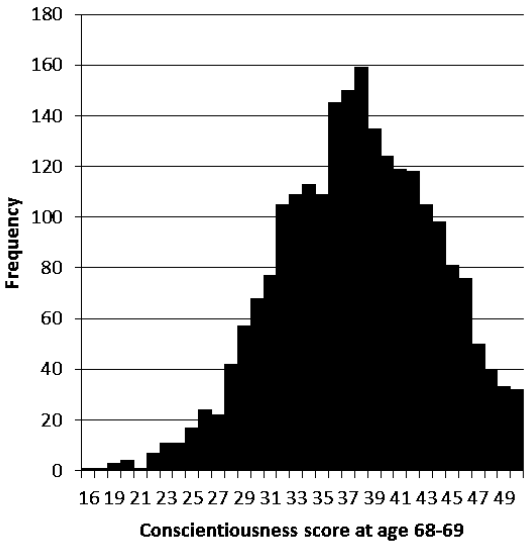
Table 6.1, and Figure 6.2 and Figure 6.3 show the distribution of the psychological, social and lifestyle factors used in the analysis. Mastery, conscientiousness, agreeableness, extraversion and neuroticism scores all had approximately normal distributions. Loneliness, negative social support and alcohol consumption scores were all skewed to the right, and positive social support scores were skewed to the left.

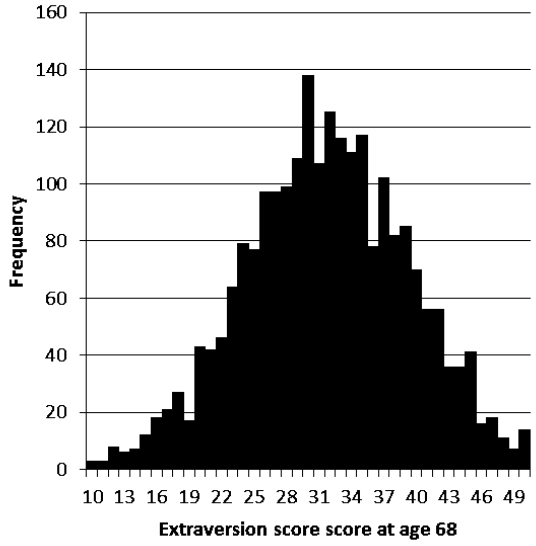
Table 6.1. Descriptives of mastery, agreeableness, extraversion and conscientiousness at age 68

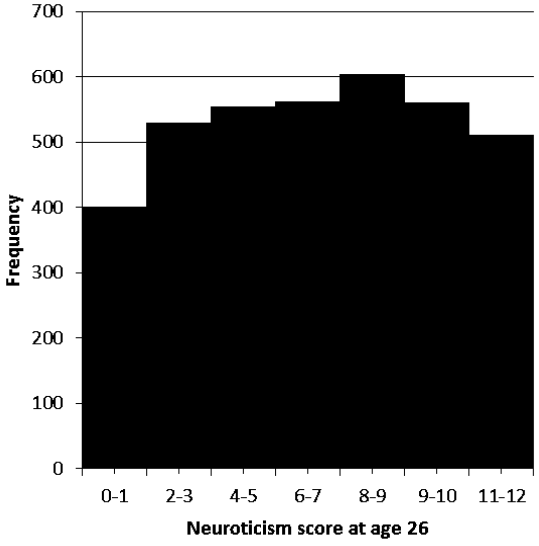
	Mean	SD	Range	Median	Interquartile range
Mastery (n=2338)	23.96	3.62	8-28	22	22-25
Conscientiousness (n=2247)	37.70	6.01	16-50	38	38-42
Agreeableness (n=2317)	40.87	5.77	13-50	42	42-45
Extraversion (n=2297)	31.71	7.54	10-80	32	32-37
Neuroticism (n=3716)	6.31	3.82	0-12	6	6-10
Positive social support (n=2367)	6.33	1.95	0-9	6	6-8
Negative social support (n=2354)	1.69	1.50	0-9	1	1-3
Loneliness (n=2389)	3.85	4.41	3-9	3	3-4
Alcohol consumption (n=2127)	2.97	2.08	0-11	3	1-4

All variables measured at age 68-68 apart from neuroticism which was measured at age 26









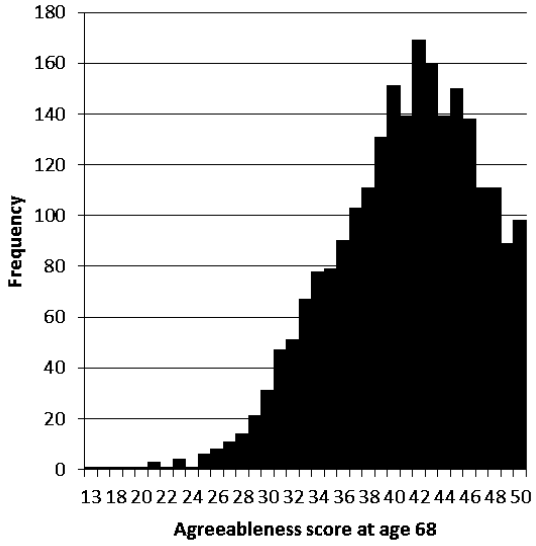


Figure 6.2 Histograms of psychological factors

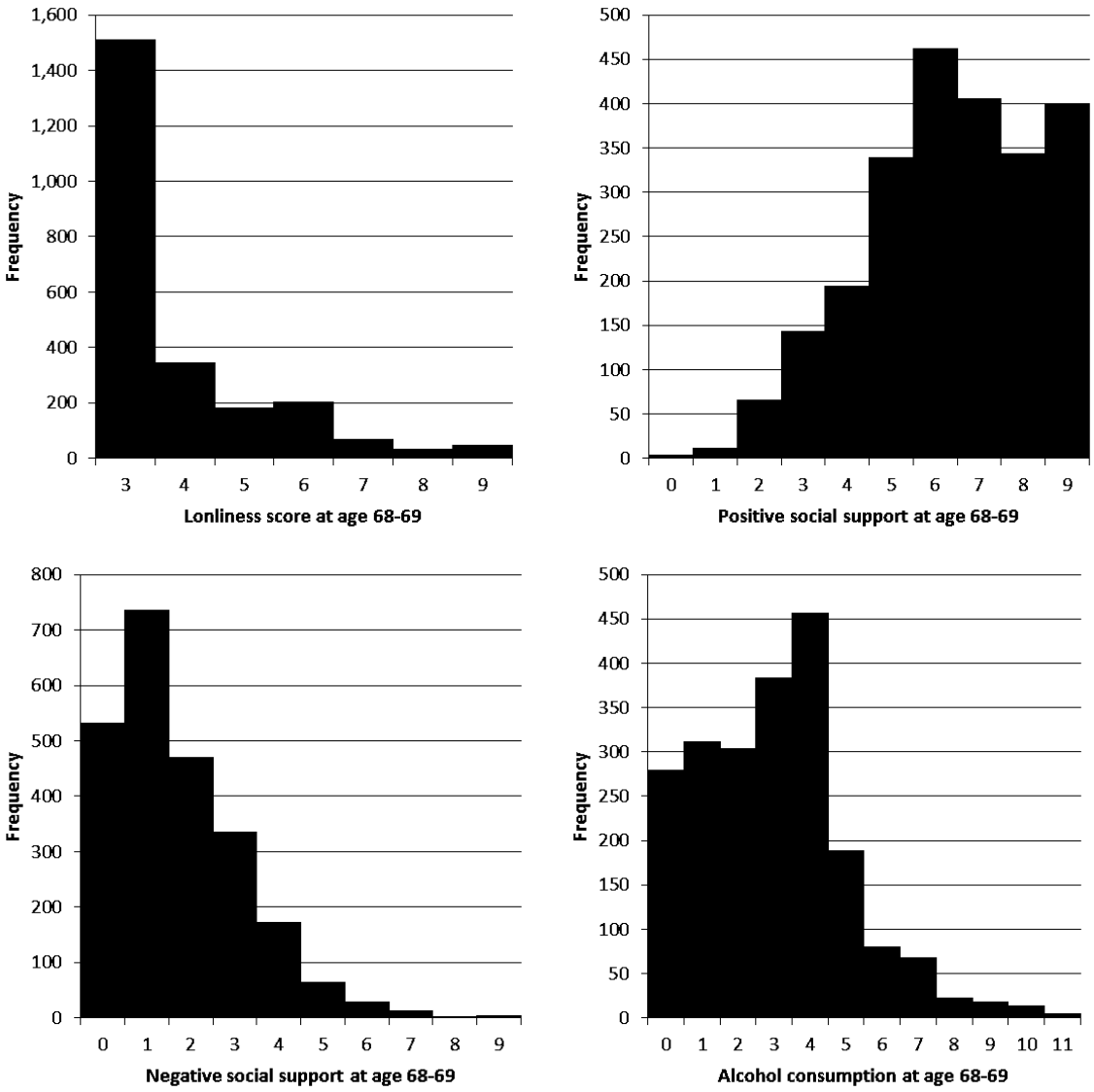


Figure 6.3 Histograms of social and lifestyle factors

6.3.2 Associations with religiosity, mental health and wellbeing

Tables 6.2 and 6.3 show bi-variate associations between religiosity, and psychological, social and lifestyle factors.

Psychological factors

Weekly religious attendance, daily prayer or meditation, religion being somewhat important in life and religion providing meaning in life were all associated with lower levels of mastery. No associations were found between mastery and a change in religious beliefs (from upbringing to adulthood).

Gender interactions were found for religious attendance, daily prayer or meditation, religion being somewhat important in life and religion providing meaning in life, and conscientiousness score. Attending church on a less than monthly basis was associated with lower levels of conscientiousness compared to never attending for women only. Furthermore, daily prayer, reporting that religion is important in life and religion provides meaning in life was associated with higher levels of conscientiousness but only for men. No associations were found between conscientiousness and a change in religious belief (from upbringing to adulthood).

Study members who had religious beliefs at age 36 (irrespective of upbringing) also had higher levels of agreeableness compared to those with no religious upbringing and no religious beliefs at age 36. Religious attendance, daily prayer or meditation, religion being somewhat important in life and religion providing meaning in life were associated with higher levels of agreeableness with the association between the importance of religion and agreeableness being stronger for men than women.

Attending religious services less than monthly or monthly were positively associated with extraversion scores. Regular prayer and religion being important in life were also associated with higher levels of extraversion. No associations were found between any measure of religiosity and neuroticism.

Social factors

Religious beliefs in adulthood, prayer or meditation, the importance of religious belief and religion provide meaning in life were associated with higher levels of positive social support. For religious attendance, associations with higher social support were only found for men. Occasional prayer and those reporting that religion provides no meaning or not much meaning was more likely to report higher levels of negative social support. No associations were found between religiosity and loneliness.

Alcohol consumption

Study members with a religious upbringing, irrespective of their beliefs as an adult, had lower alcohol consumption compared to those with no religious upbringing and no religious beliefs as an adult. Weekly religious attendance was associated with lower alcohol consumption compared to those who never attend but only for men. Study members who reported daily prayer or meditation, religion is ‘very important’ in life or religion providing ‘a lot’ meaning in life had lower alcohol consumption scores compared to those who were not religious at all.

Table 6.2 Bi-variate analysis for associations between religiosity and psychological factors

	Mastery n=2338	**Conscientiousness** n=2247 men=1083 | women=1164		**Agreeableness** n=2317 men=1113 | women=1204		**Extraversion** n=2297	**Neuroticism** n=3716
	b (95% CI)	b (95% CI)		b (95% CI)		b (95% CI)	b (95% CI)
Change in religious beliefs from upbringing to adulthood							
Same (not religious)	Ref	Ref		Ref		Ref	Ref
Same (religious)	-0.06 (-0.54,0.41)	0.42 (1.31,0.00)		**1.71 (0.99,2.43)**		0.43 (-0.58,1.44)	-0.26 (-0.65,0.14)
Religious to not religious	-0.15 (-0.70,0.39)	0.08 (-0.86,1.01)		0.08 (-0.74,0.90)		-0.22 (-1.37,0.94)	0.02 (-0.44,0.47)
Not religious to religious	0.23 (-0.51,0.97)	0.94 (-0.32,2.20)		**1.76 (0.65,2.87)**		0.52 (-1.05,2.09)	-0.13 (-0.75,0.49)
Religious attendance							
Never	Ref	Ref		Ref		Ref	Ref
<Monthly	-0.01 (-0.47,0.46)	0.22 (-0.95,1.40)	**-1.10 (-2.20,0.00)**	**0.93 (0.23,1.64)**		**1.11 (0.12,2.10)**	0.02 (-0.48,0.53)
Monthly	-0.30 (-0.98,0.37)	-1.00 (-2.76,0.76)	0.44 (-1.09,1.97)	**1.44 (0.43,2.45)**		**1.51 (0.05,2.97)**	0.25 (-0.49,0.99)
Weekly	**-0.48 (-0.91,-0.05)**	1.08 (-0.01,2.17)	-0.83 (-1.81,0.14)	**1.65 (1.01,2.30)**		-0.24 (-1.15,0.67)	-0.23 (-0.69,0.23)
Prayer or meditation							
Never	Ref	Ref		Ref		Ref	Ref
Occasionally	-0.31 (-0.65,0.04)	0.39 (-0.43,1.21)	-0.12 (-0.97,0.74)	**0.94 (0.16,1.72)**	**1.46 (0.80,2.13)**	0.73 (-0.01,1.46)	0.29 (-0.08,0.66)
Regularly	-0.37 (-0.88,0.15)	0.27 (-1.08,1.63)	0.15 (-1.02,1.33)	**3.17 (1.87,4.48)**	**2.08 (1.17,2.99)**	**1.43 (0.33,2.53)**	0.14 (-0.41,0.69)
Daily	**-0.87 (-1.32,-0.42)**	**1.73 (0.58,2.89)**	-0.28 (-1.33,0.76)	**3.48 (2.37,4.59)**	**1.98 (1.17,2.80)**	-0.04 (-1.00,0.92)	-0.19 (-0.67,0.29)
Importance of religion							
Not important at all	Ref	Ref		Ref		Ref	Ref
Not particularly important	0.11 (-0.27,0.49)	0.43 (1.07,0.00)	0.58 (-0.42,1.58)	**0.92 (0.35,1.48)**		0.81 (-0.01,1.62)	-0.12 (-0.53,0.29)
Somewhat important	**-0.52 (-0.93,-0.10)**	**1.27 (0.27,2.26)**	0.83 (-0.22,1.89)	**1.93 (1.32,2.55)**		**1.18 (0.29,2.08)**	0.13 (-0.32,0.58)
Very important	-0.35 (-0.79,0.09)	**1.74 (0.68,2.80)**	0.02 (-1.05,1.09)	**2.90 (2.25,3.54)**		**1.09 (0.16,2.02)**	-0.14 (-0.61,0.33)
Religious meaning							
Not at all	Ref	Ref		Ref		Ref	Ref
Not much	**-0.45 (-0.83,-0.08)**	0.27 (-0.60,1.15)	0.10 (-0.84,1.03)	**0.69 (0.13,1.24)**		-0.35 (-1.15,0.44)	-0.04 (-0.44,0.37)
A little	**-0.60 (-1.00,-0.20)**	0.91 (-0.10,1.92)	-0.14 (-1.10,0.83)	**1.73 (1.13,2.33)**		0.59 (-0.27,1.45)	0.08 (-0.36,0.51)
A lot	**-0.75 (-1.19,-0.30)**	**1.55 (0.44,2.67)**	-0.01 (-1.07,1.05)	**2.60 (1.94,3.27)**		-0.26 (-1.21,0.69)	0.00 (-0.47,0.48)

Linear regression models; b = Unstandardized coefficients; CI= Confidence Intervals
Where gender-interactions were present, results for men and women are presented separately (left=men; right=women). All other models show combined coefficients adjusted for gender

Table 6.3 Bi-variate analysis for associations between religiosity, and social and lifestyle factors

	Positive social support n=2367 men=1138 | women=1229		**Negative social support** n=2354	**Loneliness** n=2389	**Alcohol consumption** n=2127 men=1041 | women=1086	
	b (95% CI)		b (95% CI)	b (95% CI)	b (95% CI)	
Change in religious beliefs from upbringing to adulthood						
Same (not religious)	Ref		Ref	Ref	Ref	
Same (religious)	**0.27 (0.01,0.52)**		0.12 (-0.08,0.32)	0.06 (-0.13,0.24)	**-0.31 (-0.58,-0.03)**	
Religious to not religious	-0.11 (-0.40,0.18)		0.07 (-0.15,0.30)	0.20 (-0.01,0.42)	**-0.34 (-0.65,-0.03)**	
Not religious to religious	**0.47 (0.08,0.87)**		0.14 (-0.16,0.45)	-0.18 (-0.47,0.10)	-0.25 (-0.67,0.17)	
Religious attendance						
Never	Ref		Ref	Ref	Ref	
<Monthly	**0.46 (0.08,0.84)**	0.04 (-0.30,0.38)	0.11 (-0.09,0.31)	-0.08 (-0.26,0.11)	-0.08 (-0.55,0.40)	-0.01 (-0.34,0.32)
Monthly	0.52 (-0.06,1.10)	0.18 (-0.29,0.64)	-0.17 (-0.45,0.11)	-0.20 (-0.47,0.06)	0.36 (-0.34,1.06)	0.07 (-0.37,0.51)
Weekly	**0.55 (0.19,0.91)**	-0.04 (-0.34,0.27)	-0.04 (-0.22,0.14)	-0.06 (-0.23,0.11)	**-1.19 (-1.62,-0.76)**	-0.34 (-0.63,-0.05)
Prayer or meditation						
Never	Ref		Ref	Ref	Ref	
Occasionally	**0.20 (0.01,0.38)**		**0.15 (0.00,0.29)**	-0.10 (-0.24,0.03)	-0.04 (-0.25,0.17)	
Regularly	**0.32 (0.05,0.60)**		0.11 (-0.10,0.33)	-0.15 (-0.34,0.05)	-0.10 (-0.41,0.20)	
Daily	**0.31 (0.07,0.55)**		0.04 (-0.14,0.23)	0.12 (-0.05,0.30)	**-0.80 (-1.07,-0.53)**	
Importance of religion						
Not important at all	Ref		Ref	Ref	Ref	
Not particularly important	0.08 (-0.12,0.29)		0.10 (-0.05,0.26)	-0.08 (-0.23,0.07)	-0.13 (-0.36,0.09)	
Somewhat important	**0.23 (0.01,0.46)**		0.12 (-0.05,0.29)	0.00 (-0.16,0.16)	-0.05 (-0.30,0.21)	
Very important	**0.39 (0.15,0.62)**		0.16 (-0.02,0.34)	-0.06 (-0.23,0.11)	**-0.66 (-0.92,-0.40)**	
Religious meaning						
Not at all	Ref		Ref	Ref	Ref	
Not much	0.00 (-0.20,0.20)		**0.23 (0.08,0.39)**	0.05 (-0.10,0.19)	-0.09 (-0.31,0.13)	
A little	**0.32 (0.10,0.53)**		**0.18 (0.01,0.34)**	-0.02 (-0.17,0.14)	-0.13 (-0.37,0.12)	
A lot	**0.44 (0.20,0.68)**		0.16 (-0.02,0.35)	0.09 (-0.08,0.27)	**-0.72 (-0.98,-0.45)**	

Linear regression models; b = Unstandardized coefficients; CI= Confidence Intervals

Where gender-interactions were present, results for men and women are presented separately (left=men; right=women). All other models show combined coefficients adjusted for gender

Mental health and wellbeing

Table 6.4 shows the bivariate associations between the psychological, social and lifestyle factors, and mental health and wellbeing at age 68-69. All psychological, social and lifestyle factors were associated with mental health and wellbeing at age 68-69. However, the association between alcohol consumption and higher wellbeing was borderline significant. Mastery, conscientiousness, agreeableness, extraversion, positive social support and alcohol consumption were all associated with better mental health and wellbeing. Neuroticism, negative social support and loneliness were associated with worse mental health and wellbeing.

Gender interactions were found for extraversion and conscientiousness in relation to mental health and wellbeing outcomes respectively. Conscientiousness was associated with higher wellbeing scores, particularly for men. Extraversion was associated with better mental health, and this association was stronger for women than men.

Table 6.4 Bi-variate analysis for associations between social and lifestyle factors, and religiosity, mental health and wellbeing at age 68-69

	GHQ-28 n=2125 men=1041 | women=1084 b (95% CI)	**WEMWBS** n=2402 men=1041 | women=1084 b (95% CI)
Mastery	**-0.05 (-0.05,-0.04)**	**1.41 (1.32,1.49)**
Conscientiousness	**-0.01 (-0.01,-0.01)**	**0.50 (0.40,0.58)** **0.36 (0.28,0.44)**
Agreeableness	**-0.01 (-0.01,0.00)**	**0.48 (0.41,0.54)**
Extraversion	**-0.01 (-0.01,-0.00)** **-0.01 (-0.02,-0.01)**	**0.41 (0.37,0.46)**
Neuroticism	**0.02 (0.02,0.03)**	**-0.41 (-0.51,-0.31)**
Positive social support	**-0.03 (-0.04,-0.02)**	**1.87 (1.70,2.03)**
Negative social support	**0.07 (0.06,0.08)**	**-1.53 (-1.77,-1.30)**
Loneliness	**0.10 (0.08,0.11)**	**-2.84 (-3.07,-2.62)**
Alcohol consumption	**-0.01 (-0.02,0.00)**	0.19 (-0.01,0.39)

Linear regression models; b = Unstandardized coefficients; CI= Confidence Intervals
Where gender-interactions were present, results for men and women are presented separately (left=men; right=women).
All other models show combined coefficients adjusted for gender

6.3.3 The role of psychological, social and lifestyle factors in the relationship between religiosity, and mental health and wellbeing

Mental health

Table 6.5 shows the results of the linear regression models testing associations between religiosity (attendance, religious meaning, religious importance and prayer or meditation) and mental health, adjusting for psychological, social and lifestyle factors.

There was no significant association between religious attendance or change in religious belief from upbringing to adulthood, and mental health at age 68-69, before or after adjustment for the psychological, social and lifestyle factors.

Occasional and daily prayer were both associated with worse mental health after controlling for gender and education (model 1). This association was partially attenuated by mastery and alcohol consumption (Models 2 and 8) and strengthened by conscientiousness, agreeableness and positive social support (Models 3, 4 and 6).

Individual adjustments for conscientiousness, agreeableness, extraversion, and positive social support revealed an association between religion being ‘very important in life’ and worse mental health. However, in the fully adjusted model (Model 9) this association was no longer significant.

Religion providing meaning in life was associated with worse mental health. These associations were attenuated by mastery and negative social support (Models 2 and 7). However, the association between religion providing ‘a lot’ of meaning in life and worse mental health remained significant in the fully adjusted model.

Table 6.5 Associations between religiosity, and mental health at age 68-69

n=2125	Model 1 b (95% CI)	Model 2 b (95% CI)	Model 3 b (95% CI)	Model 4 b (95% CI)	Model 5 b (95% CI)	Model 6 b (95% CI)	Model 7 b (95% CI)	Model 8 b (95% CI)	Model 9 b (95% CI)
Change in religious beliefs from upbringing to adulthood									
Same (not religious)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Same (religious)	0.01 (-0.05,0.07)	0.01 (-0.05,0.06)	0.01 (-0.04,0.07)	0.02 (-0.04,0.08)	0.01 (-0.05,0.07)	0.01 (-0.04,0.07)	0.00 (-0.06,0.05)	0.00 (-0.06,0.06)	0.01 (-0.05,0.07)
Religious to not religious	0.02 (-0.05,0.08)	0.02 (-0.04,0.09)	0.02 (-0.05,0.09)	0.02 (-0.05,0.08)	0.01 (-0.05,0.08)	0.01 (-0.05,0.08)	0.01 (-0.05,0.08)	0.01 (-0.05,0.08)	0.02 (-0.04,0.08)
Not religious to religious	0.01 (-0.08,0.10)	0.02 (-0.06,0.10)	0.02 (-0.07,0.11)	0.02 (-0.07,0.11)	0.01 (-0.07,0.10)	0.02 (-0.07,0.10)	-0.01 (-0.09,0.08)	0.00 (-0.09,0.09)	0.03 (-0.06,0.11)
Religious attendance at age 68-69									
Never	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
<Monthly	0.03 (-0.03,0.09)	0.02 (-0.04,0.08)	0.02 (-0.04,0.08)	0.03 (-0.03,0.09)	0.03 (-0.03,0.09)	0.03 (-0.03,0.09)	0.02 (-0.04,0.08)	0.03 (-0.04,0.09)	0.02 (-0.04,0.07)
Monthly	-0.02 (-0.11,0.06)	-0.05 (-0.13,0.03)	-0.02 (-0.10,0.07)	-0.01 (-0.10,0.07)	-0.01 (-0.09,0.08)	-0.01 (-0.09,0.07)	-0.01 (-0.09,0.07)	-0.02 (-0.11,0.07)	-0.03 (-0.10,0.05)
Weekly	0.04 (-0.02,0.09)	0.01 (-0.04,0.06)	0.04 (-0.02,0.09)	0.05 (-0.01,0.10)	0.03 (-0.02,0.09)	0.04 (-0.01,0.10)	0.04 (-0.02,0.09)	0.03 (-0.03,0.08)	0.01 (-0.04,0.06)
Prayer or meditation at age 68-69									
Never	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Occasionally	**0.06 (0.02,0.11)**	**0.05 (0.00,0.09)**	**0.07 (0.02,0.11)**	**0.08 (0.03,0.12)**	**0.07 (0.03,0.11)**	**0.07 (0.03,0.12)**	**0.05 (0.01,0.10)**	**0.06 (0.02,0.11)**	**0.05 (0.01,0.09)**
Regularly	0.03 (-0.04,0.10)	0.01 (-0.06,0.07)	0.04 (-0.03,0.10)	0.06 (-0.01,0.12)	0.04 (-0.02,0.11)	0.04 (-0.02,0.11)	0.02 (-0.05,0.08)	0.03 (-0.04,0.10)	0.01 (-0.05,0.07)
Daily	**0.09 (0.03,0.15)**	0.05 (-0.01,0.10)	**0.10 (0.04,0.15)**	**0.11 (0.05,0.17)**	**0.09 (0.03,0.14)**	**0.10 (0.04,0.16)**	**0.08 (0.03,0.14)**	**0.08 (0.02,0.14)**	**0.06 (0.01,0.11)**
Importance of religion at age 68-69									
Not important at all	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Not particularly important	0.02 (-0.03,0.07)	0.03 (-0.02,0.07)	0.03 (-0.02,0.08)	0.03 (-0.02,0.08)	0.03 (-0.02,0.08)	0.03 (-0.02,0.08)	0.01 (-0.04,0.06)	0.02 (-0.03,0.07)	0.03 (-0.02,0.07)
Somewhat important	0.04 (-0.02,0.09)	0.01 (-0.04,0.06)	0.05 (-0.01,0.10)	0.05 (0.00,0.11)	0.05 (-0.01,0.10)	0.05 (0.00,0.11)	0.02 (-0.03,0.08)	0.04 (-0.02,0.09)	0.02 (-0.03,0.07)
Very important	0.05 (-0.01,0.11)	0.03 (-0.02,0.08)	**0.06 (0.00,0.12)**	**0.07 (0.02,0.13)**	**0.06 (0.00,0.12)**	**0.07 (0.02,0.13)**	0.04 (-0.02,0.09)	0.04 (-0.01,0.10)	0.03 (-0.02,0.09)
Religious meaning at age 68-69									
Not at all	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Not much	**0.07 (0.02,0.12)**	**0.05 (0.00,0.09)**	**0.07 (0.02,0.12)**	**0.08 (0.03,0.13)**	**0.07 (0.02,0.12)**	**0.07 (0.02,0.12)**	**0.05 (0.00,0.10)**	**0.07 (0.02,0.12)**	0.04 (0.00,0.08)
A little	**0.06 (0.00,0.11)**	0.02 (-0.03,0.07)	**0.06 (0.01,0.11)**	**0.07 (0.02,0.12)**	**0.06 (0.01,0.12)**	**0.06 (0.01,0.12)**	0.04 (-0.01,0.09)	**0.06 (0.00,0.11)**	0.03 (-0.02,0.08)
A lot	**0.09 (0.04,0.15)**	**0.06 (0.00,0.11)**	**0.10 (0.05,0.16)**	**0.12 (0.06,0.18)**	**0.09 (0.03,0.15)**	**0.11 (0.05,0.17)**	**0.08 (0.03,0.14)**	**0.09 (0.03,0.14)**	**0.06 (0.01,0.11)**

Linear regression models; b = Unstandardized coefficients; CI= Confidence Intervals

Model 1: gender and education; Model 2: 1+ mastery; Model 3: 1+ conscientiousness; Model 4: 1+ agreeableness; Model 5: 1+ extraversion; Model 6: 1+ positive social support; Model 7: 1+ negative social support; Model 8: 1+ alcohol consumption; Model 9: 1+ mastery, conscientiousness, agreeableness, extraversion, positive social support, negative social support and alcohol consumption

Wellbeing

Table 6.6 shows the results of the linear regression models testing the associations between religiosity (attendance, religious meaning, religious importance and prayer or meditation) and wellbeing, adjusting for psychological and social factors.

Study members who reported religious beliefs at age 36 but no religious upbringing had higher wellbeing scores compared to study members with no religious upbringing or religious belief. This association was partially attenuated by mastery (Model 2) and extraversion (Model 5) and strengthened by the level of negative social support (Model 7). In the final model which includes all psychological and social factors, the association is no longer statistically significant (Model 8).

There were no significant associations found between religious attendance and wellbeing at age 68-69 apart from adjustment for mastery (Model 2) when frequent attendance was associated with higher wellbeing scores.

The association between prayer or meditation and wellbeing change after adjusting for mastery, agreeableness and positive social support. With mastery controlled for, regular prayer was associated with higher wellbeing scores (Model 2). Adjusting for agreeableness and positive social support (Models 4 and 6), levels of wellbeing were lower for those who engage in daily prayer or meditation.

Positive associations between the importance of religion in life and wellbeing were found after adjusting for mastery or negative social support (Models 2 and 7).

After adjusting for mastery, those who reported that religion provided meaning in life had better wellbeing (Model 2). Adjusting for agreeableness, levels of wellbeing were lower in those reporting that religion provides meaning in life (Model 4).

Table 6.6 Associations between religiosity and wellbeing at age 68-69

n=2402	Model 1 b (95% CI)	Model 2 b (95% CI)	Model 3 b (95% CI)	Model 4 b (95% CI)	Model 5 b (95% CI)	Model 6 b (95% CI)	Model 7 b (95% CI)	Model 8 b (95% CI)
Change in religious beliefs from upbringing to adulthood								
Same (not religious)	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Same (religious)	0.85 (-0.31,2.01)	0.95 (-0.02,1.92)	0.66 (-0.46,1.77)	0.07 (-1.06,1.19)	0.68 (-0.42,1.78)	0.31 (-0.76,1.38)	1.05 (-0.07,2.18)	0.33 (-0.56,1.22)
Religious to not religious	0.41 (-0.91,1.73)	0.59 (-0.51,1.69)	0.39 (-0.88,1.65)	0.44 (-0.83,1.71)	0.52 (-0.73,1.77)	0.59 (-0.62,1.81)	0.53 (-0.76,1.81)	0.73 (-0.27,1.74)
Not religious to religious	**2.01** **(0.24,3.79)**	**1.66** **(0.17,3.15)**	1.66 (-0.05,3.36)	1.23 (-0.49,2.94)	**1.79** **(0.11,3.47)**	1.12 (-0.52,2.75)	**2.26** **(0.53,3.98)**	0.92 (-0.44,2.28)
Religious attendance at age 68-69								
Never	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
<Monthly	0.67 (-0.47,1.81)	0.48 (1.61,0.00)	0.88 (-0.22,1.97)	0.22 (-0.87,1.31)	0.21 (-0.86,1.28)	0.19 (-0.85,1.23)	0.82 (-0.28,1.92)	0.18 (-0.68,1.04)
Monthly	1.37 (-0.30,3.04)	**1.76** **(0.39,3.13)**	1.40 (-0.20,3.00)	0.65 (-0.95,2.25)	0.76 (-0.81,2.33)	0.64 (-0.88,2.17)	1.13 (-0.48,2.74)	0.79 (-0.46,2.04)
Weekly	0.45 (-0.60,1.49)	**1.16** **(0.29,2.02)**	0.48 (-0.52,1.48)	-0.35 (-1.36,0.66)	0.55 (-0.43,1.53)	0.06 (-0.90,1.01)	0.42 (-0.59,1.43)	0.59 (-0.20,1.38)
Prayer or meditation at age 68-69								
Never	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Occasionally	-0.24 (-1.08,0.60)	0.19 (-0.50,0.88)	-0.31 (-1.12,0.49)	**-0.88** **(-1.69,-0.08)**	-0.54 (-1.33,0.25)	-0.63 (-1.40,0.13)	-0.02 (-0.83,0.80)	-0.44 (-1.07,0.20)
Regularly	0.91 (-0.34,2.15)	**1.43** **(0.40,2.45)**	0.83 (-0.37,2.03)	-0.35 (-1.55,0.85)	0.33 (-0.84,1.50)	0.29 (-0.84,1.43)	1.07 (-0.13,2.27)	0.37 (-0.58,1.31)
Daily	-0.60 (-1.69,0.50)	0.58 (-0.32,1.48)	-0.85 (-1.90,0.20)	**-1.90** **(-2.95,-0.84)**	-0.56 (-1.58,0.47)	**-1.18** **(-2.17,-0.18)**	-0.52 (-1.57,0.54)	-0.49 (-1.32,0.35)
Importance of religion at age 68-69								
Not important at all	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Not particularly important	0.57 (-0.36,1.49)	0.44 (-0.32,1.21)	0.37 (-0.52,1.26)	0.09 (-0.80,0.98)	0.27 (-0.60,1.14)	0.36 (-0.49,1.20)	0.71 (-0.18,1.61)	0.07 (-0.62,0.77)
Somewhat important	0.14 (-0.88,1.16)	**0.89** **(0.05,1.73)**	-0.30 (-1.28,0.68)	-0.83 (-1.81,0.16)	-0.34 (-1.29,0.62)	-0.32 (-1.25,0.61)	0.31 (-0.67,1.29)	-0.13 (-0.91,0.64)
Very important	1.06 (0.00,2.12)	**1.54** **(0.66,2.41)**	0.76 (-0.26,1.78)	-0.39 (-1.43,0.65)	0.63 (-0.36,1.63)	0.27 (-0.70,1.24)	**1.29** **(0.27,2.32)**	0.34 (-0.47,1.16)
Religious meaning at age 68-69								
Not at all	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Not much	-0.50 (-1.41,0.40)	0.16 (-0.59,0.91)	-0.59 (-1.47,0.28)	-0.84 (-1.71,0.03)	-0.34 (-1.20,0.51)	-0.52 (-1.35,0.31)	-0.15 (-1.03,0.73)	-0.03 (-0.72,0.65)
A little	-0.12 (-1.10,0.86)	0.75 (-0.06,1.55)	-0.25 (-1.19,0.70)	**-0.99** **(-1.93,-0.04)**	-0.36 (-1.28,0.56)	-0.73 (-1.62,0.17)	0.16 (-0.79,1.11)	-0.18 (-0.92,0.56)
A lot	0.18 (-0.91,1.26)	**1.21** **(0.32,2.11)**	-0.11 (-1.16,0.93)	**-1.14** **(-2.19,-0.09)**	0.30 (-0.72,1.31)	-0.69 (-1.68,0.30)	0.42 (-0.63,1.47)	0.10 (-0.73,0.93)

Linear regression models; b = Unstandardized coefficients; CI= Confidence Intervals

Model 1: gender and education; Model 2: 1+ mastery; Model 3: 1+ conscientiousness; Model 4: 1+ agreeableness; Model 5: 1+ extraversion; Model 6: 1+ positive social support; Model 7: 1+ negative social support; Model 8: 1+ mastery, conscientiousness, agreeableness, extraversion, positive social support and negative social support

6.4 Summary of results and discussion

The conceptual model (Chapter 1, page 52) framed psychological, social and lifestyle factors as mediators between the relationship between religiosity, and mental health and wellbeing. As there were very few direct associations between religiosity, and mental health and wellbeing in Chapter 4, this chapter aimed to examine how psychological, social and lifestyle factors were associated with mental health and wellbeing and if there was any evidence for confounding. Of the pathways outlined, evidence was found for psychological and social factors. Higher mastery scores and alcohol consumption were associated with lower levels of religiosity, and better mental health and wellbeing. Conscientiousness, agreeableness, extraversion and positive social support were associated with higher levels of religiosity and better mental health and wellbeing at age 68-69. Negative social support was also associated with higher levels of religiosity, and with worse mental health and wellbeing.

Linear regression models showed that associations between prayer or meditation and how much religion provides meaning in life, and poorer mental health at age 68-69 were attenuated by mastery. These associations remained significant after adjustment for other psychological, social and lifestyle variables. Conscientiousness, agreeableness, extraversion and positive social support all appear to be suppressors of the association between the importance of religion in life and poor mental health.

Adjusting for mastery, negative social support or alcohol consumption revealed positive associations between religiosity and wellbeing. However, adjusting for agreeableness and positive social support appears to show negative associations between religiosity and wellbeing. In other words, failure to control for these psychological and social factors suppresses an association between religiosity and wellbeing.

6.4.1 Psychological factors

Mastery

Mastery was associated with better mental health and wellbeing. This finding is consistent with previous research which suggests that personal control or mastery is a protective factor for mental health and wellbeing (Krause and Stryker 1984, Mausbach et al. 2006).

Lower levels of religiosity were associated with higher mastery scores. A report by Ellison (1998) is one of the few to investigate associations between personal mastery and religiosity where he showed that there was little variation in mastery by religiosity in the National Survey of Black Americans. The difference between Ellison's findings and those reported in this chapter could be due to variations in socio-economic circumstances or cultural differences between the two samples. In addition to the socio-demographic differences in religiosity between the USA and the UK (discussed previously in Chapter 1, page 49), it has been previously reported that Black Americans are more likely to report lower mastery levels than White Americans (Jang et al. 2003).

In the linear regression models, mastery partly explained the associations between some measures of religiosity and poorer mental health. The association between daily prayer or meditation and mental health almost halved after the addition of mastery to the model. Similar levels of attenuation were found for the associations between how much religion provides meaning in life and mental health. On the other hand, personal mastery appears to suppress associations between all measures of religiosity at age 68-69 and wellbeing. These findings are supported by research which investigated different factors associated with religious coping through prayer (Ellison and Taylor 1996). This study found that higher personal mastery was associated with a reduced likelihood of religious coping through prayer. These findings may indicate that the relationship between religiosity and mastery is reciprocal and dynamic.

In this study, measures of divine or God-mediated control were not captured (Schieman et al. 2006, Woźniak 2015). Research by Schieman (2008) showed that personal control is inversely correlated with the sense of divine control, and concluded that rather than religiosity empowering personal control, religiosity was associated with relinquished personal control. The finding that lower mastery is associated with higher levels of religiosity could be due to relinquished control in favour of divine or God-mediated control among the more religious participants.

Personality

All personality traits examined in this chapter were associated with mental health and wellbeing. Conscientiousness, agreeableness and extraversion were associated with better mental health and wellbeing, and neuroticism was associated with worse mental health and wellbeing. These findings are supported by two studies using data from NSHD. Abbott et al. (2008) investigated personality traits in childhood and early adulthood, and wellbeing in female study members at age 52. Gale et al. (2013) also investigated personality traits in childhood and early adulthood and their associations with mental health and wellbeing at age 60-64. These studies both showed that extraversion was associated with higher levels of wellbeing and mental health and that neuroticism was associated with worse mental health and wellbeing. Hayes and Joseph (2003) found similar results and identified conscientiousness as another important personality trait related to higher levels of subjective wellbeing.

We found in the bivariate analysis that conscientiousness, agreeableness and extraversion were the main personality traits associated with religiosity, with the strongest associations found for agreeableness. This has previously been found in meta-analyses of religiosity and the big 5 factors personality traits (Lodi-Smith and Roberts 2007, Saroglou 2002). Neuroticism was not associated with any measure of religiosity.

The associations between personality and religiosity are difficult to interpret and could be subject to bi-directionality or reverse causation. It is possible that conscientious and agreeable personalities are more likely to join and stay in religious groups, or that a religious upbringing fosters a conscientiousness and agreeable personality. There is some evidence that personality traits are formed in childhood and adolescence, and are relatively stable over the life course (Shiner and Caspi 2003). Since exposure to religiosity also begins at a young age, it is, therefore, challenging to disentangle the interaction between personality and religiosity.

6.4.2 Social factors

Social support

Positive social support was associated with better mental health and wellbeing, and negative social support was associated with worse mental health and wellbeing. These findings are supported by a vast amount of research which demonstrates the benefits of social support. A meta-analysis of 64 studies by Harandi et al. (2017) found strong evidence for correlations between social support and better mental health.

Positive and negative social support was related to higher levels of religiosity, consistent with a previous study (Salsman et al. 2005). The finding that negative social support is positively associated with religiosity has not been previously investigated. Previous research on the processes through which religiosity is related to better health outcomes point towards instrumental and emotional social support in times of need provided by a religious community (Debnam et al. 2012, Salsman et al. 2005). It is possible that these associations reflect the benefits of being part of a religious community.

Adjusting for positive social support strengthened the association between daily prayer and religious beliefs, and worse mental health. Similarly, adjusting for positive social support resulted in a negative association between daily prayer and wellbeing. Adjusting for negative social support strengthened the association between the importance of

religion and higher levels of wellbeing. These findings suggest the need for further research to better understand the role of social support in religiosity and wellbeing, e.g. by exploring these associations in other populations and using other social support measures.

Loneliness

Loneliness was associated with worse mental health and wellbeing. This finding is supported by several studies (Alpass and Neville 2003, Cacioppo et al. 2010, Golden et al. 2009). In the current study, no associations were found between loneliness and religiosity. This finding is not supported by other studies on loneliness and religiosity which report an inverse association between religiosity and loneliness (Kirkpatrick et al. 1999, Lauder et al. 2006, Rote et al. 2012). However, while a study by Johnson and Mullins (1989) found that social aspects of religiosity were associated with lower levels of loneliness, no associations were found between the importance of religion and loneliness. A possible reason for the discrepancy between these findings and the results presented in this thesis is that most studies on loneliness and religion were conducted on much older populations, which may have a higher prevalence of loneliness than NSHD (Johnson and Mullins 1989, Rote et al. 2012).

6.4.3 Lifestyle factors

Alcohol consumption

Higher levels of alcohol consumption were associated with worse mental health (although this association was not statistically significant) and higher wellbeing. Previous research has shown that high levels of alcohol consumption are associated with worse mental health, but moderate levels of drinking can be associated with higher levels of wellbeing (Lynskey 1998, Stranges et al. 2014). Other studies suggest a J-shaped association with low levels of alcohol consumption associated with better mental health

and wellbeing and very heavy drinking associated with worse mental health and wellbeing (Boden and Fergusson 2011, Geiger and MacKerron 2016).

Low alcohol consumption was associated with higher levels of religiosity. This finding is not unexpected as many religious organisations discourage alcohol consumption. Religiosity has previously been associated with moderate levels of drinking (Booth et al. 2004) and healthier lifestyle behaviours. For example, a study by Strawbridge (2001) investigating religiosity and health behaviours found that women who attended church on a weekly basis were more likely to reduce heavy drinking over a period of 28 years compared to those attending less often or never.

6.4.4 Strengths and limitations

A major strength of these analyses is that they examine a range of different psychological, social and lifestyle factors. Using bi-variate analyses and multivariable linear regression models allowed a better understanding of how these factors are related to religiosity, and mental health and wellbeing by examining changes in associations.

A limitation of the work presented in this chapter is that many of the religiosity variables have only been measured at age 68-69 resulting in cross-sectional analyses. This restricts inference about the direction of associations found between religiosity, psychological, social, and lifestyle factors, and mental health and wellbeing. Another limitation of this study is that there is no information about social support received from religion. In addition, the social support measure used in this analysis (The Close Person Questionnaire) only captures data about the nominated closest person. Most other studies which investigate religion and social support use more tailored measures about social support such as emotional support anticipated support and negative support received from their religious congregation (Harvey et al. 2016). Not having a measure of divine or God-mediated control also makes it difficult to interpret the findings related to mastery.

The decision to focus on alcohol consumption was due to the strength of pre-existing evidence for associations with religiosity, mental health and wellbeing (Boden and Fergusson 2011, Geiger and MacKerron 2016, Lynskey 1998, Stranges et al. 2014). A limitation of this analysis is that there are very few cases of hazardous drinking in NSHD; most study members are moderate drinkers which makes it difficult to fully understand how alcohol consumption is associated with religiosity, and mental health and wellbeing. Using another dataset which has more variability in lifestyle behaviours would be ideal to explore associations with religiosity further. Another limitation of using alcohol consumption as a measure of lifestyle is that higher levels of drinking are often associated with a higher socio-economic status which is usually associated with positive health outcomes (Richards et al. 2004). Confounding by socio-economic status is a possibility in this analysis which has not been accounted for.

There is also the possibility of confounding from a wider range of lifestyle variables such as physical activity, smoking and diet. For example, those who are religious are less likely to adopt risky health behaviours such as substance abuse, unhealthy eating, smoking, sedentary behaviour and hazardous drinking (Koenig et al. 2012b). Furthermore, given that lifestyle variables tend to cluster and have been associated with mental health and wellbeing, future research should examine clustering patterns in relation to religiosity and their effect on subsequent mental health in more detail (Conry et al. 2011, Vermeulen-Smit et al. 2015).

6.4.5 Summary

This chapter investigated how different psychological, social and lifestyle factors are associated with religiosity, and mental health and wellbeing. Mastery suppressed, and conscientiousness, extraversion, agreeableness and positive social support partially explained the positive associations between religiosity and mental health. Agreeableness and positive social support strengthened the associations between some

aspects of religiosity and higher wellbeing. The next chapter will consider religiosity as an effect modifier of the relationship stressful life events religiosity, and mental health and wellbeing.

7 Stressful life events, religiosity, mental health and wellbeing

7.1 Introduction

The results from Chapter 5 showed that poor mental health was predictive of subsequent religious attendance, suggesting a possible coping mechanism. To explore this further, this chapter's aim was to investigate if religiosity, moderates the association between SLEs across the life course (health, work and social stressful life events), and mental health and wellbeing at age 68-69 as described in the conceptual model (Chapter 1, page 50) and in Figure 7.1. The analysis in this chapter relates to research objective 4 described in the methods chapter (Chapter 3, page 102) and a full list of the SLEs used for this analysis is on page 114.

7.2 Analysis plan

7.2.1 Analytical sample

The analytical samples used in this chapter were limited to study members who had complete data on the outcomes of interest. For mental health and wellbeing at age 68-69, this was n=2125 and n=2402 respectively. For religiosity variables across the life course, this varied from 2395-3722. Missing data on exposures and co-variates were addressed using Full Information Maximum Likelihood (FIML). Further details of FIML are described in Chapter 3 (page 115).

7.2.2 Descriptive analyses

The mean, standard deviation, median, range and interquartile range were presented for the measures of stressful life events (SLEs) in addition to histograms.

7.2.3 Co-variates

Mutually adjusted linear regression models were used to analyse how SLEs across the life course were associated with gender, educational attainment and social class.

Variables which were associated with religiosity (reported in Chapter 4), mental health and wellbeing (reported in Chapter 5), and SLEs were used as covariates in subsequent models in this chapter.

7.2.4 Regression models

The conceptual framework for this analysis is shown in Figure 7.1. To test if SLEs are associated with religiosity variables from age 26 to 68-69, ordered logistic, logistic and multinomial regression models were used with religiosity variables modelled as the outcome.

Linear regression models were used to test associations between SLEs, and mental health and wellbeing at age 68-69. To test if religiosity moderates the associations between SLEs, and mental health and wellbeing, interaction terms between SLEs and religiosity variables were examined in relation to mental health and wellbeing.

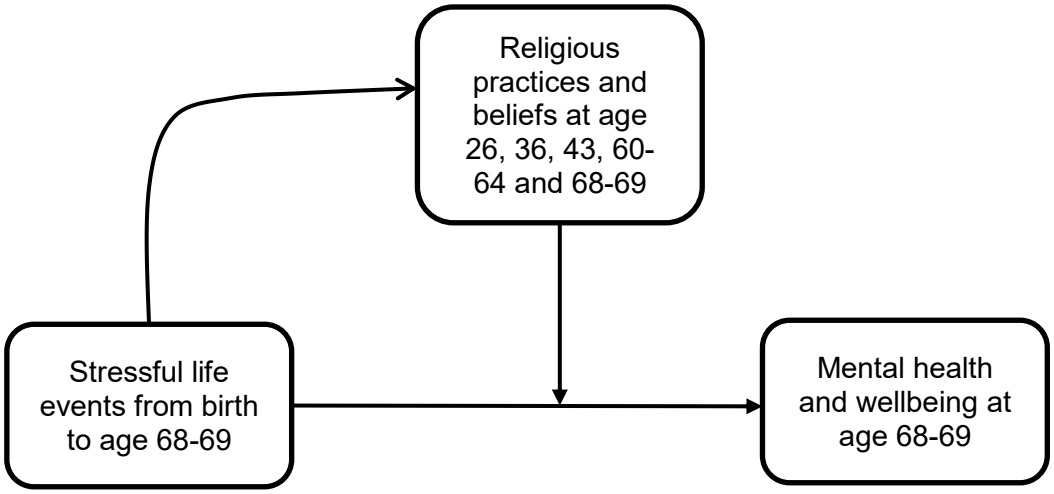


Figure 7.1 Conceptual framework for analysis of stressful life events, religiosity, and mental health and wellbeing

All regression model results were presented as unstandardized coefficients and 95% confidence intervals. Tests for gender interactions were conducted for all models. If gender interactions were found, results were presented for men and women separately.

7.3 Results

7.3.1 Stressful life events

Table 7.1 and Figure 7.2 show the distribution of the SLE scores. Each unit of the SLE score represents one life event (described in Chapter 3, page 114). The distribution of the total SLEs was normally distributed with a mean and median of 8 SLEs. The sub-scores for childhood, social, health and work SLEs were skewed to the right.

Table 7.1 Summary statistics of stressful life event scales

	Mean	Standard Deviation	Median	Range	Inter-quartile range
Total (out of 65; n=1227)	8.1	3.8	8	0-28	5-10
Social (out of 39; n=1452)	4.7	2.4	4	0-19	3-6
Health (out of 12; n=1782)	0.8	1.0	1	0-5	0-1
Work (out of 14; n=1567)	1.1	1.3	1	0-7	0-2

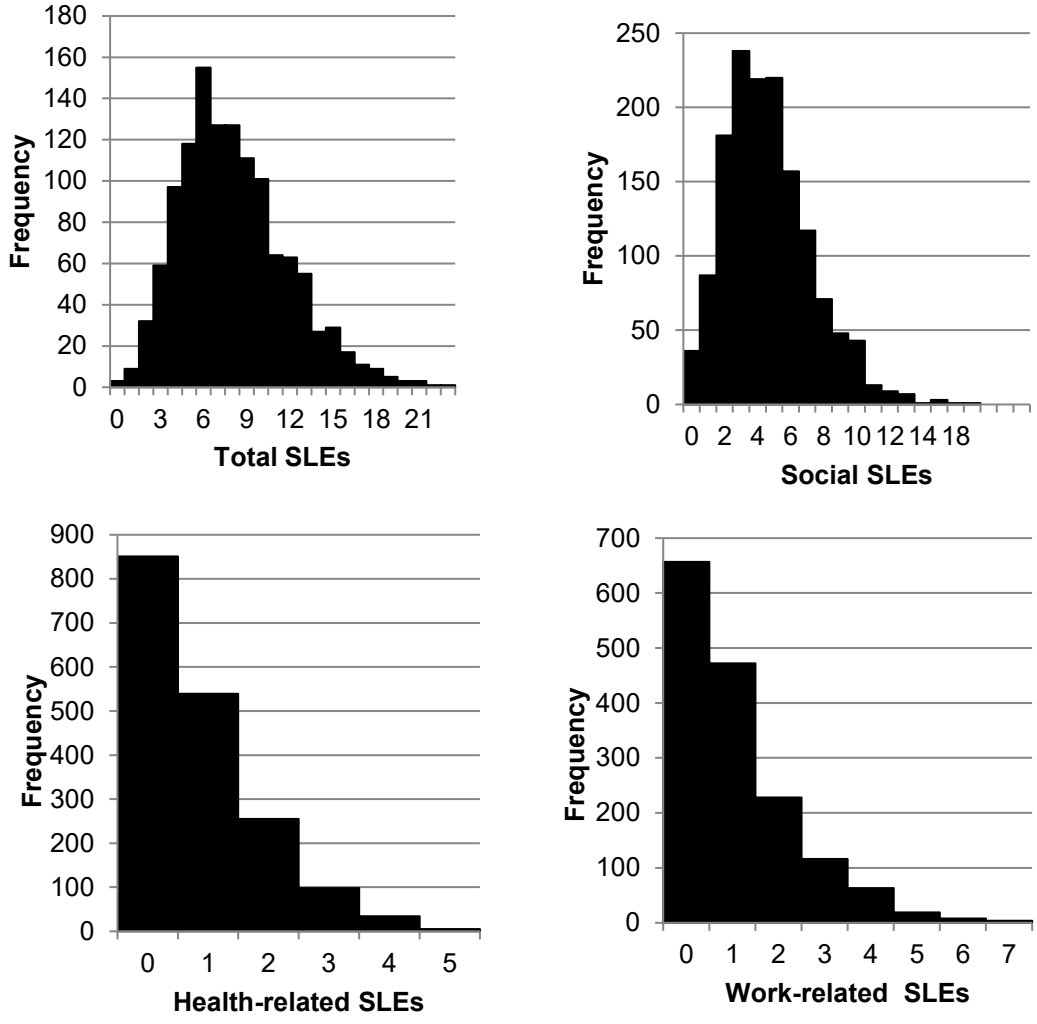


Figure 7.2 Histograms of stressful life events

7.3.2 Socio-economic factors associated with stressful life events

Table 7.2 shows how gender, education and social class are associated with SLEs. Women were more likely to experience social SLEs and less likely to experience work and health SLEs compared to men. Higher educational attainment and social class appear to be associated with fewer health SLEs (test for trend) although no associations were found for other types of SLEs.

Table 7.2 Association between stressful life events, and gender, education and social class.

	Total SLEs n=1,227 b (95% CI)	**Social SLEs n=1,452 b (95% CI)**	**Health SLEs n=1,782 b (95% CI)**	**Work SLEs n=1,567 b (95% CI)**
Gender				
Male	Ref	Ref	Ref	Ref
Female	0.02 (-0.41,0.46)	**0.46 (0.18,0.74)**	**-0.10 (-0.20,-0.01)**	**-0.27 (-0.40,-0.14)**
Education				
No qualifications	Ref	Ref	Ref	Ref
O level	-0.04 (-0.63,0.55)	0.03 (-0.35,0.41)	-0.11 (-0.24,0.02)	0.13 (-0.05,0.31)
A level	-0.18 (-0.80,0.44)	-0.11 (-0.51,0.29)	-0.12 (-0.25,0.02)	0.18 (0.00,0.37)
Higher education	-0.41 (-1.23,0.40)	-0.02 (-0.55,0.52)	-0.17 (-0.35,0.02)	0.11 (-0.14,0.36)
p for trend	0.3	0.8	**0.06**	0.2
Social class				
Unskilled	Ref	Ref	Ref	Ref
Partly skilled	-0.40 (-1.87,1.08)	-0.52 (-1.43,0.40)	-0.05 (-0.37,0.26)	-0.06 (-0.47,0.36)
Skilled (manual)	-0.52 (-1.87,0.83)	-0.67 (-1.49,0.15)	-0.16 (-0.45,0.13)	0.09 (-0.28,0.47)
Skilled (non- manual)	0.17 (-1.24,1.57)	-0.01 (-0.88,0.85)	-0.16 (-0.46,0.14)	0.05 (-0.35,0.45)
Intermediate	-0.25 (-1.59,1.10)	-0.41 (-1.23,0.41)	-0.22 (-0.51,0.06)	0.06 (-0.32,0.43)
Professional	-0.61 (-2.07,0.84)	-0.56 (-1.46,0.34)	-0.25 (-0.57,0.07)	-0.11 (-0.52,0.31)
p for trend	1.0	1.0	**<0.05**	0.8

Linear regression models; b=Unstandardized coefficients; CI=Confidence Intervals

7.3.3 Stressful life events, and mental health and wellbeing

Table 7.3 shows associations between SLEs and mental health and wellbeing at age 68-69. The total SLE score was associated with higher levels of anxiety and depression symptoms and lower levels of wellbeing. Similar patterns were found for social, health and work SLEs.

Table 7.3 Association between SLEs, and mental health and wellbeing.

	GHQ-28 (n=2125) b (95% CI)	**WEMWBS (n=2402)** b (95% CI)
Total	**0.02 (0.01,0.03)**	**-0.29 (-0.42,-0.15)**
Social	**0.02 (0.02,0.03)**	**-0.37 (-0.55,-0.19)**
Health	**0.07 (0.05,0.09)**	**-0.88 (-1.32,-0.44)**
Work	**0.02 (0.00,0.04)**	**-0.37 (-0.71,-0.02)**

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

7.3.4 Stressful life events and religiosity

Religious beliefs

Tables 7.4 to 7.5 describe associations between SLEs and religious beliefs. Table 7.4 shows the associations between SLEs and religious beliefs. Social SLEs were associated with having stronger religious beliefs at age 26, and with reporting a religious belief at age 36. Study members who had a higher number of SLEs were also more likely to report that religion provides meaning in life or that religious beliefs are important at age 68-69. These associations were found for social, health and work-related SLEs. No differences were found between Protestant study members and those with no religion in terms of SLEs. Study members who had a religious upbringing and religious beliefs in adulthood had fewer social SLEs compared to study members with no religious beliefs in adulthood and no religious upbringing (Table 7.5).

Table 7.4. Associations between SLEs and religious beliefs

	Strength of belief at age 26[1] • No religion • Little or not at all • Moderate • Very strong	**Religious belief at age 36[2]** • No • Yes	**Religion provides meaning at age 68-69[1]** • Not important at all • Not particularly important • Somewhat important • Very important	**Importance of religious beliefs at age 68-69[1]** • Not at all • Not much • A little • A lot
	n=3722 b (95% CI)	n=3242 b (95% CI)	n=2403 b (95% CI)	n=2403 b (95% CI)
Total	0.02 (0.00,0.03)	**0.03 (0.01,0.05)**	**0.04 (0.03,0.05)**	**0.04 (0.03,0.05)**
Social	**0.03 (0.01,0.05)**	**0.05 (0.03,0.07)**	**0.05 (0.03,0.07)**	**0.05 (0.03,0.07)**
Health	0.01 (-0.03,0.05)	0.01 (-0.04,0.06)	**0.08 (0.03,0.12)**	**0.07 (0.03,0.12)**
Work	-0.01 (-0.05,0.03)	**0.05 (0.00,0.09)**	**0.06 (0.03,0.10)**	**0.06 (0.03,0.10)**

[1]Ordered logistic and [2]logistic regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

Table 7.5. Associations between SLEs and change in beliefs from upbringing

n=3239	**Same (not religious)**	**Same (religious)**	**Religious to not religious**	**Not religious to religious**
	n=500 b (95% CI)	n=1,830 b (95% CI)	n=689 b (95% CI)	n=220 b (95% CI)
Total	Base outcome	-0.06 (-0.13,-0.00)	-0.00 (-0.05,0.05)	-0.04 (-0.09,0.02)
Social	Base outcome	**-0.10 (-0.17,-0.02)**	0.02 (-0.04, 0.09)	-0.04 (-0.11,0.03)
Health	Base outcome	0.03 (-0.18,0.25)	0.17 (-0.02,0.36)	0.21 (0.01,0.41)
Work	Base outcome	-0.14 (-0.30,0.02)	-0.05 (-0.18,0.08)	-0.12 (-0.27,0.02)

Multinomial regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

Partner beliefs

Table 7.6 and Table 7.7 outline associations between partner beliefs and SLEs. No associations were found between the strength of partner belief and SLEs (Table 7.6). Having no partner or the same belief as your partner was associated with more SLEs compared to partners with no belief or a different belief, and this was driven by health SLEs (Table 7.7).

Table 7.6. Associations between SLEs and strength of partner's belief

n=3695	**No partner** n=883 b (95% CI)	**Little or no religion** n=1459 b (95% CI)	**Moderate/very strong** n=1353 b (95% CI)
Total	-0.02 (-0.05,0.01)	Base outcome	-0.01 (-0.04,0.03)
Social	-0.03 (-0.06,0.01)	Base outcome	-0.02 (-0.07,0.03)
Health	-0.06 (-0.15,0.03)	Base outcome	0.03 (-0.09,0.14)
Work	-0.01 (-0.09,0.07)	Base outcome	0.00 (-0.09,0.10)

Multinomial regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

Table 7.7. Associations between SLEs and partners' religious beliefs

n=3105	**No partner** n=408 b (95% CI)	**No/different belief** n=799 b (95% CI)	**Same belief** n=1898 b (95% CI)
Total	**0.04 (0.01,0.07)**	Base outcome	-0.01 (-0.06,0.05)
Social	0.04 (0.00,0.08)	Base outcome	-0.01 (-0.09,0.06)
Health	**0.16 (0.07,0.25)**	Base outcome	**0.19 (0.05,0.33)**
Work	-0.01 (-0.09,0.07)	Base outcome	-0.10 (-0.22,0.03)

Multinomial regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

Religious practices

Table 7.8 shows the associations between SLEs and religious practices across the life course. SLEs were positively associated with religious attendance at ages 36, 43 53, 60-64 and 68-69, and prayer at age 68-69. These associations were found only for social SLEs at ages 36, 43, 60-64 and 68-68, although health SLEs were associated with the overall sum of religious attendances from age 36 to 68-69 and prayer or meditation at age 68-68. In contrast, work SLEs were associated only with prayer or meditation at age 68-69.

Table 7.8. Associations between SLEs and religious attendance

	Attendance at 36	**Attendance at 43**	**Attendance at 60-64**	**Attendance at 68-69**	**Sum attendance 36-68/69**	**Prayer or meditation at 68-69**
	n=3286 b (95% CI)	n=3246 b (95% CI)	n=2246 b (95% CI)	n=2395 b (95% CI)	n=1800 b (95% CI)	n=2404 b (95% CI)
Total	**0.02 (0.00,0.03)**	**0.04 (0.02,0.05)**	**0.04 (0.02,0.06)**	**0.05 (0.03,0.06)**	**0.03 (0.02,0.05)**	**0.04 (0.03,0.06)**
Social	**0.04 (0.02,0.06)**	**0.05 (0.03,0.07)**	**0.06 (0.04,0.09)**	**0.07 (0.05,0.10)**	**0.05 (0.03,0.07)**	**0.06 (0.04,0.08)**
Health	0.01 (-0.03,0.05)	0.03 (-0.02,0.08)	0.05 (-0.01,0.11)	0.05 (-0.00,0.10)	**0.06 (0.01,0.12)**	**0.05 (0.00,0.10)**
Work	0.00 (-0.04,0.04)	0.05 (-0.00,0.09)	0.03 (-0.02,0.07)	0.03 (-0.02,0.07)	0.03 (-0.02,0.07)	**0.08 (0.05,0.12)**

Ordered logistic regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals

7.3.5 Effect modification of stressful life events by religiosity

Table 7.9 to Table 7.18 display the results of testing for interactions between religiosity and SLEs on mental health and wellbeing at age 68-69. Each table shows the regression models with and without the interaction between religiosity and SLEs, and the likelihood ratio test result comparing the two models. Results are shown for total, social, health and work SLEs.

Religious beliefs

No interactions were found between the change in religious belief from upbringing to adulthood and SLEs, and mental health or wellbeing (Table 7.9 and Table 7.10). Table 7.11 and Table 7.12 show the interaction between the strength of religious belief at age 26 and SLEs, on mental health and wellbeing. Study members who reported they had very strong religious beliefs at age 26 had better mental health than those who reported having no religious beliefs in relation to total SLE score (b =-0.03; 95% CI=-0.05, 0.00). This association was accounted for by health SLEs (b =-0.04; 95% CI=-0.07, -0.01). No interaction was found between the strength of religious belief and SLE on wellbeing.

No interactions were found between SLEs and religious belief at age 36, denomination at age 36 or importance of religion at age 68-69 (Table 7.13 to Table 7.16). There were some significant interactions between SLEs and how religion provides meaning in life

and work SLEs in relation to mental health (Table 7.17). Reporting that religion provides ‘a little’ meaning in life was associated with better mental health than those reporting ‘not at all’ in the presence of work SLEs (b =-0.06; 95% CI=-0.11, -0.01). Reporting that religion does not provide much meaning in life at age 68-69 was associated with worse wellbeing than those reporting that it provided no meaning in life at all in relation to social SLEs (b =-0.60; 95% CI=-1.08, -0.01).

Table 7.9. Interaction between change in religious beliefs from upbringing to adulthood and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	0.01 (-0.01,0.03)
Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-0.01 (-0.07,0.05)	-0.07 (-0.23,0.09)
Religious to not religious	0.01 (-0.06,0.08)	-0.11 (-0.30,0.08)
Not religious to religious	-0.02 (-0.11,0.07)	0.13 (-0.16,0.42)
Total SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	0.01 (-0.01,0.03)
Religious to not religious	-	0.02 (-0.01,0.04)
Not religious to religious	-	-0.02 (-0.05,0.02)
Likelihood-ratio test: χ^2 (p)		3.05 (0.4)
Social SLEs	**0.02 (0.02,0.03)**	0.01 (-0.02,0.04)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	-0.01 (-0.07,0.05)	-0.09 (-0.23,0.04)
Religious to not religious	0.01 (-0.06,0.08)	-0.04 (-0.19,0.12)
Not religious to religious	-0.01 (-0.10,0.08)	0.06 (-0.17,0.30)
Social SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	0.02 (-0.01,0.05)
Religious to not religious	-	0.01 (-0.02,0.05)
Not religious to religious	-	-0.01 (-0.06,0.03)
Likelihood-ratio test: χ^2 (p)		3.43 (0.3)
Health SLEs	**0.07 (0.05,0.09)**	0.05 (-0.01,0.11)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	0.00 (-0.06,0.06)	-0.02 (-0.09,0.06)
Religious to not religious	0.01 (-0.06,0.07)	-0.02 (-0.12,0.07)
Not religious to religious	0.01 (-0.08,0.10)	0.03 (-0.09,0.15)
Health SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	0.02 (-0.05,0.09)
Religious to not religious	-	0.04 (-0.04,0.12)
Not religious to religious	-	-0.03 (-0.15,0.08)
Likelihood-ratio test: χ^2 (p)		1.86 (0.6)
Work SLEs	**0.02 (0.00,0.04)**	0.03 (-0.01,0.08)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	0.00 (-0.06,0.06)	0.04 (0.10,0.00)
Religious to not religious	0.02 (-0.05,0.08)	0.00 (-0.09,0.09)
Not religious to religious	0.00 (-0.09,0.09)	0.06 (-0.07,0.20)
Work SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	-0.02 (-0.07,0.04)
Religious to not religious	-	0.01 (-0.05,0.08)
Not religious to religious	-	-0.05 (-0.14,0.03)
Likelihood-ratio test: χ^2 (p)		3.05 (0.4)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.10 Interaction between change in religious beliefs from upbringing to adulthood and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.30 (-0.43,-0.16)**	-0.08 (-0.44,0.27)
Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	1.11 (-0.06,2.27)	2.79 (-0.47,6.04)
Religious to not religious	0.51 (-0.81,1.83)	3.80 (-0.02,7.62)
Not religious to religious	**2.26 (0.48,4.04)**	1.23 (-4.62,7.08)
Total SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	-0.22 (-0.62,0.17)
Religious to not religious	-	-0.43 (-0.90,0.04)
Not religious to religious	-	0.10 (-0.58,0.78)
Likelihood-ratio test: χ^2 (p)		0.99 (0.8)
Social SLEs	**-0.38 (-0.56,-0.21)**	-0.06 (-0.59,0.47)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	1.13 (-0.03,2.30)	**2.97 (0.30,5.64)**
Religious to not religious	0.54 (-0.78,1.85)	1.54 (-1.53,4.62)
Not religious to religious	**2.24 (0.46,4.01)**	2.17 (-2.48,6.82)
Social SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	-0.43 (-1.00,0.14)
Religious to not religious	-	-0.25 (-0.92,0.41)
Not religious to religious	-	-0.03 (-0.98,0.92)
Likelihood-ratio test: χ^2 (p)		2.92 (0.4)
Health SLEs	**-0.89 (-1.33,-0.44)**	-1.15 (-2.42,0.11)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	1.00 (-0.16,2.16)	0.74 (-0.80,2.28)
Religious to not religious	0.57 (-0.75,1.89)	0.72 (-1.10,2.55)
Not religious to religious	**2.03 (0.25,3.80)**	1.20 (-1.22,3.62)
Health SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	0.37 (-1.03,1.77)
Religious to not religious	-	-0.13 (-1.78,1.53)
Not religious to religious	-	1.18 (-1.17,3.54)
Likelihood-ratio test: χ^2 (p)		1.63 (0.7)
Work SLEs	**-0.39 (-0.74,-0.04)**	-0.55 (-1.44,0.35)
Religious upbringing and effect on life		
Same (not religious)	Ref	Ref
Same (religious)	0.91 (-0.26,2.07)	0.68 (-0.89,2.24)
Religious to not religious	0.42 (-0.90,1.74)	0.48 (-1.33,2.29)
Not religious to religious	**2.11 (0.33,3.89)**	1.33 (-1.28,3.93)
Work SLEs X Change in religious beliefs from upbringing to adulthood		
Same (not religious)	Ref	Ref
Same (religious)	-	0.22 (-0.79,1.22)
Religious to not religious	-	-0.06 (-1.26,1.14)
Not religious to religious	-	0.68 (-0.98,2.34)
Likelihood-ratio test: χ^2 (p)		0.99 (0.8)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.11 Interaction between the strength of religious belief and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.04)**
The strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	-0.03 (-0.09,0.02)	0.01 (-0.16,0.17)
Moderate	0.01 (-0.03,0.06)	-0.01 (-0.15,0.13)
Very strong	**-0.07 (-0.14,0.00)**	0.17 (-0.05,0.38)
Total SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	0.00 (-0.02,0.02)
Moderate	-	0.00 (-0.01,0.02)
Very strong	-	**-0.03 (-0.05,0.00)**
Likelihood-ratio test: χ^2 (p)		1.95 (0.5)
Social SLEs	**0.03 (0.02,0.03)**	**0.03 (0.01,0.05)**
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	0.03 (0.02,0.00)	0.04 (-0.09,0.17)
Moderate	0.01 (-0.04,0.05)	-0.01 (-0.12,0.10)
Very strong	**-0.07 (-0.14,0.00)**	0.12 (-0.05,0.29)
Social SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	-0.02 (-0.04,0.01)
Moderate	-	0.00 (-0.02,0.03)
Very strong	-	**-0.04 (-0.07,-0.01)**
Likelihood-ratio test: χ^2 (p)		**9.31 (0.03)**
Health SLEs	**0.07 (0.05,0.09)**	**0.05 (0.01,0.09)**
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	-0.03 (-0.09,0.02)	-0.04 (-0.11,0.04)
Moderate	0.01 (-0.04,0.05)	-0.02 (-0.09,0.04)
Very strong	-0.06 (-0.13,0.01)	-0.03 (-0.12,0.07)
Health SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	0.00 (-0.07,0.07)
Moderate	-	0.04 (-0.02,0.09)
Very strong	-	-0.04 (-0.11,0.04)
Likelihood-ratio test: χ^2 (p)		4.54 (0.2)
Work SLEs	**0.02 (0.00,0.04)**	0.03 (0.00,0.07)
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	-0.04 (-0.09,0.02)	-0.03 (-0.12,0.05)
Moderate	0.01 (-0.04,0.05)	0.02 (-0.05,0.08)
Very strong	-0.05 (-0.12,0.02)	0.02 (-0.08,0.13)
Work SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	0.00 (-0.06,0.05)
Moderate	-	-0.01 (-0.05,0.04)
Very strong	-	-0.07 (-0.14,0.00)
Likelihood-ratio test: χ^2 (p)		2.03 (0.6)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.12 Interaction between strength of religious belief and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.29 (-0.42,-0.15)**	-0.20 (-0.45,0.05)
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	-0.02 (-1.12,1.07)	1.01 (-2.38,4.40)
Moderate	0.47 (-0.45,1.39)	1.91 (-0.88,4.70)
Very strong	1.03 (-0.39,2.45)	0.15 (-4.28,4.58)
Total SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	-0.13 (-0.54,0.28)
Moderate	-	-0.18 (-0.50,0.15)
Very strong	-	0.09 (-0.39,0.56)
Likelihood-ratio test: χ^2 (p)		6.88 (0.08)
Social SLEs	**-0.38 (-0.55,-0.20)**	-0.25 (-0.59,0.09)
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	0.00 (-1.10,1.09)	0.46 (-2.16,3.07)
Moderate	0.52 (-0.40,1.43)	1.78 (-0.44,4.01)
Very strong	1.06 (-0.36,2.48)	0.75 (-2.72,4.21)
Social SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	-0.10 (-0.63,0.43)
Moderate	-	-0.27 (-0.71,0.17)
Very strong	-	0.04 (-0.57,0.65)
Likelihood-ratio test: χ^2 (p)		2.01 (0.6)
Health SLEs	**-0.88 (-1.32,-0.44)**	-0.71 (-1.57,0.15)
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	0.00 (-1.09,1.10)	0.21 (-1.35,1.77)
Moderate	0.51 (-0.41,1.43)	0.89 (-0.42,2.21)
Very strong	0.80 (-0.61,2.22)	0.24 (-1.75,2.24)
Health SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	-0.25 (-1.65,1.15)
Moderate	-	-0.46 (-1.58,0.67)
Very strong	-	0.64 (-1.01,2.29)
Likelihood-ratio test: χ^2 (p)		2.07 (0.6)
Work SLEs	**-0.37 (-0.71,-0.02)**	0.01 (-0.64,0.67)
Strength of religious belief at age 26		
No religion	Ref	Ref
Little or not at all	0.07 (-1.02,1.17)	0.77 (-0.83,2.37)
Moderate	0.47 (-0.45,1.39)	0.99 (-0.34,2.31)
Very strong	0.75 (-0.66,2.17)	1.62 (-0.51,3.75)
Work SLEs X Strength of religious belief at age 26		
No religion	-	Ref
Little or not at all	-	-0.62 (-1.66,0.42)
Moderate	-	-0.46 (-1.34,0.42)
Very strong	-	-0.76 (-2.14,0.63)
Likelihood-ratio test: χ^2 (p)		3.99 (0.3)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.13 Interaction between religious belief at age 36 and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.03)**
Religious belief		
No	Ref	Ref
Yes	-0.02 (-0.06,0.02)	0.01 (-0.11,0.13)
Total SLEs X Religious belief	-	
No	-	Ref
Yes	-	0.00 (-0.02,0.01)
Likelihood-ratio test: χ^2 (p)		2.74 (0.1)
Social SLEs	**0.02 (0.02,0.03)**	**0.02 (0.00,0.04)**
Religious belief		
No	Ref	Ref
Yes	-0.02 (-0.06,0.02)	-0.05 (-0.15,0.04)
Social SLEs X Religious belief	-	
No	-	Ref
Yes	-	0.01 (-0.01,0.03)
Likelihood-ratio test: χ^2 (p)		0.66 (0.4)
Health SLEs	**0.07 (0.05,0.09)**	**0.07 (0.03,0.11)**
Religious belief		
No	Ref	Ref
Yes	-0.01 (-0.05,0.03)	0.00 (-0.05,0.06)
Health SLEs X Religious belief	-	
No	-	Ref
Yes	-	-0.01 (-0.06,0.04)
Likelihood-ratio test: χ^2 (p)		0.16 (0.7)
Work SLEs	**0.02 (0.00,0.04)**	**0.04 (0.01,0.07)**
Religious belief		
No	Ref	Ref
Yes	-0.01 (-0.05,0.03)	0.02 (-0.04,0.08)
Work SLEs X Religious belief	-	
No	-	Ref
Yes	-	-0.03 (-0.07,0.01)
Likelihood-ratio test: χ^2 (p)		2.09 (0.1)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.14 Interaction between religious belief at age 36 and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.30 (-0.43,-0.16)**	**-0.33 (-0.56,-0.10)**
Religious belief		
No	Ref	Ref
Yes	**0.92 (0.11,1.73)**	0.52 (-1.89,2.94)
Total SLEs X Religious belief	-	
No	-	Ref
Yes	-	0.05 (-0.24,0.34)
Likelihood-ratio test: χ^2 (p)		0.26 (0.6)
Social SLEs	**-0.38 (-0.56,-0.21)**	-0.22 (-0.54,0.10)
Religious belief		
No	Ref	Ref
Yes	**0.92 (0.12,1.73)**	**2.01 (0.10,3.91)**
Social SLEs X Religious belief	-	
No	-	Ref
Yes	-	-0.24 (-0.63,0.14)
Likelihood-ratio test: χ^2 (p)		1.51 (0.2)
Health SLEs	**-0.89 (-1.33,-0.45)**	**-1.22 (-2.02,-0.42)**
Religious belief		
No	Ref	Ref
Yes	0.76 (-0.04,1.56)	0.37 (-0.75,1.49)
Health SLEs X Religious belief	-	
No	-	Ref
Yes	-	0.49 (-0.50,1.48)
Likelihood-ratio test: χ^2 (p)		0.95 (0.3)
Work SLEs	**-0.39 (-0.73,-0.04)**	-0.58 (-1.18,0.01)
Religious belief		
No	Ref	Ref
Yes	0.78 (-0.03,1.58)	0.46 (-0.67,1.59)
Work SLEs X Religious belief	-	
No	-	Ref
Yes	-	0.30 (-0.44,1.04)
Likelihood-ratio test: χ^2 (p)		0.63 (0.4)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.15 Interaction between the importance of religion at age 68-69 and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.03)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.02 (-0.03,0.07)	-0.02 (-0.17,0.12)
Somewhat important	0.02 (-0.03,0.08)	0.05 (-0.12,0.22)
Very important	0.02 (-0.04,0.08)	0.01 (-0.16,0.18)
Total SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.01 (-0.01,0.02)
Somewhat important	-	0.00 (-0.02,0.02)
Very important	-	0.00 (-0.02,0.02)
Likelihood-ratio test: χ^2 (p)		0.7 (0.9)
Social SLEs	**0.02 (0.02,0.03)**	**0.02 (0.00,0.04)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.02 (-0.03,0.07)	0.00 (-0.12,0.11)
Somewhat important	0.03 (-0.03,0.08)	0.02 (-0.12,0.15)
Very important	0.03 (-0.03,0.08)	0.03 (-0.11,0.16)
Social SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.00 (-0.02,0.03)
Somewhat important	-	0.00 (-0.02,0.03)
Very important	-	0.00 (-0.02,0.03)
Likelihood-ratio test: χ^2 (p)		0.16 (0.1)
Health SLEs	**0.07 (0.04,0.09)**	**0.06 (0.01,0.10)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.02 (-0.03,0.07)	0.00 (-0.07,0.07)
Somewhat important	0.03 (-0.02,0.09)	0.04 (-0.03,0.12)
Very important	0.04 (-0.02,0.09)	0.03 (-0.05,0.11)
Health SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.03 (-0.03,0.10)
Somewhat important	-	-0.01 (-0.08,0.05)
Very important	-	0.01 (-0.05,0.08)
Likelihood-ratio test: χ^2 (p)		2.41 (0.5)
Work SLEs	**0.02 (0.00,0.04)**	-0.55 (-1.21,0.12)
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.02 (-0.03,0.07)	0.34 (-0.99,1.67)
Somewhat important	0.03 (-0.02,0.09)	0.01 (-1.48,1.49)
Very important	0.04 (-0.01,0.10)	0.86 (-0.70,2.42)
Work SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.25 (-0.66,1.16)
Somewhat important	-	0.17 (-0.87,1.20)
Very important	-	0.28 (-0.71,1.27)
Likelihood-ratio test: χ^2 (p)		0.41 (0.9)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in a model with interaction.

Table 7.16 Interaction between the importance of religion at age 68-69 and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.29 (-0.42,-0.15)**	**-0.37 (-0.63,-0.11)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.58 (-0.35,1.51)	-0.39 (-3.36,2.58)
Somewhat important	0.28 (-0.74,1.30)	-0.74 (-4.15,2.68)
Very important	**1.46 (0.38,2.53)**	0.83 (-2.57,4.23)
Total SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.13 (-0.24,0.49)
Somewhat important	-	0.13 (-0.28,0.54)
Very important	-	0.08 (-0.30,0.46)
Likelihood-ratio test: χ^2 (p)		0.58 (0.9)
Social SLEs	**-0.38 (-0.56,-0.20)**	**-0.41 (-0.75,-0.06)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.58 (-0.35,1.50)	0.04 (-2.28,2.36)
Somewhat important	0.28 (-0.74,1.29)	0.43 (-2.22,3.09)
Very important	**1.39 (0.32,2.46)**	1.40 (-1.25,4.04)
Social SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	0.12 (-0.36,0.61)
Somewhat important	-	-0.03 (-0.57,0.50)
Very important	-	0.01 (-0.49,0.50)
Likelihood-ratio test: χ^2 (p)		0.41 (0.9)
Health SLEs	**-0.87 (-1.32,-0.43)**	**-0.91 (-1.78,-0.04)**
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.52 (-0.41,1.44)	0.89 (-0.43,2.21)
Somewhat important	0.21 (-0.81,1.22)	-0.25 (-1.70,1.21)
Very important	**1.20 (0.14,2.26)**	1.08 (-0.46,2.61)
Health SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	-0.51 (-1.75,0.73)
Somewhat important	-	0.53 (-0.71,1.78)
Very important	-	0.14 (-1.15,1.43)
Likelihood-ratio test: χ^2 (p)		2.75 (0.4)
Work SLEs	**-0.38 (-0.72,-0.03)**	0.03 (-0.01,0.06)
Importance of religion at age 68-69		
Not important at all	Ref	Ref
Not particularly important	0.60 (-0.33,1.53)	0.03 (-0.04,0.10)
Somewhat important	0.18 (-0.84,1.20)	0.04 (-0.04,0.12)
Very important	**1.17 (0.10,2.23)**	0.06 (-0.02,0.14)
Work SLEs X Importance of religion		
Not important at all	-	Ref
Not particularly important	-	-0.01 (-0.06,0.04)
Somewhat important	-	-0.01 (-0.06,0.05)
Very important	-	-0.02 (-0.07,0.04)
Likelihood-ratio test: χ^2 (p)		0.4 (0.9)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.17 Interaction between how much religion provides meaning in life belief at age 36 and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 b (95% CI) n=2125	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.03)**
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	**0.07 (0.02,0.11)**	-0.04 (-0.19,0.10)
A little	0.04 (-0.01,0.10)	0.10 (-0.07,0.27)
A lot	**0.07 (0.01,0.12)**	0.04 (-0.14,0.21)
Total SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	0.01 (0.00,0.03)
A little	-	-0.01 (-0.03,0.01)
A lot	-	0.00 (-0.02,0.02)
Likelihood-ratio test: χ^2 (p)		4.06 (0.3)
Social SLEs	**0.02 (0.01,0.03)**	**0.02 (0.00,0.03)**
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	**0.07 (0.02,0.12)**	-0.01 (-0.12,0.11)
A little	0.04 (-0.01,0.10)	0.04 (-0.09,0.18)
A lot	**0.08 (0.02,0.13)**	0.05 (-0.09,0.19)
Social SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	0.02 (-0.01,0.04)
A little	-	0.00 (-0.02,0.03)
A lot	-	0.01 (-0.02,0.03)
Likelihood-ratio test: χ^2 (p)		2.06 (0.6)
Health SLEs	**0.07 (0.04,0.09)**	**0.07 (0.04,0.11)**
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	**0.07 (0.02,0.12)**	**0.08 (0.01,0.14)**
A little	0.05 (-0.01,0.10)	0.06 (-0.02,0.13)
A lot	**0.08 (0.03,0.14)**	**0.09 (0.01,0.17)**
Health SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	-0.01 (-0.07,0.05)
A little	-	-0.01 (-0.07,0.04)
A lot	-	-0.01 (-0.08,0.05)
Likelihood-ratio test: χ^2 (p)		0.29 (1.0)
Work SLEs	**0.02 (0.00,0.04)**	0.02 (0.00,0.05)
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	**0.07 (0.02,0.12)**	0.04 (-0.03,0.11)
A little	**0.06 (0.00,0.11)**	**0.12 (0.04,0.19)**
A lot	**0.09 (0.03,0.15)**	**0.10 (0.01,0.18)**
Work SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	0.03 (-0.02,0.08)
A little	-	**-0.06 (-0.11,-0.01)**
A lot	-	-0.01 (-0.06,0.04)
Likelihood-ratio test: χ^2 (p)		**8.85 (0.03)**

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in a model with interaction.

Table 7.18 Interaction between how much religion provides meaning in life belief at age 36 and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.28 (-0.42,-0.15)**	-0.17 (-0.39,0.05)
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	-0.48 (-1.39,0.43)	2.18 (-0.77,5.13)
A little	0.07 (-0.91,1.06)	0.47 (-2.90,3.83)
A lot	0.60 (-0.50,1.70)	1.55 (-1.90,5.00)
Total SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	-0.34 (-0.70,0.02)
A little	-	-0.06 (-0.45,0.34)
A lot	-	-0.12 (-0.50,0.25)
Likelihood-ratio test: χ^2 (p)		3.56 (0.3)
Social SLEs	**-0.37 (-0.55,-0.19)**	-0.16 (-0.45,0.13)
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	-0.52 (-1.43,0.39)	2.11 (-0.21,4.43)
A little	0.09 (-0.89,1.07)	0.89 (-1.72,3.51)
A lot	0.47 (-0.62,1.56)	1.50 (-1.19,4.19)
Social SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	**-0.60 (-1.08,-0.11)**
A little	-	-0.19 (-0.69,0.32)
A lot	-	-0.23 (-0.73,0.26)
Likelihood-ratio test: χ^2 (p)		5.84 (0.1)
Health SLEs	**-0.87 (-1.31,-0.42)**	**-0.92 (-1.67,-0.17)**
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	-0.49 (-1.40,0.42)	-0.40 (-1.70,0.90)
A little	0.03 (-0.95,1.01)	-0.29 (-1.69,1.11)
A lot	0.32 (-0.76,1.40)	0.37 (-1.17,1.92)
Health SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	-0.11 (-1.32,1.09)
A little	-	0.35 (-0.82,1.53)
A lot	-	-0.05 (-1.36,1.26)
Likelihood-ratio test: χ^2 (p)		0.6 (0.9)
Work SLEs	**-0.37 (-0.71,-0.02)**	-0.29 (-0.82,0.24)
Religion provides meaning in life at age 68-69		
Not at all	Ref	Ref
Not much	-0.49 (-1.40,0.42)	-0.16 (-1.49,1.17)
A little	-0.09 (-1.06,0.89)	0.21 (-1.22,1.64)
A lot	0.29 (-0.80,1.38)	0.00 (-1.62,1.61)
Work SLEs X Religion provides meaning		
Not at all	-	Ref
Not much	-	-0.31 (-1.23,0.61)
A little	-	-0.27 (-1.26,0.71)
A lot	-	0.21 (-0.76,1.17)
Likelihood-ratio test: χ^2 (p)		1.15 (0.8)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in a model with interaction.

Partner beliefs

Table 7.19 and Table 7.20 shows the interaction between the strength of partner's beliefs at age 26 and SLEs on mental health and wellbeing. No interactions were found between SLEs and strength of partner's belief on mental health. The association between SLEs and lower wellbeing was more pronounced for study members who had a partner with little or no religious beliefs compared to not having a partner.

Table 7.21 and Table 7.22 shows the interaction between partner's beliefs and SLEs on mental health and wellbeing. Having a partner with the same religious belief (compared to a partner with no belief or a different belief) moderated the association between SLEs and mental health. Looking at the SLE sub-scales, it appears as if this effect modification is driven in part by work SLEs. Similarly, wellbeing scores were higher for study members with a partner who had the same religious belief in relation to SLEs. For wellbeing, however, this interaction appears to be more pronounced for social SLEs. Those with partners who had 'little or no' religious beliefs had lower wellbeing in relation to SLEs than those with no partners (b =-0.39; 95% CI=-0.75, -0.03). No associations were found between SLEs and whether study members had the same or different belief to their partners (Table 7.21 and Table 7.22).

Table 7.19 Interaction between the strength of partner's belief and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 b (95% CI) n=2125	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.03)**
Strength of partner's belief at age 26		
No partner	0.04 (-0.01,0.09)	0.12 (-0.03,0.27)
Little or no religion	Ref	Ref
Moderate or very strong	0.01 (-0.03,0.06)	-0.01 (-0.15,0.12)
Total SLEs X Strength of partner's belief		
No partner		-0.01 (-0.03,0.01)
Little or no religion	Ref	Ref
Moderate or very strong		0.00 (-0.01,0.02)
Likelihood-ratio test: χ^2 (p)		1.35 (0.5)
Social SLEs	**0.02 (0.02,0.03)**	**0.02 (0.01,0.04)**
Strength of partner's belief at age 26		
No partner	0.04 (-0.01,0.09)	0.06 (-0.06,0.18)
Little or no religion	Ref	Ref
Moderate or very strong	0.02 (-0.03,0.06)	-0.05 (-0.15,0.06)
Health SLEs X Strength of partner's belief		
No partner	-	0.00 (-0.03,0.02)
Little or no religion	-	Ref
Moderate or very strong	-	0.01 (-0.01,0.03)
Likelihood-ratio test: χ^2 (p)		2.73 (0.3)
Health SLEs	**0.07 (0.05,0.09)**	**0.06 (0.02,0.10)**
Strength of partner's belief at age 26		
No partner	0.04 (-0.02,0.09)	0.06 (-0.01,0.13)
Little or no religion	Ref	Ref
Moderate or very strong	0.01 (-0.03,0.06)	-0.01 (-0.07,0.05)
Social SLEs X Strength of partner's belief		
No partner	-	-0.03 (-0.09,0.03)
Little or no religion	-	Ref
Moderate or very strong	-	0.03 (-0.02,0.08)
Likelihood-ratio test: χ^2 (p)		4.84 (0.08)
Work SLEs	**0.02 (0.00,0.04)**	0.02 (-0.01,0.05)
Strength of partner's belief at age 26		
No partner	0.04 (-0.01,0.10)	0.06 (-0.01,0.14)
Little or no religion	Ref	Ref
Moderate or very strong	0.02 (-0.02,0.06)	0.01 (-0.05,0.07)
Work SLEs X Strength of partner's belief		
No partner	-	-0.02 (-0.07,0.03)
Little or no religion	-	Ref
Moderate or very strong	-	0.01 (-0.03,0.05)
Likelihood-ratio test: χ^2 (p)		1.35 (0.5)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.20 Interaction between the strength of partner's belief and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.29 (-0.42,-0.15)**	**-0.45 (-0.67,-0.23)**
Strength of partner's belief at age 26		
No partner	-0.92 (-1.96,0.12)	**-4.06 (-7.10,-1.01)**
Little or no religion	Ref	Ref
Moderate or very strong	0.24 (-0.63,1.10)	-1.10 (-3.77,1.57)
Total SLEs X Strength of partner's belief		
No partner	-	**0.39 (0.03,0.75)**
Little or no religion	-	Ref
Moderate or very strong	-	0.17 (-0.14,0.48)
Likelihood-ratio test: χ^2 (p)		2.83 (0.20)
Social SLEs	**-0.37 (-0.55,-0.20)**	**-0.46 (-0.74,-0.18)**
Strength of partner's belief at age 26		
No partner	-0.95 (-1.99,0.08)	-2.23 (-4.56,0.10)
Little or no religion	Ref	Ref
Moderate or very strong	0.22 (-0.64,1.09)	-0.01 (-2.13,2.11)
Health SLEs X Strength of partner's belief		
No partner	-	0.28 (-0.18,0.73)
Little or no religion	-	Ref
Moderate or very strong	-	0.05 (-0.36,0.47)
Likelihood-ratio test: χ^2 (p)		1.51 (0.47)
Health SLEs	**-0.85 (-1.29,-0.41)**	**-0.88 (-1.66,-0.10)**
Strength of partner's belief at age 26		
No partner	-0.56 (-1.97,0.85)	**-1.82 (-3.27,-0.37)**
Little or no religion	Ref	Ref
Moderate or very strong	**1.20 (0.30,2.09)**	0.75 (-0.47,1.97)
Social SLEs X Strength of partner's belief		
No partner	-	1.07 (-0.20,2.34)
Little or no religion	-	Ref
Moderate or very strong	-	-0.58 (-1.65,0.49)
Likelihood-ratio test: χ^2 (p)		**7.02 (0.03)**
Work SLEs	**-0.37 (-0.71,-0.02)**	**-0.75 (-1.34,-0.16)**
Strength of partner's belief at age 26		
No partner	-0.97 (-2.01,0.06)	**-1.86 (-3.38,-0.34)**
Little or no religion	Ref	Ref
Moderate or very strong	0.15 (-0.72,1.02)	-0.39 (-1.63,0.84)
Work SLEs X Strength of partner's belief		
No partner	-	0.81 (-0.19,1.80)
Little or no religion	-	Ref
Moderate or very strong	-	0.51 (-0.32,1.34)
Likelihood-ratio test: χ^2 (p)		2.83 (0.2)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.21 Interaction between partner's belief and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.03 (0.02,0.04)**
Partner's belief at age 26		
No partner	-0.02 (-0.09,0.06)	0.12 (-0.10,0.35)
No/different belief	Ref	Ref
Same belief	**-0.05 (-0.09,-0.01)**	0.09 (-0.04,0.23)
Total SLEs X Partner's belief		
No partner	-	-0.02 (-0.04,0.01)
No/different belief	-	Ref
Same belief	-	**-0.02 (-0.03,0.00)**
Likelihood-ratio test: χ^2 (p)		**6.08 (0.05)**
Social SLEs	**0.02 (0.02,0.03)**	**0.04 (0.02,0.06)**
Partner's belief at age 26		
No partner	-0.02 (-0.09,0.05)	0.09 (-0.08,0.25)
No/different belief	Ref	Ref
Same belief	**-0.05 (-0.10,-0.01)**	0.02 (-0.09,0.14)
Health SLEs X Partner's belief		
No partner	-	-0.02 (-0.05,0.01)
No/different belief	-	Ref
Same belief	-	-0.02 (-0.04,0.01)
Likelihood-ratio test: χ^2 (p)		2.75 (0.3)
Health SLEs	**0.07 (0.04,0.09)**	**0.04 (0.00,0.09)**
Partner's belief at age 26		
No partner	-0.03 (-0.10,0.04)	-0.10 (-0.20,0.00)
No/different belief	Ref	Ref
Same belief	**-0.05 (-0.10,-0.01)**	**-0.07 (-0.13,-0.01)**
Social SLEs X Partner's belief		
No partner	-	0.08 (0.00,0.15)
No/different belief	-	Ref
Same belief	-	0.02 (-0.03,0.07)
Likelihood-ratio test: χ^2 (p)		3.50 (0.2)
Work SLEs	**0.02 (0.00,0.04)**	**0.06 (0.03,0.10)**
Partner's belief at age 26		
No partner	-0.03 (-0.10,0.05)	0.03 (-0.07,0.14)
No/different belief	Ref	Ref
Same belief	**-0.06 (-0.10,-0.01)**	0.00 (-0.07,0.07)
Work SLEs X Partner's belief		
No partner	-	-0.06 (-0.14,0.02)
No/different belief	-	Ref
Same belief	-	**-0.05 (-0.10,-0.01)**
Likelihood-ratio test: χ^2 (p)		**6.08 (0.05)**

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.22 Interaction between partner's belief and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.28 (-0.42,-0.15)**	**-0.54 (-0.79,-0.29)**
Partner's belief at age 26		
No partner	-0.69 (-2.10,0.73)	-3.27 (-7.40,0.87)
No/different belief	Ref	Ref
Same belief	**1.16 (0.26,2.06)**	-1.99 (-4.75,0.78)
Total SLEs X Partner's belief		
No partner	-	0.31 (-0.18,0.79)
No/different belief	-	Ref
Same belief	-	**0.38 (0.06,0.69)**
Likelihood-ratio test: χ^2 (p)		0.2 (0.9)
Social SLEs	**-0.36 (-0.54,-0.19)**	**-0.73 (-1.09,-0.37)**
Partner's belief at age 26		
No partner	-0.61 (-2.02,0.80)	-2.95 (-6.09,0.20)
No/different belief	Ref	Ref
Same belief	**1.22 (0.32,2.12)**	-1.12 (-3.37,1.13)
Health SLEs X Partner's belief		
No partner	-	0.49 (-0.12,1.10)
No/different belief	-	Ref
Same belief	-	**0.49 (0.06,0.92)**
Likelihood-ratio test: χ^2 (p)		5.17 (0.08)
Health SLEs	**-0.85 (-1.29,-0.41)**	-0.69 (-1.59,0.20)
Partner's belief at age 26		
No partner	-0.56 (-1.97,0.85)	-0.19 (-2.20,1.82)
No/different belief	Ref	Ref
Same belief	**1.20 (0.30,2.09)**	**1.36 (0.07,2.65)**
Social SLEs X Partner's belief		
No partner	-	-0.45 (-2.21,1.31)
No/different belief	-	Ref
Same belief	-	-0.18 (-1.27,0.90)
Likelihood-ratio test: χ^2 (p)		0.27 (0.9)
Work SLEs	**-0.38 (-0.73,-0.04)**	-0.51 (-1.22,0.19)
Partner's belief at age 26		
No partner	-0.55 (-1.97,0.86)	-0.84 (-2.90,1.21)
No/different belief	Ref	Ref
Same belief	**1.31 (0.42,2.21)**	1.14 (-0.14,2.41)
Work SLEs X Partner's belief		
No partner	-	0.28 (-1.23,1.80)
No/different belief	-	Ref
Same belief	-	0.16 (-0.67,0.99)
Likelihood-ratio test: χ^2 (p)		0.20 (0.91)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Religious practices

Table 7.23 to Table 7.26 present the interactions between religious practices and SLEs in relation to mental health and wellbeing at age 68-69. Table 7.23 and Table 7.24 show that study members who reported attending religious services at least once a month at age 36, 43, 60-64 and 68-69 (very frequent attendance) had better mental health than those who infrequently attended in relation to health SLEs (b =-0.10; 95% CI=-0.19, -0.01). No interactions were found between SLEs and religious attendance on wellbeing.

Occasional prayer or meditation was associated with better mental health (b =-0.05; 95% CI=-0.10, -0.01) and wellbeing (b =0.99; 95% CI=0.17, 1.81) compared to those who never pray or meditate in relation to work SLEs (Table 7.25 and Table 7.26).

Table 7.23 Interaction between sum religious attendance from age 36 to 68-69 and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.03 (0.02,0.03)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.00 (-0.06,0.07)	0.08 (-0.11,0.27)
Moderate attendance	**-0.10 (-0.19,-0.01)**	0.07 (-0.22,0.36)
Frequent attendance	0.05 (-0.04,0.14)	0.19 (-0.05,0.42)
Very frequent attendance	-0.01 (-0.09,0.08)	0.15 (-0.08,0.38)
Total SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	-0.01 (-0.03,0.01)
Moderate attendance	-	-0.02 (-0.05,0.01)
Frequent attendance	-	-0.02 (-0.04,0.01)
Very frequent attendance	-	-0.02 (-0.04,0.01)
Likelihood-ratio test: χ^2 (p)		4.53 (0.3)
Social SLEs	**0.02 (0.01,0.03)**	**0.03 (0.02,0.04)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.00 (-0.06,0.07)	0.02 (-0.13,0.18)
Moderate attendance	**-0.10 (-0.19,-0.01)**	-0.11 (-0.34,0.13)
Frequent attendance	0.05 (-0.04,0.14)	0.16 (-0.05,0.36)
Very frequent attendance	-0.01 (-0.09,0.08)	0.08 (-0.09,0.26)
Social SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	-0.01 (-0.03,0.02)
Moderate attendance	-	0.00 (-0.04,0.05)
Frequent attendance	-	-0.02 (-0.06,0.01)
Very frequent attendance	-	-0.02 (-0.05,0.01)
Likelihood-ratio test: χ^2 (p)		5.45 (0.2)
Health SLEs	**0.07 (0.05,0.09)**	**0.07 (0.04,0.10)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.01 (-0.06,0.07)	-0.04 (-0.13,0.05)
Moderate attendance	**-0.10 (-0.20,-0.01)**	-0.11 (-0.24,0.02)
Frequent attendance	0.06 (-0.03,0.15)	0.07 (-0.05,0.19)
Very frequent attendance	0.01 (-0.07,0.09)	0.09 (-0.02,0.20)
Health SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	0.06 (-0.02,0.13)
Moderate attendance	-	0.01 (-0.08,0.09)
Frequent attendance	-	-0.01 (-0.10,0.08)
Very frequent attendance	-	**-0.10 (-0.19,-0.01)**
Likelihood-ratio test: χ^2 (p)		8.15 (0.08)
Work SLEs	**0.02 (0.00,0.04)**	**0.03 (0.01,0.05)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.01 (-0.06,0.08)	0.02 (-0.07,0.12)
Moderate attendance	-0.09 (-0.19,0.00)	0.00 (-0.14,0.14)
Frequent attendance	0.07 (-0.02,0.16)	0.03 (-0.09,0.16)
Very frequent attendance	0.02 (-0.06,0.10)	0.07 (-0.04,0.18)
Work SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	-0.01 (-0.08,0.05)
Moderate attendance	-	-0.08 (-0.18,0.01)
Frequent attendance	-	0.03 (-0.04,0.10)
Very frequent attendance	-	-0.05 (-0.11,0.02)
Likelihood-ratio test: χ^2 (p)		5.45 (0.2)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.24 Interaction between sum religious attendance from age 36 to 68-69 and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.29 (-0.42,-0.15)**	**-0.36 (-0.53,-0.19)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.93 (-0.38,2.25)	-1.65 (-5.51,2.21)
Moderate attendance	-0.06 (-1.84,1.72)	-3.25 (-8.79,2.30)
Frequent attendance	-0.02 (-1.83,1.79)	-0.14 (-5.18,4.89)
Very frequent attendance	**1.97 (0.32,3.63)**	0.88 (-3.91,5.68)
Total SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	0.32 (-0.13,0.77)
Moderate attendance	-	0.39 (-0.25,1.03)
Frequent attendance	-	0.02 (-0.50,0.54)
Very frequent attendance	-	0.13 (-0.38,0.64)
Likelihood-ratio test: χ^2 (p)		3.13 (0.5)
Social SLEs	**-0.38 (-0.56,-0.20)**	**-0.44 (-0.66,-0.22)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	1.03 (-0.28,2.34)	0.29 (-2.80,3.39)
Moderate attendance	-0.16 (-1.94,1.62)	-2.83 (-7.36,1.70)
Frequent attendance	-0.06 (-1.87,1.75)	-0.55 (-4.81,3.72)
Very frequent attendance	**1.99 (0.34,3.64)**	1.71 (-1.94,5.35)
Social SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	0.15 (-0.42,0.73)
Moderate attendance	-	0.58 (-0.33,1.49)
Frequent attendance	-	0.10 (-0.63,0.83)
Very frequent attendance	-	0.06 (-0.56,0.68)
Likelihood-ratio test: χ^2 (p)		3.18 (0.5)
Health SLEs	**-0.88 (-1.32,-0.44)**	**-1.02 (-1.59,-0.45)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.88 (-0.43,2.18)	1.05 (-0.71,2.81)
Moderate attendance	-0.02 (-1.80,1.76)	-0.22 (-2.66,2.22)
Frequent attendance	-0.32 (-2.12,1.49)	-0.95 (-3.38,1.48)
Very frequent attendance	**1.74 (0.10,3.39)**	0.85 (-1.36,3.07)
Health SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	-0.23 (-1.77,1.31)
Moderate attendance	-	0.24 (-1.53,2.01)
Frequent attendance	-	0.77 (-1.19,2.73)
Very frequent attendance	-	1.09 (-0.72,2.91)
Likelihood-ratio test: χ^2 (p)		2.10 (0.7)
Work SLEs	**-0.36 (-0.71,-0.02)**	**-0.48 (-0.91,-0.05)**
Sum attendance 36/68-69		
Never	Ref	Ref
Low attendance	0.85 (-0.46,2.16)	-0.16 (-1.97,1.64)
Moderate attendance	-0.17 (-1.96,1.61)	-0.46 (-3.07,2.16)
Frequent attendance	-0.33 (-2.14,1.48)	0.13 (-2.35,2.62)
Very frequent attendance	**1.68 (0.03,3.33)**	1.33 (-0.92,3.59)
Work SLEs X Sum attendance 36/68-69		
Never	-	Ref
Low attendance	-	0.99 (-0.22,2.19)
Moderate attendance	-	0.26 (-1.53,2.06)
Frequent attendance	-	-0.36 (-1.75,1.04)
Very frequent attendance	-	0.31 (-1.05,1.67)
Likelihood-ratio test: χ^2 (p)		3.18 (0.5)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.25 Interaction between the frequency of prayer or meditation at age 68-69 and SLEs on mental health and wellbeing at age 68-69

	GHQ-28 **b (95% CI)** **n=2125**	
Total SLEs	**0.02 (0.01,0.03)**	**0.02 (0.01,0.03)**
Prayer		
Never	Ref	Ref
Occasionally	**0.05 (0.00,0.09)**	**0.19 (0.05,0.33)**
Regularly	0.01 (-0.06,0.08)	0.15 (-0.06,0.69-69)
Daily	0.06 (0.00,0.12)	-0.02 (-0.19,0.16)
Total SLEs X Prayer		
Never	-	Ref
Occasionally	-	**-0.02 (-0.03,0.00)**
Regularly	-	-0.02 (-0.04,0.01)
Daily	-	0.01 (-0.01,0.03)
Likelihood-ratio test: χ^2 (p)		7.76 (0.05)
Social SLEs	**0.02 (0.01,0.03)**	**0.03 (0.01,0.04)**
Prayer		
Never	Ref	Ref
Occasionally	**0.05 (0.01,0.10)**	**0.14 (0.03,0.25)**
Regularly	0.02 (-0.05,0.08)	0.07 (-0.09,0.23)
Daily	**0.06 (0.00,0.12)**	0.02 (-0.13,0.16)
Social SLEs X Prayer		
Never	-	Ref
Occasionally	-	-0.02 (-0.04,0.00)
Regularly	-	-0.01 (-0.04,0.02)
Daily	-	0.01 (-0.02,0.03)
Likelihood-ratio test: χ^2 (p)		4.5 (0.2)
Health SLEs	**0.07 (0.04,0.09)**	**0.06 (0.03,0.10)**
Prayer		
Never	Ref	Ref
Occasionally	**0.06 (0.01,0.10)**	0.06 (0.00,0.12)
Regularly	0.02 (-0.04,0.09)	0.06 (-0.03,0.15)
Daily	**0.08 (0.02,0.14)**	0.04 (-0.04,0.12)
Health SLEs X Prayer		
Never	-	Ref
Occasionally	-	0.00 (-0.05,0.06)
Regularly	-	-0.04 (-0.12,0.03)
Daily	-	0.05 (-0.01,0.12)
Likelihood-ratio test: χ^2 (p)		4.63 (0.2)
Work SLEs	**0.02 (0.00,0.04)**	**0.04 (0.01,0.06)**
Prayer		
Never	Ref	Ref
Occasionally	**0.06 (0.01,0.11)**	**0.12 (0.05,0.18)**
Regularly	0.03 (-0.04,0.09)	-0.02 (-0.12,0.09)
Daily	**0.08 (0.02,0.14)**	0.11 (0.02,0.19)
Work SLEs X Prayer		
Never	-	Ref
Occasionally	-	**-0.05 (-0.10,-0.01)**
Regularly	-	0.04 (-0.03,0.11)
Daily	-	-0.02 (-0.07,0.03)
Likelihood-ratio test: χ^2 (p)		9.26 (0.03)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

Table 7.26 Interaction between the frequency of prayer or meditation at age 68-69 and SLEs on mental health and wellbeing at age 68-69

	WEMWBS b (95% CI) n=2402	
Total SLEs	**-0.27 (-0.41,-0.14)**	**-0.40 (-0.61,-0.19)**
Prayer		
Never	Ref	Ref
Occasionally	-0.10 (-0.94,0.74)	**-2.73 (-5.43,-0.04)**
Regularly	1.20 (-0.06,2.45)	2.45 (-1.79,6.68)
Daily	-0.15 (-1.26,0.96)	-2.10 (-5.75,1.54)
Total SLEs X Prayer		
Never	-	Ref
Occasionally	-	**0.33 (0.01,0.66)**
Regularly	-	-0.13 (-0.61,0.35)
Daily	-	0.23 (-0.16,0.63)
Likelihood-ratio test: χ^2 (p)		5.78 (0.1)
Social SLEs	**-0.35 (-0.53,-0.18)**	**-0.44 (-0.72,-0.15)**
Prayer		
Never	Ref	Ref
Occasionally	-0.12 (-0.96,0.72)	1.08 (1.31,0.00)
Regularly	1.12 (-0.13,2.37)	1.47 (-1.75,4.70)
Daily	-0.19 (-1.30,0.92)	-1.43 (-4.37,1.51)
Social SLEs X Prayer		
Never	-	Ref
Occasionally	-	0.15 (-0.28,0.58)
Regularly	-	-0.06 (-0.67,0.55)
Daily	-	0.24 (-0.28,0.77)
Likelihood-ratio test: χ^2 (p)		1.26 (0.7)
Health SLEs	**-0.87 (-1.31,-0.43)**	**-1.00 (-1.70,-0.30)**
Prayer		
Never	Ref	Ref
Occasionally	-0.21 (-1.05,0.62)	-0.37 (-1.55,0.81)
Regularly	1.02 (-0.22,2.26)	0.81 (-0.97,2.59)
Daily	-0.48 (-1.58,0.61)	-0.69 (-2.26,0.88)
Health SLEs X Prayer		
Never	-	Ref
Occasionally	-	0.20 (-0.85,1.25)
Regularly	-	0.25 (-1.24,1.75)
Daily	-	0.25 (-1.09,1.58)
Likelihood-ratio test: χ^2 (p)		0.24 (1.0)
Work SLEs	-0.34 (-0.69,0.01)	**-0.69 (-1.20,-0.17)**
Prayer		
Never	Ref	Ref
Occasionally	-0.18 (-1.02,0.66)	**-1.25 (-2.46,-0.04)**
Regularly	0.96 (-0.28,2.21)	1.67 (-0.25,3.58)
Daily	-0.46 (-1.56,0.64)	-1.15 (-2.78,0.48)
Work SLEs X Prayer		
Never	-	Ref
Occasionally	-	**0.99 (0.17,1.81)**
Regularly	-	-0.62 (-1.96,0.72)
Daily	-	0.59 (-0.39,1.57)
Likelihood-ratio test: χ^2 (p)		8.30 (0.4)

Linear regression models adjusted for gender and education
b=Unstandardized coefficients; CI=Confidence Intervals
Likelihood-ratio test assumption: simple model nested in model with interaction.

7.4 Summary of results and discussion

SLEs across the life course were strongly associated with poor mental health and wellbeing outcomes at age 68-69. These associations were apparent for social, health and social SLEs. SLEs were also associated with stronger religious beliefs and more frequent religious attendance across the life course, most commonly with social SLEs.

There is evidence that some aspects of religiosity buffer the associations between SLEs, and mental health and wellbeing. Religious beliefs moderated the associations between social SLEs and worse mental health and religious attendance moderated the association between health SLEs, and worse mental health and wellbeing. There is some evidence that religious beliefs and prayer or meditation moderate the association between work SLEs and worse mental health and wellbeing. However, some findings suggest that religious beliefs worsen the association between social SLEs and mental health and wellbeing.

7.4.1 Religious beliefs

Religious beliefs were associated with stressful life events across the life course. Strong religious beliefs at age 26 and reporting religious beliefs at age 36 were both associated with more social SLEs. SLEs were also positively associated with religious beliefs (religion provides meaning and importance of religious beliefs) at age 68-69.

SLEs are measured across the life course and religious beliefs, although measured at specific ages, track throughout life, i.e. study members with strong religious beliefs at 26 are highly likely to have strong religious beliefs at age 68-69. This overlap in measures makes it challenging to understand the direction of associations. It is conceivable that experiencing SLEs may strengthen religious beliefs and it is also possible that exposure to a religious community may increase the potential for negative social interactions (Ellison et al. 2009, Park 2006). Previous research has focused on how religion is used to cope with health SLEs and appears to show that religiosity increases in response to

trauma and health SLEs (Chen and Koenig 2006b, Chen and Koenig 2006a, Harrison et al. 2001).

Although not a direct measure of religious doubt, change or maintenance of religious beliefs from upbringing could reflect high and low levels of religious doubt respectively. Therefore, the finding of no association between change in religious beliefs from upbringing, and SLEs on mental health and wellbeing is surprising as it might have been expected that becoming religious in adulthood or maintaining religious beliefs from childhood would moderate the impact from SLEs.

Testing for interactions between SLEs and religious beliefs showed some evidence that reporting ‘very strong’ religious belief at age 36 moderated the association between social SLEs and mental health at age 68-69, i.e. as the number of social SLEs increase, study members with very strong religious beliefs have better mental health compared to those reporting no religious beliefs.

Interactions were also found between work SLEs and how much religion provides meaning in life. As work SLEs increase, study members who reported that religion provides ‘a little’ meaning in life have better mental health compared to those reporting that it provides no meaning at all. This is an interesting finding, as the model without the interaction shows that there is a positive association between the extent to which religion provides meaning in life, and depression and anxiety symptoms.

An interaction between religion providing meaning in life and social SLEs on wellbeing at age 68-69 was found. As social SLEs increase, study members who report that religion does not provide much meaning in life had lower wellbeing compared to study members reporting it provides no meaning at all. Previous research on stress-buffering of religion on chronic pain found that importance of religion in life moderated associations with life satisfaction (Dezutter et al. 2010).

The difference between these two categories ('not at all' and 'not much') are subtle. It is possible that study members reporting 'not much' is a reflection of religious doubt which has been associated with lower levels of wellbeing (Krause 2006a).

There was an interaction between how much religion provides meaning in life and work SLEs, where reporting that religion provides 'a little' meaning in life was associated with better mental health than those with reporting religion does not provide any meaning at all. This finding is supported by previous research which found that religion and work stress are associated with higher job satisfaction and lower risk of burn-out (Kutcher et al. 2010). The measure of work SLEs used in this chapter includes work crises but also the potential loss of job or actual loss of their job. There is very little research on religiosity, work stress and mental health and wellbeing although there is some evidence that religiosity is protective of financial hardship, an issue which goes which goes hand in hand with work SLEs. Bradshaw and Ellison (2010) found that religious beliefs, in particular, belief in the afterlife, moderated the association between financial stress and psychological distress. This is supported by Krause (2006b) who found that social support from religious congregations moderated the association between financial strain and self-rated health compared to secular support.

There is no clear explanation as to why the interactions were found between SLEs, and strength of belief at age 26 and how much religion provides meaning at age 68-69 and not for any other measures of religious beliefs. As this is novel research, these findings need to be replicated in to understand them further.

7.4.2 Partner beliefs

Health SLEs were positively associated with having a partner with the same belief, compared to having a partner with no belief or a different belief. No associations were found between SLEs and strength of partner beliefs. There is no clear explanation for this association. It is possible that people with health SLEs are more likely to choose a

partner with the same belief as this may be perceived as more supportive. However, more research is needed to understand this relationship better.

There is some evidence that the association between SLEs and mental health and wellbeing is moderated by partner beliefs. Having a partner with the same religious belief at age 36 is associated with better mental health and wellbeing in the context of increasing SLEs compared to those with partners with no religious beliefs or different religious beliefs. For mental health, this finding appeared to be driven by work SLEs and for wellbeing, this was driven by social SLEs. This finding is supported by previous research which shows the various benefits of religion in marriage (Waite and Lehrer 2003). For example, having a partner with the same religious belief could increase social integration within a religious community. It is not clear why sharing religious beliefs with your partner would protect against work SLEs specifically, and the research in this area is not conclusive. No interactions were found between partner's strength of religious belief at age 26 and SLEs in relation to mental health and wellbeing.

7.4.3 Religious practices

Social and health SLEs were positively associated with religious attendance across the life course. Social, health and work SLEs were all positively associated with frequency of prayer and meditation.

There is some evidence that very frequent religious attendance across the life course (reporting at least monthly attendance at ages 36, 43, 60-64 and 68-69) buffers the association between health SLEs and mental health at age 68-69 when compared to those attending less than monthly (at age 36, 43, 60-64 and 68-69). This finding adds to the finding by (Smith et al. 2003) that the inverse relationship between religious attendance and depressive symptoms was stronger for participants who were experiencing stressful life events. There was no evidence of effect modification of religious attendance on the association between SLEs and wellbeing.

There was also an interaction showing that occasional prayer or meditation buffered the associations between work SLEs, and mental health and wellbeing. The models show that when there are no SLEs, the frequency of prayer or meditation is associated with worse mental health but as the number of SLEs increase, reporting prayer or meditation occasionally is associated with better mental health. These findings suggest that prayer is only beneficial for mental health in the presence of SLEs.

7.4.4 Strengths and limitations

The main strength of this analysis is the rich measure of SLEs available in NSHD that was collated from across the entire life course. The comprehensive list of events takes into account SLEs in terms of illnesses and job stress which are not frequently used in other measures of SLEs. Data collection of SLEs were collected until closer to the time of the event which helps to reduce recall bias of SLEs (Raphael et al. 1991). Furthermore, using a multi-component measure of SLEs allowed a better understanding of what type of stressors religiosity may be operating through.

A limitation is that it is not possible to compare associations of SLEs at different ages because the type of SLEs measured at each wave is different. The finding that religiosity buffers associations between SLEs and mental health and wellbeing are not consistently found and it is important to be aware that the high number of statistical tests may have led to false positive results. There is also some difficulty in interpreting the findings as the ages at which measures of SLEs and religiosity were taken overlap. This challenge is not easily addressed as religiosity variables are likely to track across the life course.

7.4.5 Summary

Religiosity may modify the effect of SLEs on mental health and wellbeing, particularly for social stressors, although there was some evidence for effect modification of mental health and work stressors too. Further research is required confirm these findings and to better understand the underlying mechanisms.

8 Discussion

8.1 Summary of main findings

This thesis investigated the relationship between religiosity across the life course and mental health and wellbeing using data from the MRC National Survey of Health and development. Before embarking on the quantitative exploration of the data set, a systematic review on longitudinal associations between religiosity, and mental health and wellbeing was conducted (Chapter 2, page 54). Although there were a significant number of longitudinal studies testing these associations, the majority were based in the USA, and none were in the UK. Therefore, this thesis represents the first exploration of longitudinal relationships between religion, and mental health and wellbeing in a British population.

Before testing associations between religiosity, and mental health and wellbeing directly, the first step was to understand how religious practices and beliefs change across the life course (Chapter 4, page 118). A decline in religious observance was observed by comparing the proportion who reported a religious upbringing to the proportion reporting religious beliefs in adulthood. Partner beliefs and education were also found to positively associated with religiosity. These findings confirm previous work by Storm and Voas (2012), (Voas 2015) and (Voas and Ling 2010). A novel finding from this chapter was the gender differences in the relationship between partner's religious belief and on study members' religiosity. On the basis of these findings, there is scope for including religiosity variables in future research relating to partnership, and mental health and wellbeing. Furthermore, a U-shaped association in religious attendance was found across life, with an increase in the frequency of attendance found after the age of 60-64. This is the first time that this has been shown in a UK population and was only possible using the MRC National Survey of Health and Development. Previous research from the United States showed a strengthening of religious beliefs and an increase in attendance after

retirement (Glamser 1988). It is possible that the increase is reflective of increased social participation in older age, however this will need to be investigated in future research.

When investigating direct associations between religiosity and subsequent mental health and wellbeing, it was found that study members who frequently attended religious services had slightly higher wellbeing scores compared to those never attending. This is supported by previous research on religious attendance and wellbeing (Greenfield and Marks 2007, Lechner and Leopold 2015, Lim and Putnam 2010). Post-hoc analysis using the individual items from the wellbeing scale as outcome measures indicate that these associations are driven by increases in social aspects wellbeing such as 'feeling close to other people' (Appendix N, page 282). These findings could be useful for developing interventions aimed at improving wellbeing of older people.

Some aspects of religiosity such as frequency of prayer and how much religion provides meaning in life were associated with worse mental health. No other associations were found between religiosity variables across life and mental health and wellbeing. These findings were surprising, as previous research (Chapter 2, page 54) pointed towards a protective association between religiosity, and mental health and wellbeing. However, as previously mentioned, no research of this kind has been carried out in the UK and more research using other data sets is needed to confirm these findings. Despite no direct associations between religiosity, and mental health, using an auto-regressive cross-lagged model (a model which accounts for reciprocal relationships between two variables measured over several time-points) revealed that poor mental health predicts later religious attendance but not vice versa. The findings provide new evidence for the theory that religious attendance is triggered by stressful life events and utilised as a coping mechanism whilst taking into account the potential for reverse causality (Marks et al. 2005, VanderWeele et al. 2016).

The next step was to consider potential mediators between religiosity, and mental health and wellbeing. However, considering the relative lack of direct associations found,

Chapter 6 (page 167) focused on how psychological, social and lifestyle variables were associated with religiosity, and mental health and wellbeing and if any of these factors were confounders of the relationship between religiosity, and mental health and wellbeing. The factors identified as partial confounders between religiosity, mental health and wellbeing were mastery, agreeableness and social support. Notably, controlling for mastery revealed positive associations between some aspects of religiosity and wellbeing. In support of previous research, the analysis presented here suggests that pathways between religiosity, and mental health and wellbeing may be psychological and social in nature pathways (George et al. 2002, Koenig 2012, Levin 2009, Woźniak 2015). The final objective of this thesis was to investigate if religious practices and beliefs 1) were associated with stressful life events (SLEs) across the life course, and 2) moderated the association between SLEs, and mental health and wellbeing. Experiencing a higher number of SLEs was associated with stronger religious beliefs and more frequent religious attendance. This finding confirms previous research which also found that stressful experiences such as bereavement, natural disasters, and hospitalisations are associate with increases in religiosity (McIntosh et al. 2011, Wortmann and Park 2008).

Some aspects of religious beliefs and practices were found to moderate the association between SLEs, and mental health and wellbeing. However, a clear pattern of association was not found and so there is only a tentative confirmation of previous research on religion, stress, and mental health and wellbeing (Chen and Koenig 2006b, Chen and Koenig 2006a, Harrison et al. 2001). There were some methodological issues regarding the analysis used in this chapter which may explain some of the inconsistencies found. Future research designed specifically to address the question of whether religiosity moderates the impact of stress on mental health and wellbeing would help understand these findings better.

In summary, this thesis provides some insight into how religiosity is associated with mental health and wellbeing and lays the foundation for a range of future research avenues. It appears that religion is actively used as a coping mechanism in response to stress, with some evidence of success. However, no direct associations were found between religiosity and better mental health, which highlights the importance of conducting this research using a UK population rather than relying on studies from the USA. Furthermore, this thesis emphasises the importance of using positive measures of mental health in addition to measures of psychiatric morbidity.

8.2 Discussion of main findings

8.2.1 Religious practices and beliefs across the life course

The question of how religiosity changes across the life has been subject to much speculation. It was found that religious attendance decreases across the life course with an increase after the age of 60-64. It is possible that after retirement, study members begin or resume attending religious services because of an increase in free time or to substitute lost social connections from work (van Tilburg 1992). It has been suggested that people become more religious as they age, primarily due to being temporally closer to confronting concepts of death and the afterlife (Braam et al. 2006). Others have shown a decrease in religiosity in older age and evidence of disillusionment (Coleman et al. 2004), although it should be noted this research was conducted in a much older age group than NSHD.

Comparing the proportion of people who reported that religion is important or provides meaning at age 68-69 and religious beliefs at age 36 suggest a decline in religious beliefs. The prevalence of religious beliefs in adulthood and early old age is also substantially lower than the proportion of study members reporting a religious upbringing. As the measures of religious belief in NSHD are all worded differently and capture subtly different concepts, it is not possible to draw any strong conclusions from these findings.

Previous research on religious beliefs in the UK has demonstrated how the wording of questions about religious belief can significantly modify how people respond (Voas and Bruce 2004). It is also possible that the decrease in religiosity described in this thesis is an underestimation since study members with missing data were less likely to be religious than those who respond.

Some interesting gender interactions were found between the religious beliefs of study members' partners and their own religious practices and beliefs. The finding that having a religious partner is associated with more frequent religious practices and stronger religious beliefs is not particularly surprising and has been shown before (Storm and Voas 2012). However, having a partner with the same religious belief, compared to having no belief or a different belief was associated with more frequent religious practices and stronger religious beliefs but only for men. This finding suggests that women are perhaps more intrinsically religious than men, i.e. their beliefs and practices are not dependant on their partner's belief. An alternative explanation could be that religious men are more likely to choose a partner with the same religious beliefs as them than women.

Female study members were generally more religious than male study members, and educational attainment was positively associated with religious attendance. This association between education and religious attendance was not as strong for religious beliefs. There was some evidence that frequent religious attendance at age 60-64, and 68-69 was associated with employment status, with those in employment being less likely to attend religious services.

This is the first study to examine changes in religious attendance and beliefs across the life course. Findings from the 1970 British birth cohort also showed a decline in religiosity from age 16 to 34 and 42 which indicates that the decline in religiosity observed here is

perhaps present in younger, and more religiously and ethnically diverse cohorts (Voas 2015).

8.2.2 Religiosity, and mental health and wellbeing

There was little evidence that any measure of religiosity across the life course was associated with mental health at age 68-68 (Chapter 5, page 148). When looking at mental health at age 60-64 and subsequent religious practices and beliefs, religiosity was associated with worse mental health but not with wellbeing. Most of the longitudinal studies examining associations between religiosity and mental health report that more frequent attendance is associated with better mental health (Chapter 2, page 54). However, there are a couple of studies which found the opposite and debated the potential for bi-directional associations between religiosity and mental health or reverse causality (Maselko et al. 2012, VanderWeele 2013, Yeager et al. 2006). In order to address this question, an auto-regressive cross-lagged model was used to test reciprocal relationships between religious attendance and mental health over three waves of data collection (Chapter 5, page 158). The results from the cross-lagged model suggest that poor mental health is associated with subsequently more frequent religious attendance and that religious attendance is not associated with subsequent mental health. It was not possible to run similar analyses on religious beliefs, or frequency of prayer as there are currently not enough repeated measures of these variables available in NSHD.

The results suggest that the association between poor mental health and subsequent religious attendance may represent a method of religious coping. Previous research suggests several pathways through which religiosity may benefit mental health. In Chapter 6 (page 167) a range of psychological, social and lifestyle factors (mastery, conscientiousness, agreeableness, extraversion, neuroticism, positive social support, negative social support, and alcohol consumption) were associated with both religiosity

and mental health. Stepwise regression models provided evidence that these factors partially explained the associations between mental health and religiosity.

There was some evidence that very frequent religious attendance across the life course was associated with higher wellbeing at age 68-68; no associations were found for other measures of religiosity (Chapter 5, page 148). A possible reason for the association between religious attendance and wellbeing but not with other aspects of religiosity could be the social component accompanying religious attendance. This idea is supported by Lim and Putnam (2010) who found that the association between religious attendance and life satisfaction was completely attenuated by the number of friends in the congregation.

The role of social support in religiosity and wellbeing was explored further in Chapter 6 (page 167) where religious attendance was associated with more positive social support (men only). In turn, positive social support was strongly associated with higher wellbeing scores. Furthermore, this association was only found for religious attendance once a month or more at age 36, 43, 60-64 and 68-68 suggesting an accumulative effect on wellbeing. It is possible that the benefits to wellbeing from religious attendance arise from social relationships which are consistent over long periods of time. This concept is supported by previous research by Greenfield and Marks (2004) who reported that continuous volunteering in religious groups is associated with personal growth compared to non-continuous participation over a period of 5 years. Further analysis of religious attendance and the individual items of the Warwick Edinburgh Mental Wellbeing Scale showed particularly strong associations with items such as ‘feeling loved’, ‘feeling close to other people’, ‘feeling useful’ (Appendix N, page 282).

Mastery is another factor which was identified to be important in the association between religiosity and wellbeing (Chapter 6, page 167). Religiosity was associated with lower mastery scores, and low mastery scores were in turn associated with lower wellbeing.

By using stepwise regression models, it was found that mastery was suppressing positive associations between religiosity and wellbeing. A plausible explanation for this finding is that low mastery in people who are religious could be due to different control mechanisms such as divine or God-mediated control (Schieman 2008). Divine or God-mediated control is unmeasured in NSHD and therefore cannot be further investigated in NSHD.

8.2.3 Effect modification of stressful life events

In Chapter 7 (page 189) the hypothesis that religiosity is used as a coping mechanism in relation to SLEs was investigated. SLEs across the life course were associated with higher levels of religious attendance, stronger beliefs and more frequent prayer or meditation. There is, however, the possibility of reverse causality, e.g. being part of a religious group may increase exposure to social SLEs.

There is some evidence that some aspects of religiosity moderate the associations between SLEs, and mental health and wellbeing. However, the interactions reported did not appear to follow a consistent pattern. The strength of religious belief at age 26 moderated the association between social SLEs and mental health at age 68-69. Study members with who reported very strong religious beliefs had fewer symptoms of depression and anxiety at age 68-69 due to social SLEs compared to those reporting no religious beliefs at all. Similar effect modifications were found for the association between work SLEs and mental health by having a partner with the same religious belief, religion providing meaning in life and frequency of prayer. Frequent religious attendance across the life course was also found to moderate the deleterious effects of health SLEs on mental health. These findings suggest that different aspects of religiosity (beliefs, private practice and attendance) can have benefits for different types of SLEs.

Having a partner with the same religious beliefs compared to having a partner with no religious belief or a different religious belief was found to moderate the association

between social SLEs and poor wellbeing. Having a partner with no religious beliefs or different religious beliefs magnifies the associations between social SLEs and wellbeing compared to those with no partner. This finding may be related to the fact that the social SLE scale includes a number of items related to disagreements and stressors from partners and children (Lincoln 2000). It is likely that study members without a partner would therefore not be exposed to the consequences these stressors. Having a partner with the same belief was revealed to modify the association between social SLEs and wellbeing compared to a partner with no belief or a different belief. Prayer was also found to moderate associations between work SLEs and wellbeing.

Not all of these models followed the expected dose-response relationship, e.g. occasional prayer moderates the association between work SLEs and mental health but similar or stronger interactions were not found for regular or daily prayer. These mixed findings point towards more complex and non-linear relationship between religiosity and mental health and wellbeing. As discussed previously, there is potential for bi-directional associations between religiosity and mental health. Very frequent prayer could be a consequence of a high number of stressors and a consequence of mental distress, rather than a successful coping mechanism. There is also the possibility of negative religious coping where religious coping methods such as prayer can become dysfunctional, and are associated with poor mental health (Pargament et al. 2000).

8.3 Strengths

One of the major strengths of this thesis is that it utilises rich data from the National Survey of Health and Development, which has a representative sample of people born in Britain in 1946. Analyses using a longitudinal birth cohort study design with various measures of religiosity across the life course, a long period of follow up (up to 60 years), detailed information on mental health and wellbeing in mid and later life, and a comprehensive range of prospectively obtained covariates across the life course all contribute to the strength of this thesis.

The analyses presented here are the first study to examine longitudinal associations between religiosity, and mental health and wellbeing in a UK sample. The majority of previous research on this topic has been cross-sectional and based on populations in the USA. This thesis has also been able to consider different aspects of religiosity within the same cohort of people which allows a deeper understanding of how religiosity is related to mental health and wellbeing. For example, the question of how partner beliefs could be associated with mental health and wellbeing has never been considered before, and no other study has examined associations between religious upbringing, and mental health and wellbeing in early old age. The longitudinal data allowed an investigation of how religiosity in adulthood (relative to upbringing) were associated with mental health in wellbeing. The repeated measures of religious attendance and mental health at three time-points was ideally placed for a better understanding the reciprocal associations using an auto-regressive cross-lagged model, and the rich information available on potential psychosocial pathways highlight areas for future research. Furthermore, using data across the life course revealed that mid-life (age 36) appears to be a sensitive period for associations between religious attendance and higher wellbeing.

By having two primary outcome measures in mental health and wellbeing, this thesis can contribute with novel findings relating to the literature on religiosity and wellbeing. As outlined in Chapters 1 and 2, the clear majority of previous research focused on mental

health and the few that do investigate wellbeing use measures which have not been validated. By showing that there are differences in how religiosity is associated with mental health and wellbeing, this thesis offer insights into potential mechanisms and pathways.

Full information maximum likelihood was the method was used to include data from study members, who were missing data on exposures or covariates, but not on mental health or wellbeing at age 68-69. This method ensures that all data available are used to provide estimates and is preferable to the alternative of listwise deletion.

8.4 Limitations

A limitation of this thesis, which is common when using secondary data, is that there are variables which have not been measured which could be relevant to the study. More specific measures of religiosity, religious coping and God-mediated control could have strengthened the research presented. The measures of religiosity included may have issues relating to validity, reliability and social desirability (Voas 2014). There are inconsistencies in the wording of questions about religious beliefs across the life course with the frequency of religious attendance being the only consistently measured in NSHD. It is also not possible to know the extent of religious practices and beliefs across life outside of the time of measurement, e.g. frequent prayer or meditation at age 68-69 is likely to have occurred earlier in life which makes interpretation of causality in associations problematic. This study is not generalisable to religions other than Christianity or ethnicities other than White. As there is evidence that societal changes in religiosity are due to changes in successive cohorts, it is also not possible to generalise findings to younger cohorts.

Another limitation to consider is the theoretical perspective used to address the main research questions. The field of epidemiology uses a positivist paradigm, which at its heart assumes that all phenomena can be operationalised and objectively measured

(Gray 2004). This approach may not be so easily applied to the study of religion and health. As religion is inherently a social construct, and subjective, with interpretation and meaning varying from person to person, it could be argued that it is impossible to objectively measure religiosity using a survey methodology. An alternative would be to use a phenomenological paradigm where theories are constructed from qualitative data and focuses on meaning. Despite the challenges in measurement, there are some aspect of religion that can be more easily quantified, such as frequency of religious attendance, and that epidemiology can provide insights into the role of religion in health and in fact be complementary to phenomenological based studies (Van Ness 2003, Voas 2014). Missing data is a common problem in longitudinal studies. One of the problems which can arise from missing data is the potentially biased estimates and reduced statistical power. In this thesis, it was found that religious study members were less likely to have missing data compared those who were not religious. It is possible that this difference in response rate is related to personality measures such as agreeableness and conscientiousness which are positively associated with religiosity (Chapter 6, page 167). Another possible reason for this difference in response rate is survivor effects. Religiosity has previously been associated with lower mortality rates, suicide, cardiovascular disease and cancer and so we could expect the study members of NSHD to be more religious than those who have died (Chida et al. 2009). Other studies suggest that people with worse mental health are more likely to stop attending religious services (Maselko et al. 2012, Regnerus and Smith 2005). If this is true, then the health of the sample of study members attending religious services may be overestimated. These factors combined can inflate the association between religiosity, and mental health and wellbeing.

8.5 Future research

This was the first study of its kind, with the primary aim to understand how religiosity was related to mental health and wellbeing in the oldest and longest running of the British

birth cohort studies. Different aspects of religiosity across the life course were used employing various analytical models. However, it is very likely that religious practices and beliefs correlate and cluster together. For example, Voas (2015) highlighted seven different types of religiosity based on different religious affiliation, beliefs in god, belief in life after death and religious attendance. Clustering methods could be achieved using data-driven methods such as latent class analysis or principal component analysis. These method have generally used in establishing clusters of risk factors such as lifestyle or sociodemographic factors but could be applied for use in research on religion (Conry et al. 2011, Vermeulen-Smit et al. 2015). Furthermore, more complex analyses such as growth curve modelling identifying longitudinal trajectories of religiosity across life, could offer further insights into how religion may be related to health in older age. Capturing religiosity from early childhood, and focusing on life course trajectories of religious beliefs, practices and mental health could also be explored in relation to other health outcomes such as the ascertainment of clinically significant cognitive decline, functional impairment and neurodegeneration.

Future research which utilises cross-cohort data could help understand age, period and cohort effects of changing religious practices and beliefs and their associations with mental health and wellbeing. An added benefit and challenge of using data from younger cohorts is their increasing religious and ethnic diversity. Research comparing different religions and interactions with ethnicity would build upon the research presented in this thesis. Recently, NSHD has become part of CLOSER (Cohort & Longitudinal Studies Enhancement Resources) and Dementias Platform UK (DPUK), which aim to maximise the use, value and impact of the UK's longitudinal studies. Therefore, these new ventures present further opportunities for big data investigations between religiosity and mental health using cross-cohort data. Other cohorts may offer extra opportunities for exploring different aspects of data on religion using a multidisciplinary approach across disciplines from societal opportunities and barriers, through behavioural choices and stigma, to

underlying biological regulation from genes, endocrine systems, inflammatory mechanisms, and autonomic control.

As we found that associations with religiosity differed with mental health and wellbeing religiosity, a prospect for future research could be to use a combined measure of mental health and wellbeing in line with the theory of flourishing and languishing outlined by Keyes (2007). This approach has been taken before by Hatch et al. (2010) who investigated a range of developmental and contextual factors in relation to Keyes model of flourishing and languishing. A natural step forward from this thesis would be to apply this methodology using religious factors across the life course and their associations with flourishing and languishing. .

There was some evidence that religiosity moderates the associations between stress, and mental health and wellbeing. Religiosity has also been shown to be associated with a lower mortality rate (Chida et al. 2009). The mechanisms underlying the associations between religiosity and mental health could be further explored by examining the mechanistic pathways and biological markers of stress such as cortisol levels, hypothalamic-pituitary-adrenal axis functioning, or measures of cardiovascular health such as blood pressure. The main aim of the NSHD during childhood was to investigate how the environment at home and school affected physical and mental development and educational attainment. However, over recent years and waves of data collection, the overall aim has shifted towards investigating how lifetime social circumstances affected health and function with age. Moreover, new waves of recent clinical data could provide new opportunities for further examinations between lifetime religiosity and subsequent health, employing biomarkers and clinical diagnosis of depression.

As discussed in the limitations, another useful avenue for future research could be to employ a phenomenological perspective through the use of qualitative studies. This thesis highlights several associations between religion and health and qualitative studies would be able to provide further insights into the potential mechanisms.

8.6 Implications of findings

This thesis highlights the lack of evidence on the relationships between religiosity and mental health and wellbeing in the UK. As some evidence was found that religiosity may be a useful coping strategy for stressful life events, this thesis could have implications for an increasingly secularised society. The prevalence of common mental disorders in the UK has been increasing over the past 30 years. There are several explanations for this increase such as increased awareness and reduced stigma of mental health problems and reduced social cohesiveness. It is also possible that increased secularisation results in diminished personal and social resources to cope with stress. Future research should aim to delineate the social and collective aspects of religious practices from private aspects which will improve understanding of the mechanisms involved and lead towards better-targeted interventions.

Religious institutions can offer social, psychological support in times of distress by providing hope, meaning and someone to talk to (Marks et al. 2005). While it is not appropriate or reasonable to advocate joining a religious group or taking up religious practices for those who identify as not religious, further research using more in-depth measures into the mechanisms of how religion impacts mental health could identify areas for intervention development. This has already been observed in recent years with the vast amount of research on the efficacy of practices such as mindfulness, meditation and yoga. These practices, which have their roots in eastern religious practice, are actively encouraged in a secularised from by the NHS as a self-help treatment for depression and anxiety. Similar research on specific aspects of religiosity such as gratitude, forgiveness and compassion have demonstrated some beneficial associations with mental health and wellbeing (Baetz and Toews 2009).

For those who do consider themselves religious, this thesis supports the application of religious-based therapies. One of the main findings of this thesis was that study members with poor mental health are more likely to subsequently attended religious services. A

practical response would be to ensure that religious leaders have the skills and capability to support people in distress. This is not a novel concept as religiously integrated cognitive behavioural therapies have already been developed for Christianity, Judaism, Islam, Buddhism and Hinduism (Pearce et al. 2015).

8.7 Conclusions

This thesis finds evidence that religiosity may be a coping mechanism for stressful life events and psychological distress and that frequent religious attendance may foster a sense of wellbeing through social connections. These findings highlight the importance of researching the role of religiosity in mental health and wellbeing, particularly in light of the scarcity of research in the UK.

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Yeager, D. M., D. A. Glei, M. Au, H.-S. Lin, R. P. Sloan and M. Weinstein (2006). "Religious involvement and health outcomes among older persons in Taiwan." Social Science & Medicine **63**(8): 2228-2241.

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Appendix A: Search strategy for Ovid (Medline and PsychInfo)

Database: Ovid MEDLINE(R) Daily Update <March 18, 2015>, Ovid OLDMEDLINE(R) <1946 to 1965>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

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1 exp Religion/ (49673)
2 exp "Religion and Medicine"/ (10198)
3 Religio$.mp. (48921)
4 Religious belie$.mp. (2042)
5 exp Spirituality/ (5124)
6 exp Spiritualism/ (456)
7 Spiritu$.mp. (13639)
8 exp Depression/ (79448)
9 Depress$.mp. (403896)
10 exp Anxiety/ or exp Anxiety Disorders/ (123214)
11 Anxi$.mp. (166453)
12 exp Mental Disorders/ (971438)
13 Depressive Disorder/ (59050)
14 CMD.mp. (1411)
15 Common Mental Disorder.mp. (290)
16 Mental health.mp. or exp Mental Health/ (120588)
17 Quality of Life.mp. or exp "Quality of Life"/ (208541)
18 QoL.mp. (21255)
19 well being.mp. (42995)
20 well-being.mp. (42995)
21 wellbeing.mp. (6397)
22 exp Health Status/ (108666)
23 personal satisfaction.mp. or exp Personal Satisfaction/ (12020)
24 life satisfaction.mp. (4399)
25 Yoga.mp. or exp Yoga/ (2686)
26 meditation.mp. or exp Meditation/ (3364)
27 mindfulness.mp. or exp Mindfulness/ (2263)
28 Tai chi.mp. or exp Tai Ji/ (1024)
29 church.mp. or exp "Church of Jesus Christ of Latter-day Saints"/ (4403)
30 Temple.mp. (1306)
31 Mandir.mp. (3)
32 Mosque.mp. (84)
33 Chapel.mp. (784)

34 Synagogue.mp. (24)

35 (Religion or "Religion and Medicine" or Religio$ or Religious belie$ or Spirituality or Spiritualism or Spiritu$ or (Yoga or Yoga) or (meditation or Meditation) or (mindfulness or Mindfulness) or (Tai chi or Tai Ji) or (church or "Church of Jesus Christ of Latter-day Saints") or Temple or Mandir or Mosque or Chapel or Synagogue).tw. (44500)

36 (Depression or Depress$ or (Anxiety or Anxiety Disorders) or Anxi$ or Mental Disorders or Depressive Disorder or CMD or Common Mental Disorder or (Mental health or Mental Health) or (Quality of Life or "Quality of Life") or QoL or well being or well-being or wellbeing or Health Status or (personal satisfaction or Personal Satisfaction) or life satisfaction).tw. (679947)

37 exp Cohort Studies/ (1408046)

38 cohort$.mp. (376247)

39 epidemiological methods/ (29757)

40 exp Longitudinal Studies/ (89266)

41 exp Follow-Up Studies/ (510246)

42 exp Prospective Studies/ (382075)

43 37 or 38 or 39 or 40 or 41 or 42 (1561574)

44 representative sample.mp. (16960)

45 population study.mp. (4775)

46 representative population.mp. (1601)

47 survey.mp. (342111)

48 community study.mp. (1256)

49 community.mp. (367738)

50 sample.mp. (535198)

51 44 or 45 or 46 or 47 or 48 or 49 or 50 (1134474)

52 cancer.tw. (1100654)

53 terminally ill.tw. (4306)

54 stroke.tw. (154354)

55 52 or 53 or 54 (1253784)

56 35 and 36 and 43 and 51 (383)

57 Patients/ (16160)

58 patient$.mp. (5079867)

59 exp Terminal Care/ or terminal$.mp. (435369)

60 52 or 53 or 54 or 57 or 58 or 59 (6091975)

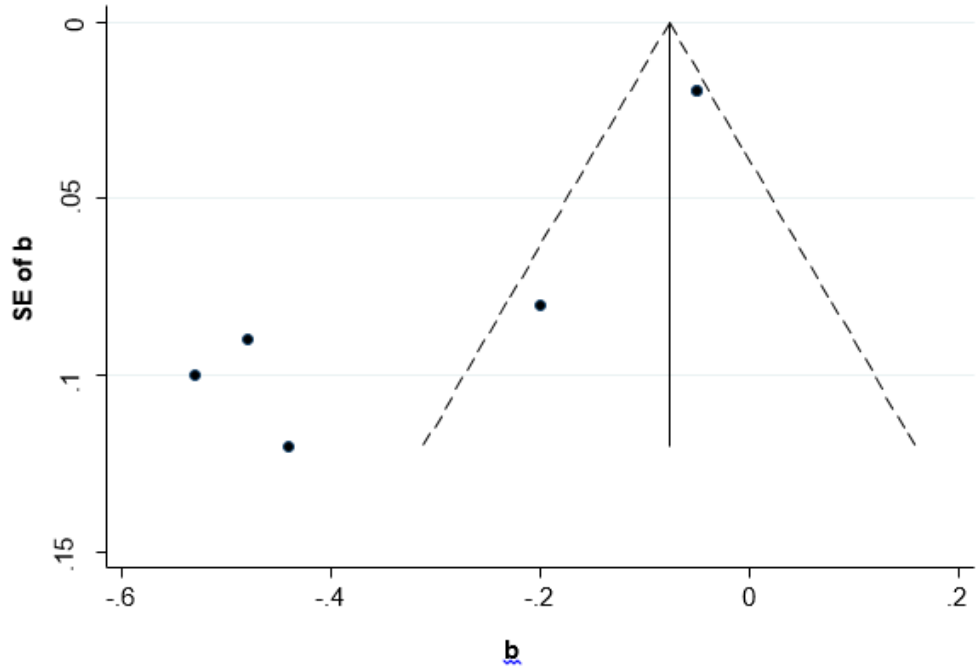
61 56 not 60 (187)

62 limit 61 to (english language and yr="1990 -Current" and ("all adult (19 plus years)" or "young adult (19 to 24 years)" or "adult (19 to 44 years)" or "young adult and adult (19-24 and 19-44)" or "middle age (45 to 64 years)" or "middle aged (45 plus years)" or "all aged (65 and over)" or "aged (80 and over)") and humans) (151)

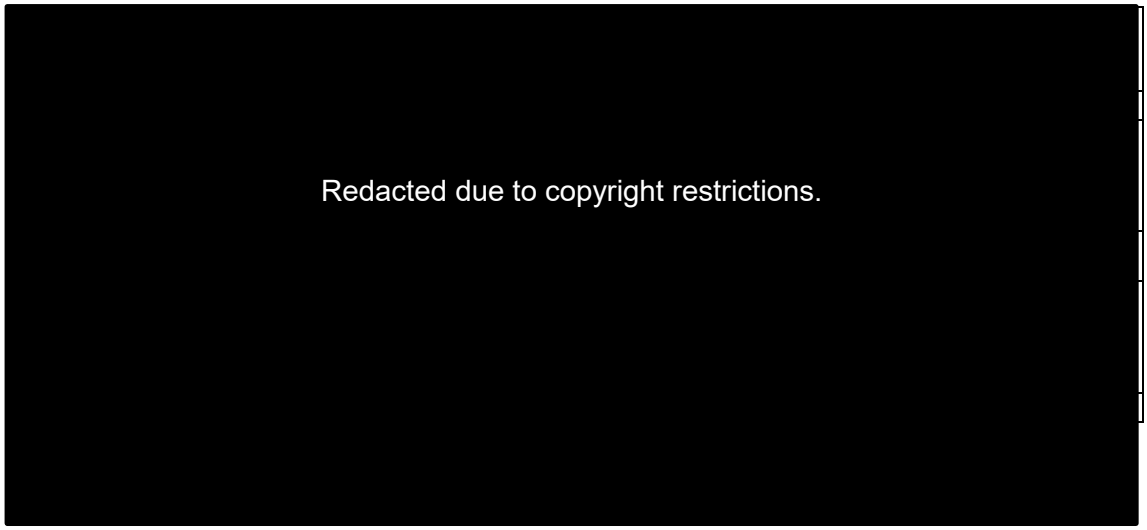
Appendix B: Search strategy for Web of Knowledge

# 1	**Approximately 903,208**	TI= (depress* OR anxi* OR mental disorder OR CMD OR mental health OR quality of life OR QOL OR well being OR well-being OR wellbeing OR personal satisfaction OR life satisfaction) *Timespan=All years*
# 2	**Approximately 279,332**	TI= (religio* OR religious belie* OR spiritu* OR yoga OR medita* OR mindful* OR tai chi OR tai ji OR church OR chapel OR temple OR mandir OR mosque OR synagogue) *Timespan=All years* *Search language=Auto*
# 3	**Approximately 6,550**	#2 AND #1 *Timespan=All years* *Search language=Auto*
# 4	**Approximately 3,141,448**	TI= (cohort study OR cohort* OR longitudinal OR follow-up OR follow up OR prospective OR representative sample OR population study OR survey OR community OR sample) *Timespan=All years* *Search language=Auto*
# 5	**195**	#4 AND #3 *Timespan=All years* *Search language=Auto*
# 6	**132**	#4 AND #3 **Refined by: RESEARCH DOMAINS:** (SOCIAL SCIENCES) AND **Databases:** (WOS) *Timespan=All years* *Search language=Auto*

Appendix C: Funnel plot of studies included in the meta-analysis



Appendix D: 28-item General Health Questionnaire


Redacted due to copyright restrictions.

Appendix E: Pearlin's Mastery Scale

The following are statements that people use to describe themselves. Think about how well the following statements describe you.

Please circle one number in each row that best describes how strongly you agree or disagree with the statement.

	Strongly disagree	disagree	Agree	Strongly agree
a. I can do just about anything I really set my mind to do	1	2	3	4
b. What happens to me in the future mostly depends on me	1	2	3	4
c. There is really no way I can solve some of the problems I have*	1	2	3	4
d. Sometimes I feel that I'm being pushed around in life*	1	2	3	4
e. I have little control over the things that happen to me*	1	2	3	4
f. I often feel helpless in dealing with the problems of life*	1	2	3	4
g. There is little I can do to change many of the important things in my life*	1	2	3	4

*Items which are reverse coded

Appendix F: Neuroticism questionnaire

Appendix G: Extraversion, agreeableness and conscientiousness questionnaire

The following statements are different ways people may describe themselves. Please circle the number next to each statement to indicate how accurately it describes you.

Appendix H: Consumption scale of the AUDIT

In the past year….

Questions	0	1	2	3	4
How often do you have a drink containing alcohol?	Never or never but have drunk alcohol in the past	Monthly or less	2-4 times per month	2-3 times per week	4 or more times per week
How many units of alcohol do you drink on a typical day when you are drinking?	1 or 2	3 or 4	5 or 6	7, 8 or 9	10 or more
How often have you had 6 or more on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily

Appendix I: Coding of stressful life events

SLE	Description	Value labels
Social		
Parental divorce "Parental divorce before SM 15	Age at which parents divorced (history variable under age 26)	16/88 (no divorce under 26)=0 0-15yrs = 1 (yes)
Parental death Derived from **Mother death "Mother died before SM age 15"** **Father death "Father died before SM age 15"**	Any parent died by 1966 Date of mother's death, Mortality, 1966 H2 (20) Date of father's death, Mortality, 1966 H2 (20)	No=0 Yes=1 -9599 Living= 0 45/62= 1 -9699= Missing data -9999 Unknown (blank rubric card)
Moving school 6-15	School moves 6-15 years, 1961 List extracted for DES, Education	-9989 Unknown (blank rubric card) -9999 Unknown (same) 0= No move, 1 Move - no change school or LEA, 9= Children in special school 1= 2 Move - change school not LEA 3 Move - change LEA not school 4 Move - change LEA and school
Moving house> 13	How many times SM had moved within G.B. between 1946-1959, 1946-72 Spatial Mobility Extraction sheet, Other socioeconomic circumstances	0 None. See note to TOTMOV48 1/8=1 9 No information
Maternal separation < age 6	Longest time separated from mother up to age 6 years. Social support or life events.	-9799= Regular or permanent separation -9899= unknown -9999= unknown 0 "sep<4wks" 1 "sep4+wks"
Father ill	Events - Ill fathers - date (grouped) of each illness of father. 1961, Derived Parents' illness list, Social support or life events	-9899 Unknown 0 = March 1946 or earlier +- 9999 Father never ill 1-9 (Rest of 1946/-61) =1
Mother ill	Same as Father ill	Same
Natural sibling death before 26 years	Do you have any brothers or sisters who are now dead?	No=0 Yes=1
Family crisis at 36 years	In the last year have there been any crises in your own family, or in others close to you? (in the last year)	No=0 Yes=1

SLE	Description	Value labels
Spousal disagreement at 43 years	Have you ever had any serious disagreements with your spouse/partner or felt betrayed or disappointed by him/her	No=0 Yes=1 No partner=0
Spousal disagreement at 53 years	Have you had any serious disagreements with your spouse/partner or felt betrayed or disappointed by them?	No=0 Yes=1 No partner=0
Spousal disagreement at 60-64 years	Have you had any serious disagreements with your spouse/partner or felt betrayed or disappointed by them in the last 12 months?	No=0 Yes=1 No partner=0
Friend or relation (not spouse or child) ill at 53 years	Has a friend or relative (other than your spouse/partner or children) or someone you know well had a serious accident or illness or received a serious injury?	No=0 No friends or relatives=0 Yes=1
Friend or relation (not spouse or child) ill at 60-64 years	Has a friend or relative (other than your spouse/partner or children) or someone you know well had a serious accident or illness or received a serious injury in the last 12 months?	No=0 Yes=1
Friend or relation died at 36 years	Has a relation or friend or someone you know well died during the last year?	No=0 Yes=1
Friend or relative died at 43 years	Has a friend or relative or someone you know well died during the last year?	No=0 Yes=1
Friend or relative died at 53 years	Has a friend or relative or someone you know well died during the last 12 months?	No=0 Yes=1 No friends or relatives=0
Friend or relative (not spouse or child) died at 60-64 years	Has a friend or relative (other than your spouse/partner or children) or someone you know well died in the last 12 months?	No=0 Yes=1
Friend or relation divorced or separated at 36 years	Has a relation or friend or someone you know well been separated or divorced in the last year?	No=0 Yes=1
Disagreement with friend or relative at 53 years	Have you fallen out or had a serious disagreement with a friend or relative or felt betrayed by them?	No=0 Yes=1 No friends or relatives=0
Disagreement with friend or relative at 60-64 years	Have you fallen out or had a serious disagreement with a friend or relative (other than your spouse/partner or children) or someone you know well or felt betrayed by them in the last 12 months?	No=0 Yes=1

SLE	Description	Value labels
Lost contact with close friend or relative at 43 years	Have you lost contact with a close friend or relative for any other reason?	No=0 Yes=1
Lost contact with close friend or relative at 53 years	Have you lost contact with a close friend or relative for any other reason?	No=0 Yes=1 No friends or relatives=0
Lost contact with close friend or relative at 60-64 years	Have you lost contact with a close friend or relative (other than your spouse/partner or children) for any other reason in the last 12 months?	No=0 Yes=1
Moved house at 43 years	Have you moved house in the last year?	No=0 Yes=1
Moved house at 53 years	Have you moved house in the last 12 months?	No=0 Yes=1
Moved house at 60-64 years	Have you moved house in the last 12 months?	No=0 Yes=1
Children dead at 36 years	"Have you ever had any children who have died?"	No=0 Yes=1
Marital status at 68-69 years	So are you currently 1. single, that is never married 2. Married & living with husband/wife 3. Married & separated from husband/wife 4. Divorced 5. Widowed 6. Civil partnership	Married=0 Single=0 Divorced=1 Separated=1 Widowed=1
Spouse accident at 43 years	During the last year, has your spouse/partner had a serious accident or illness, or received a serious injury, or been assaulted.	No=0 Yes=1 No partner=0
Spouse accident at 53 years	During the last 12 months has your spouse/partner had a serious accident or illness, or received a serious injury, or been assaulted?	No=0 Yes=1 No partner=0
Spouse accident at 60-64 years	Has your spouse/partner had a serious accident or illness, or received a serious injury, or been assaulted in the last 12 months?	No=0 Yes=1 No partner=0
Children difficulty at 43 years	In the last year have you had any serious difficulties with any of your children, because of their health or behaviour or for other reasons?	No=0 Yes=1 No children=0

SLE	Description	Value labels
Children difficulty at 53 years	In the last 12 months have you had any serious difficulties with any of your children, because of their health or behaviour or for other reasons?	No=0 Yes=1 No children=0
Children difficulty at 60-64 years	Have you had any serious difficulties with any of your children, because of their health or behaviour or for other reasons in the last 12 months?	No=0 Yes=1 No children=0
Victim of robbery at 36 years	Have you been burgled or robbed in the last year?	No=0 Yes=1
Victim of robbery at 43 years	Have you been assaulted or robbed (or a victim of attempted robbery)?	No=0 Yes=1
Victim of robbery at 53 years	Have you been assaulted, robbed or been a victim of attempted robbery?	No=0 Yes=1
Victim of robbery at 60-64 years	Have you been assaulted, robbed or been a victim of attempted robbery in the last 12 months?	No=0 Yes=1
Health		
Illness 0-5	Illnesses of age 0 - 60 months (original 3 digit ICD codes reduced to classes 1-31) (age 5).	No=0 Yes=1
Illness 5-11	Illnesses of age 61-131 months (original 3 digit ICD codes reduced to classes 1-31) (age 11).	No=0 Yes=1
Illness 11-15	Illnesses of age 132-180 months (original 3 digit ICD codes reduced to classes 1-31) (age 15).	No=0 Yes=1
Accident 1989	In the last year have you had an accident or received an injury which has affected you for a month or more? Social support or life events?	No=0 Yes=1 Missing = 9
Accident 1999	Have you had an accident or received an injury which has affected you for a month or more?	No=0 Yes=1 Missing = 9
Accident 2009	Have you had an accident or received an injury that has affected you for a month or more in the last 12 months?	No=0 Yes=1 Missing= 9=.\7=.
1972 aged 26	“Have you had any accidents since we last heard from you? “ Disability resulting from accident 1-16 at	No disability or minor=0 Yes=1
Illnesses 15-20 years	Illnesses of age 181-240 months (original 3 digit ICD codes reduced to classes 1-31)	No =0 Yes = 1/31

SLE	Description	Value labels
1971 20-25 years	Illnesses of age 241-300 months (original 3 digit ICD codes reduced to classes 1-31)	No =0 Yes = 1/31
Illness 1989	In the last year have you developed or found out you have a serious illness or handicap?	No=0 Yes=1
Illness 1999	During the last 12 months have you developed, or found out that you have, a serious illness or disability?	No=0 Yes=1
Illness 2009	Have you developed, or found out that you have, a serious illness or disability in the last 12 months?	No=0 Yes=1
Jobs		
Spouse lost job (or thought)	During the last year has your spouse/partner lost his/her job or thought s/he might lose job?	No=0 Yes=1 No partner=0
Spouse lost job (or thought)	Has your spouse/partner lost their job or thought they would soon lose their job in the last 12 months?	No=0 Yes=1 No partner=0
Spouse lost job (or thought)	Has your spouse/partner lost their job or thought they would soon lose their job in the last 12 months?	No=0 Yes=1 No partner=0
Redundancy reason for retirement	First reason for retirement: Made redundant 2006-2010 Occupational Status & Retirement Class Data	No=0 Yes=1
Lost job (or thought)	In the last year have you lost your job or thought you would soon lose your job?	No=0 Yes=1
Lost job (or thought)	In the last year have you lost your job or thought you would soon lose your job?	No=0 Yes=1
Lost job (or thought)	In the last year have you lost your job or thought you would soon lose your job?	No=0 Yes=1
Spouse work crisis	In the last year has your spouse/partner had any other crises or serious disappointments in his/her work?	No=0 Yes=1 No partner=0
Spouse work crisis	Has your spouse/partner had any other crises or serious disappointments in their work in the last 12 months? 96j	No=0 Yes=1 No partner=0
Spouse work crisis	Has your spouse/partner had any other crises or serious disappointments in their work in the last 12 months?	No=0 Yes=1 No partner=0
Work crisis	Have you had any crises or particular disappointments in your work in the last year?	No=0 Yes=1

SLE	Description	Value labels
Work crisis	In the last year have you had any other crises or serious disappointments in your work or career in general?	No=0 Yes=1
Work crisis	In the last year have you had any other crises or serious disappointments in your work or career in general?	No=0 Yes=1
Work crisis	Have you had any crises or serious disappointments in your work or career in general in the last 12 months?	No=0 Yes=1

Appendix J: Missing data summary

Variable	GHQ-28 at age 68-69 (n=2125)		WEMWBS at age 68-69 (n=2402)	
	n	%	n	%
Religious upbringing				
Sunday school attendance at age 11	1878	88.4	2125	88.5
Religious upbringing reported at age 36	1933	91.0	2125	88.5
Effect of upbringing on life at age 36	1894	89.1	2079	86.6
Denomination of religious upbringing reported at age 26	1917	90.2	2152	89.6
Denomination of religious upbringing reported at age 36	1933	91.0	2124	88.4
Religious beliefs				
Strength of belief at age 26	1909	89.8	2144	89.3
Religious belief at age 36	1885	88.7	2075	86.4
Denomination at age 36	1903	89.6	2087	86.9
Importance of religious belief at age 68-69	1929	90.8	2359	98.2
How much religion provides meaning in life at age 68-69	1928	90.7	2360	98.3
Partners beliefs				
Strength of partner belief at age 26	1899	89.4	2128	88.6
Same or different from study member at age 36	1818	85.6	2002	83.3
Religious practice				
Age 36	1916	90.2	2104	87.6
Age 43	2005	94.4	2187	91.0
Age 60-64	1853	87.2	2054	85.5
Age 68-69	1919	90.3	2352	97.9
Sum attendance (has data at age 36, 43, 60-64 and 68-69)	1540	72.5	1770	73.7
Frequency of prayer at age 68-69	1931	90.9	2362	98.3
Socio-economic variables				
Gender	2125	100	2402	100
Education at age 26	2013	94.7	2272	94.6
Social class at age 53 (imputed from age 43, 36 or 26 if missing)	2114	99.5	2369	98.6
Work status at age 60-64	1857	87.4	2060	85.8
Work status at age 68-69	1919	90.3	2348	97.8
Children in household at age 36	1933	90.9	2125	88.5
Children in household at age 43	2012	94.7	2195	91.4
Mother's education at age 6	1889	88.9	2140	89.1
Father's social class at age 4	1875	88.2	2122	88.3
Psychological, social and lifestyle variables				
Neuroticism at age 26	1918	90.3	2154	89.7
Extraversion at age 68-69	1848	87.0	2268	94.4

Variable	GHQ-28 at age 68-69 (n=2125)		WEMWBS at age 68-69 (n=2402)	
Agreeableness at age 68-69	1873	88.1	2287	95.2
Conscientiousness at age 68-69	1811	85.2	2219	92.4
Mastery at age 68-69	1875	88.2	2305	96.0
Negative social support at age 68-69	1893	89.1	2317	96.5
Positive social support at age 68-69	1906	89.7	2329	97.0
Loneliness at age 68-69	1920	90.4	2348	97.8
AUDIT at age 68-69	2107	99.2	1932	80.4
Stressful life events				
Stressful life events (total)	1107	52.1	1213	50.5
Stressful life events (social)	1310	61.6	1433	59.7
Stressful life events (health)	1507	70.9	1566	65.2
Stressful life events (work)	1407	66.2	1545	64.3

Appendix K: Religious upbringing had an effect on life free-text

Free-text response at age 26	Religious upbringing	No religious upbringing	Total
1. No belief now	2	1	3
2. More aware of other people and one's conduct with others	49	3	52
3. Feels would be more settled in life if I had more religious guidance	0	2	2
4. Does not enforce children in any religious beliefs	1	2	3
5. Encourages children in religious beliefs	19	0	19
6. Life would be too materialistic without it	3	0	3
7. Gives certain standards, principles and values – controls moral behaviour/conscience	202	2	204
8. Likes to help people in a day to day life	6	0	6
9. Gives purpose – outlook on life	11	0	11
10. Gives strength in life- character	6	3	9
11. Emotional uncertainty	0	1	1
12. Religious families are more close-knit/happy/relaxed	10	1	11
13. Made me a free agent	0	5	5
14. Feels guarded/uncertain about religion as a result	2	0	2
15. Affects way brings up own children (work) experience	17	3	20
16. General outlook on life	61	0	62
17. Comfort and strength (on relative's death) and in crises in own life	17	0	17
18. Humanitarian way of life	2	0	2
19. Rediscover belief later in life	3	0	3
20. Increased tolerance	8	0	8
21. More responsibility	3	0	3
22. Reacts against it (by being pleasure seeking)	7	0	7
23. Social value (personal contact) of church	2	0	2
24. (Goes to church regularly) – sticks to belief	8	0	8
25. Does not bring children up to believe	1	0	1
26. Does not oblige children to go to Sunday school	1	0	1
27. Married a Catholic and engagement was a strain	1	0	1
28. Made life more conservative	1	0	1
29. Broadminded – less conservative	0	3	3
30. Avoid strictness of own religious upbringing	4	1	5
31. Stabilising influence	5	1	6
32. Security	10	0	10
33. Vulnerability	3	0	3
34. Helped me form my personality	6	0	6
35. Respect	9	1	10
36. Belief prevents divorce	0	0	0
37. Acquired belief	0	2	2
38. Anti-Catholic	1	0	1
39. Greater spiritual awareness	1	0	1
Total	482	31	513

Appendix L: Bi-variate associations between SES and religiosity

n=1111	**Sunday school attendance at age 11[1]** • No • Yes	**Strength of belief at age 26[2]** • None • Little • Moderate • Strong	**Religious upbringing reported at age 36[1]** • No • Yes	**Effect of upbringing on life at age 36 [1]** • No • Yes
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Gender				
Male	1.0	1.0	1.0	1.0
Female	**1.7 (1.3,2.4)**	**1.4 (1.1,1.8)**	**1.5 (1.1,2.0)**	1.1 (0.9,1.5)
Education				
No qualifications	1.0	1.0	1.0	1.0
O-levels	**1.7 (1.2,2.5)**	**1.5 (1.1,2.0)**	**2.2 (1.5,3.2)**	**1.8 (1.3,2.4)**
A-levels	**2.7 (1.8,4.0)**	**1.4 (1.1,1.9)**	**3.1 (2.1,4.7)**	**3.5 (2.5,4.8)**
Higher education	**3.7 (1.9,7.0)**	1.0 (0.7,1.4)	**2.1 (1.3,3.5)**	**4.0 (2.6,6.2)**
Social class at age 53				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	2.0 (0.8,5.1)	1.4 ()	1.3 (05,3.5)	1.0 (0.4,2.3)
Skilled (manual)	2.1 (0.9,4.8)	1.0 (0.5,2.1)	1.1 (0.5,2.6)	0.9 (0.4,1.9)
Skilled (non-manual)	**2.8 (1.1,6.6)**	1.4 (0.7,2.9)	1.7 (0.7,4.3)	0.9 (0.4,1.9)
Intermediate	**2.7 (1.2,6.1)**	1.4 (0.7,2.7)	2.0 (0.9,4.8)	1.7 (0.8,3.7)
Professional	**4.4 (1.7,11.3)**	1.7 (0.8,3.5)	2.0 (0.8,5.0)	2.3 (1.0,5.2)
Mothers education				
Primary	1.0	1.0	1.0	1.0
Secondary	**1.8 (1.1,3.0)**	1.1 (0.8,1.5)	**2.1 (1.3,3.4)**	**1.7 (1.2,2.4)**
Tech course diploma	**2.3 (1.4,3.6)**	1.2 (0.9,1.6)	**1.7 (1.1,2.6)**	**2.6 (1.9,3.6)**
Degree	1.7 (0.9,3.5)	1.0 (0.6,1.6)	1.2 (0.6,2.1)	**4.4 (2.5,7.6)**
Father's social class				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	1.0 (0.5,2.1)	1.5 (0.9,2.6)	**2.0 (1.1,3.7)**	1.6 (0.9,3.0)
Skilled (manual)	1.0 (0.5,1.9)	1.2 (0.7,2.0)	**1.9 (1.1,3.5)**	1.7 (0.9,3.1)
Skilled (non-manual)	1.8 (0.9,3.7)	**1.8 (1.0,3.0)**	**3.0 (1.6,5.7)**	**3.0 (0.6,5.5)**
Intermediate	2.0 (0.9,4.2)	1.5 (0.9,2.5)	**2.1 (1.1,4.1)**	**2.9 (1.5,5.4)**
Professional	**3.1 (1.1,8.7)**	1.7 (0.9,3.1)	**3.2 (1.3,7.5)**	**5.6 (2.6,11.9)**

[1] Logistic regression
[2] Ordered logistic regression
OR=Odds ratio; CI=Confidence intervals

n=1111	**Same (not religious)**	**Same (religious)**	**Religious to not religious**	**Not religious to religious**
	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)	RRR (95% CI)
Gender				
Male	1.0	Base outcome	1.0	1.0
Female	**0.5 (0.3,0.7)**		**0.6 (0.4,0.7)**	**1.0 (0.6,1.6)**
Education				
No qualifications	1.0	Base outcome	1.0	1.0
O-levels	**0.4 (0.3,0.7)**		0.9 (0.6,1.4)	**0.4 (0.2,0.8)**
A-levels	**0.3 (0.2,0.5)**		1.1 (0.8,1.7)	**0.4 (0.2,0.7)**
Higher education	**0.5 (0.3,1.0)**		1.1 (0.7,1.9)	**0.4 (0.2,0.9)**
Social class at age 53				
Unskilled	1.0	Base outcome	1.0	1.0
Partly skilled	1.1 (0.3,3.9)		1.4 (0.4,4.3)	0.5 (0.1,2.1)
Skilled (manual)	1.2 (0.4,3.7)		0.9 (0.3,2.7)	0.7 (0.2,2.1)
Skilled (non-manual)	0.8 (0.2,2.8)		1.2 (0.4,3.5)	0.4 (0.1,1.4)
Intermediate	0.7 (0.2,2.1)		1.0 (0.4,2.8)	0.3 (0.1,1.0)
Professional	0.7 (0.2,2.4)		0.8 (0.3,2.5)	0.3 (0.7,1.1)
Mothers education				
Primary	1.0	Base outcome	1.0	1.0
Secondary	**0.5 (0.3,0.9)**		1.3 (0.9,2.0)	0.5 (0.2,1.2)
Tech course diploma	**0.6 (0.3,0.9)**		1.3 (0.9,2.0)	0.8 (0.4,1.5)
Degree	0.7 (0.3,1.5)		1.0 (0.5,1.9)	1.3 (0.5,3.0)
Father's social class				
Unskilled	1.0	Base outcome	1.0	1.0
Partly skilled	**0.4 (0.2,0.9)**		0.7 (0.3,1.5)	0.5 (0.2,1.5)
Skilled (manual)	**0.4 (0.2,0.8)**		0.8 (0.4,1.7)	0.8 (0.3,2.2)
Skilled (non-manual)	**0.2 (0.1,0.5)**		0.6 (0.3,1.3)	0.5 (1.7,1.5)
Intermediate	**0.4 (0.2,0.9)**		0.8 (0.4,1.7)	0.5 (0.1,1.5)
Professional	**0.3 (0.1,0.7)**		0.7 (0.3,1.8)	0.3 (0.1,1.6)

Multinomial logistic regression
RRR=Relative Risk Ratio; CI=Confidence intervals

n=1111	**Sum attendance of age 36, 43, 60-64 and 68-69[2]** • Never • Low • Moderate • Frequent • Very frequent	**Prayer/ meditation at age 68-69[2]** • Never • Occasionally • Regularly • Almost daily	**Importance of religion at age 68-69[2]** • Not at all important • Not particularly important • Somewhat important • Very important	**How much religion provides meaning in life at age 68-69[2]** • Not at all • Not much • A little • A lot
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Gender				
Male	1.0	1.0	1.0	1.0
Female	**1.6 (1.2,2.0)**	**2.3 (1.8,2.9)**	**1.7 (0.4,2.1)**	**1.5 (1.2,1.9)**
Education				
No qualifications	1.0	1.0	1.0	1.0
O-levels	**2.3 (1.6,3.2)**	**1.5 (1.1,2.0)**	1.3 (1.0,1.7)	1.3 (1.0,1.7)
A-levels	**2.9 (2.1,4.1)**	**1.6 (1.2,2.1)**	1.3 (1.0,1.7)	**1.5 (0.1,2.0)**
Higher education	**3.0 (2.0,4.7)**	1.1 (0.8,1.7)	1.0 (0.7,1.4)	1.0 (0.7,1.5)
Social class at age 53				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	1.4 (0.5,4.0)	0.9 (0.4,2.1)	1.1 (0.5,2.5)	1.1 (0.5,2.3)
Skilled (manual)	1.3 (0.5,3.5)	0.9 (0.4,2.0)	1.2 (0.6,2.6)	1.1 (0.6,2.3)
Skilled (non-manual)	2.3 (0.8,6.2)	1.2 (0.5,2.6)	1.4 (0.6,2.9)	1.3 (0.6,27)
Intermediate	**1.8 (1.0,7.4)**	1.1 (0.5,2.2)	1.2 (0.6,2.5)	1.2 (0.6,2.4)
Professional	**3.0 (1.1,8.2)**	1.3 (0.6,2.8)	1.4 (0.7,3.0)	1.2 (0.6,2.5)
Mothers education				
Primary	1.0	1.0	1.0	1.0
Secondary	1.4 (1.0,1.9)	1.2 (0.9,1.6)	1.1 (0.8,1.5)	1.1 (0.8,1.5)
Tech course diploma	**2.2 (1.6,3.0)**	**1.4 (1.1,1.9)**	**1.3 (1.0,1.8)**	**1.4 (1.0,1.8)**
Degree	**2.5 (1.5,3.0)**	1.3 (0.8,2.1)	1.2 (0.8,1.9)	1.4 (0.9,2.2)
Father's social class				
Unskilled	1.0	1.0	1.0	1.0
Partly skilled	0.8 (0.4,1.5)	1.4 (0.8,2.4)	1.2 (0.7,2.0)	1.1 (0.7,1.8)
Skilled (manual)	1.0 (0.5,1.8)	1.5 (0.9,2.6)	1.1 (0.7,1.8)	1.0 (0.6,1.5)
Skilled (non-manual)	**2.0 (1.1,3.7)**	**1.9 (1.1,3.4)**	1.3 (0.8,2.2)	1.2 (0.7,2.0)
Intermediate	1.7 (0.9,3.2)	1.7 (1.0,3.1)	1.2 (0.7,2.0)	1.2 (0.7,19)
Professional	**3.0 (1.5,6.1)**	**1.9 (1.5,5.6)**	**2.0 (0.1,3.7)**	1.6 (0.9,2.9)

[1] Logistic regression
[2] Ordered logistic regression
OR=Odds ratio; CI=Confidence intervals

Appendix M: Bi-variate associations between SES, and mental health and wellbeing

	GHQ-28 (n=2125) b (95% CI)	**WEMWBS (n=2402)** b (95% CI)
Gender		
Male	Ref	Ref
Female	**0.12 (0.08,0.15)**	-0.61 (-0.31,0.09)
Education		
No qualification	Ref	Ref
O-levels	-0.02 (-0.07,0.03)	0.78 (-0.15,1.72)
A-levels	**0.09 (-0.13,-0.04)**	**1.48 (0.54,2.43)**
Higher education	**0.15 (-0.21,0.08)**	**1.91 (0.67,3.14)**
Social class (head of household) at age 53		
Unskilled	Ref	Ref
Partly skilled	-0.03 (-0.13,0.12)	0.17 (-2.21,2.54)
Skilled (manual)	0.00 (-0.11,0.11)	1.34 (-0.81,3.49)
Skilled (non-manual)	-0.06 (-0.12,0.11)	1.30 (-0.95,3.54)
Intermediate	-0.05 (-0.16,0.06)	**2.98 (0.90,5.07)**
Professional	**-0.13 (-0.25,-0.01)**	**2.64 (0.38,4.91)**

Mutually adjusted linear regression models
b = Unstandardized coefficients; CI= Confidence Intervals

Appendix N: Associations between lifetime religious attendance and WEMWBS items

	Feeling optimistic about the future	Feeling useful	Feeling relaxed	Feeling interested in other people	Had energy to spare	Dealing with problems well	Thinking clearly	Feeling good about myself	Feeling close to other people	I've been feeling confident	Able to make up my own mind	Feeling loved	Interested in new things	Feeling cheerful
Sum attendance at ages 36, 43, 60-64 and 68-69														
Never	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Low attendance	**1.5 (1.1,1.9)**	1.1 (0.8,1.4)	1.0 (0.7,1.3)	1.5 (1.1,2.0)	1.2 (0.9,1.6)	0.9 (0.7,1.2)	1.0 (0.7,1.3)	1.2 (0.9,1.5)	1.1 (0.8,1.4)	1.1 (0.9,1.5)	0.9 (0.7,1.3)	0.9 (0.7,1.3)	1.0 (0.8,1.4)	1.2 (0.9,1.5)
Moderate attendance	1.1 (0.7,1.5)	0.9 (0.6,1.3)	0.9 (0.6,1.3)	1.2 (0.8,1.7)	0.8 (0.6,1.2)	0.8 (0.5,1.2)	0.9 (0.6,1.4)	0.8 (0.6,1.2)	0.1 (0.8,0.6)	0.9 (0.6,1.3)	1.0 (0.7,1.5)	1.0 (0.7,1.4)	0.9 (0.6,1.3)	0.9 (0.6,1.3)
Frequent attendance	1.2 (0.8,1.7)	1.1 (0.7,1.6)	0.9 (0.6,1.3)	**1.7 (1.1,2.4)**	0.7 (0.5,1.0)	0.9 (0.6,1.4)	0.9 (0.6,1.3)	0.8 (0.6,1.2)	0.9 (0.7,1.4)	0.9 (0.6,1.3)	0.9 (0.6,1.4)	0.9 (0.6,1.4)	0.8 (0.5,1.1)	0.8 (0.5,1.2)
Very frequent attendance	**1.5 (1.1,2.1)**	**1.5 (1.1,2.1)**	0.9 (0.6,1.2)	**2.4 (1.7,3.4)**	1.2 (0.9,1.7)	0.9 (0.7,1.3)	0.9 (0.6,1.2)	1.3 (0.9,1.8)	**1.5 (1.1,2.1)**	1.1 (0.9,1.5)	0.9 (0.6,1.2)	**1.6 (1.1,2.2)**	1.0 (0.7,1.4)	1.2 (0.9,1.7)

Figures represent odds ratios and 95% confidence intervals.