The Effects of Quality of Life on Life Satisfaction in Europe: A Predictive Analysis with Age as a Moderator

A dissertation submitted by

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ABSTRACT

This dissertation explores the determinants of life satisfaction across Europe by developing predictive models that examine the influence of various quality of life (QoL) factors—including health, social, economic, psychological, and environmental dimensions—across different age groups. The study investigates age as a moderating variable, providing nuanced insights into how these factors interact with life satisfaction throughout the lifespan. Using advanced logistic regression analysis, the study finds that key QoL factors significantly impact life satisfaction, with age moderating the effects of specific factors such as healthcare access, quality of health services, community engagement, family life satisfaction, job security, job satisfaction, household financial well-being, housing satisfaction, and access to local amenities. In contrast, psychological factors like work-life balance and subjective well-being show consistent importance across all age groups, emphasizing their universal relevance. Empirical findings reveal that the logistic regression model achieved robust predictive performance, with an accuracy of 79.64% and an Area Under the ROC Curve (AUC) of 0.8507, indicating excellent discriminative power. These results underscore the model's reliability and generalizability in predicting life satisfaction outcomes.

The study concludes that life satisfaction is multifaceted, requiring a broad spectrum of QoL factors to be addressed to enhance well-being across different age groups. The findings suggest that age-specific strategies are essential for effectively improving life satisfaction, as different age groups prioritize different aspects of QoL. This research provides valuable insights for policymakers and practitioners aiming to develop targeted interventions to boost life satisfaction across the lifespan.

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CHAPTER I: INTRODUCTION

Life satisfaction, an overarching assessment of one's quality of life (QoL), is a crucial indicator of individual and societal well-being. It encompasses various domains such as health, social connections, economic stability, psychological well-being, and environmental conditions. Understanding the determinants of life satisfaction is essential for developing policies and interventions aimed at enhancing overall well-being, particularly in Europe, where demographic changes and socio-economic challenges necessitate targeted approaches to improving life satisfaction across different age groups (Diener et al. 2003). Therefore, it is important to consider QoL broadly to enhance the understanding of factors contributing to life satisfaction.

QoL is a multifaceted concept encompassing various factors that contribute to an individual's overall well-being. According to Veenhoven (2008), QoL includes physical health, psychological state, social relationships, financial stability, and the environment, each contributing uniquely to an individual's life satisfaction. QoL is a multidimensional concept that integrates several subjective and objective indicators, with health often considered the cornerstone. Health significantly influences life satisfaction through physical conditions, mental health status, and access to healthcare services (Ada and Frijters 2004). World Health Organization (2024) defines health as a state of complete physical, mental, and social well-being, underscoring the importance of a holistic approach to health as a determinant of life satisfaction. Social factors, including relationships with family and friends, social support networks, and community engagement, play a vital role in life satisfaction. Strong social ties provide emotional support, practical assistance, and a sense of belonging, consistently linking to higher life satisfaction (Helliwell and Putnam 2004). Economic factors, such as job security and financial stability, directly impact individuals' ability to meet their needs and

aspirations, thereby affecting life satisfaction (Dolan et al. 2008). Economic stability provides the means for a comfortable life and contributes to psychological security and personal freedom, which are critical for subjective well-being (Akhavan and Mariotti 2002). Psychological factors, including self-esteem, optimism, and work-life balance, significantly influence how individuals perceive and evaluate their lives. Psychological resilience and a positive outlook can buffer against stress and adversity, enhancing life satisfaction (Diener et al. 2003). Environmental factors, such as living conditions, urbanization, and access local amenities, also affect life satisfaction by shaping daily experiences and overall quality of life. Access to clean, safe, and aesthetically pleasing environments has been shown to improve mood and overall life satisfaction (Hartig et al. 2014). Given the complexity and interplay of these factors, a comprehensive approach is necessary to analyse their impact on life satisfaction. While these factors collectively shape life satisfaction, their influence can vary significantly across different stages of life, highlighting the need to consider age as a moderating variable.

Hartig et al. (2014) and Easterlin (2003) demonstrated Age as a significant moderating variable that influences the relationship between QoL factors and life satisfaction. Several empirical studies show that life satisfaction varies across different age groups, often following a U-shaped curve, with lower satisfaction in midlife and higher satisfaction in early adulthood and old age (Blanchflower and Oswald 2008). This pattern suggests that the determinants of life satisfaction may differ depending on the age group, necessitating a nuanced approach to research and policy interventions. For instance, Deaton (2008) found that health becomes increasingly important for life satisfaction as individuals age, whereas economic factors are more significant for younger people. Similarly, Lachman and Weaver (1998) highlighted the importance of perceived control and autonomy for older adults.

Therefore, this dissertation aims to comprehensively understand how health, social, economic, psychological, and environmental factors influence life satisfaction in Europe, with a specific focus on the moderating effects of age. Although extensive research exists on individual quality of life factors, relatively few studies have analysed the combined impact of these factors on life satisfaction across different age groups in a European context (Veenhoven 2008). Recent studies, such as those by Betti and Lemmi (2021) and Rodríguez-Pose and Berlepsch (2013), have started addressing this gap, but comprehensive analyses that consider multiple QoL domains simultaneously and their varying effects across the lifespan remain limited. This study seeks to fill this gap by incorporating a wide range of quality of life factors and examining the moderating effects of age to provide a nuanced understanding of how various aspects contribute to life satisfaction.

To achieve this comprehensive analysis of the European Quality of Life Survey (EQLS) dataset, which provides comprehensive information on various life satisfaction determinants across different European countries (Helliwell et al. 2019), the study employs a robust methodological approach. Initially, logistic regression models are used to understand how various predictors and control variables influence life satisfaction. Following this, interaction effects between each predictor and the moderating variable are examined to uncover how age influences the relationship between QoL factors and life satisfaction. To ensure the robustness and accuracy of the insights, the regression models are validated using cross-validation techniques, and ROC-AUC analysis is employed to assess the models' performance and the accuracy of the predictions (Mansour and Schain 2001).

In summary, the study's findings have practical implications for policymakers and practitioners. By identifying key predictors of life satisfaction and understanding how their influence varies across different age groups, this research can inform the development of targeted interventions and policies. Policies aimed at improving healthcare access and quality

for older adults, enhancing employment opportunities and economic stability for younger individuals, and fostering social cohesion and community support across all age groups can significantly impact life satisfaction (Deeming 2013; Layard 2005). Grounded in a robust theoretical and empirical framework and leveraging advanced analytical techniques, this research aspires to contribute valuable insights into the determinants of life satisfaction in Europe. The focus on age as a moderating variable will provide a detailed understanding of how life satisfaction determinants differ across the lifespan, enabling the development of age-specific policies and interventions. This comprehensive approach not only advances the academic understanding of life satisfaction determinants but also offers practical solutions to enhance life satisfaction across different age groups in Europe.

1.1 Research Aim

This dissertation aims to develop a predictive model to understand how health, social, economic, psychological, and environmental factors influence overall life satisfaction in Europe, with a specific focus on the moderating effects of age.

1.2 Research Objectives

- Analyse the impact of quality of life factors on life satisfaction through a comprehensive literature review and empirical analysis.
- Utilize machine learning tools and regression models to quantify the relationships and interactions between life satisfaction and its predictors, investigate how different age categories moderate these relationships, and enhance prediction accuracy.
- Offer targeted recommendations for policymakers to improve life satisfaction through tailored interventions and policies based on age-specific needs and significant factors identified in the model.

CHAPTER II: LITERERATURE REVIEW

2.1 Introduction

The purpose of this literature review is to synthesize existing research on the determinants of life satisfaction, with a particular focus on quality of life QoL factors, including health, social relationships, economic stability, psychological well-being, and environmental conditions. By comparing and contrasting different authors' views, grouping similar conclusions, and highlighting both gaps and exemplary studies, this review aims to provide a comprehensive understanding of how these factors influence life satisfaction across different age groups in Europe. This comprehensive approach ensures that the review not only covers a broad spectrum of perspectives but also identifies key areas where further research is needed.

To achieve this, the review will incorporate theoretical frameworks such as Maslow's (1954) Hierarchy of Needs, Diener et al. (2003) Subjective Well-Being Theory, and Social Comparison Theory by Ormel et al. (1999) to contextualize the relationship between QoL and life satisfaction. These theories will help explain the mechanisms through which various QoL factors impact life satisfaction and how age might moderate these effects. Additionally, the literature review will include empirical studies employing diverse methodologies to critically evaluate the robustness of the findings. By assessing the methodologies used in these studies and noting areas of disagreement among researchers, this review will situate the current study within the broader context of existing literature, demonstrating its relevance and contribution to the field. Ultimately, this literature review will lay the foundation for developing hypotheses and guiding the research design of the dissertation, ensuring that the study is well-grounded in existing knowledge while addressing identified gaps.

2.2 Conceptual Definitions

2.2.1 Concept of Life Satisfaction

Life satisfaction is a crucial component of subjective well-being, representing an individual's overall evaluation of their quality of life according to their own chosen criteria (Diener et al. 2003). Pavot and Diener (2008) assert that the concept of life satisfaction is inherently subjective, involving a cognitive, judgmental process where individuals assess their lives based on personal standards, aspirations, cultural norms, and social comparisons. Unlike momentary happiness, which is an emotional state influenced by immediate circumstances, life satisfaction is a stable construct that reflects an enduring sense of contentment and fulfilment (Pavot and Diener 2008).

Building on this understanding, subjective well-being, a broader construct encompassing life satisfaction, includes positive affect (the experience of pleasant emotions) and the absence of negative affect (the experience of unpleasant emotions) (Diener et al. 2018). According to Diener et al. (2018), these components together provide a comprehensive measure of how individuals experience and evaluate their lives. Veenhoven (2011) supports this view by describing life satisfaction as a global assessment of one's life, encompassing achievements, relationships, and overall circumstances. This comprehensive assessment is influenced by various factors, including personality traits, life events, and broader societal conditions, as highlighted by Diener et al. (2018).

While these subjective evaluations are crucial, it is also important to consider that life satisfaction is influenced by objective indicators of quality of life (Veenhoven 2011). These objective indicators include measurable factors such as health, income, and social relationships. Veenhoven (2011) argues that life satisfaction correlates strongly with these objective indicators, suggesting that individuals' evaluations of their life satisfaction are not solely based on subjective perceptions but also on tangible aspects of their lives.

Overall, the concept of life satisfaction is multifaceted, influenced by a combination of individual characteristics, subjective evaluations, and objective conditions. Understanding these influences requires a comprehensive approach that considers both subjective and objective indicators of quality of life.

2.2.2 Concept of Quality of Life

Quality of life (QoL) is a multifaceted concept encompassing various domains that contribute to overall well-being. According to the World Health Organization (2012), QoL includes physical health, psychological state, level of independence, social relationships, personal beliefs, and the environment. These dimensions are interconnected, and changes in one can impact others.

Health, both physical and mental, is critical to QoL. Schalock (2004) defines physical health as the absence of disease and the ability to perform daily activities, while mental health includes emotional well-being, cognitive functioning, and resilience to stress. These aspects of health are strongly linked to higher QoL (Diener and Chan 2011). Chronic illnesses, disabilities, and mental health disorders can reduce QoL, underscoring the importance of healthcare access and quality (Marmot 2005). Similarly, social factors play a crucial role in enhancing QoL. Helliwell and Putnam (2004) emphasize that quality relationships and social support provide emotional backing, practical assistance, and a sense of belonging. Strong social networks have been shown to enhance QoL (Holt-Lunstad et al. 2010), whereas social isolation can significantly detract from it. Community engagement fosters social cohesion and a sense of purpose (Putnam 2000).

Economic factors, such as income, employment, and financial security, also influence QoL by affecting the ability to meet basic needs and pursue personal goals (Dolan et al. 2008). While higher income offers resources for a comfortable lifestyle and better healthcare access, its impact on QoL diminishes beyond a certain point, making relative income and financial

stability more significant (Jebb et al. 2018). Psychological factors like self-esteem, optimism, perceived control, and resilience are equally important. High self-esteem and optimism contribute to a positive self-image and greater QoL (Baumeister et al. 2003). The sense of perceived control and autonomy empowers individuals to navigate challenges and achieve goals (Lachman and Weaver 1998), while psychological resilience aids in coping with stress and adapting to change (Masten 2001).

Environmental factors, including housing quality, neighbourhood safety, access to green spaces, and pollution levels, directly affect physical health and QoL. Adequate housing and safe, clean neighbourhoods reduce stress and promote well-being (Bourdin 2024; Evans et al. 2003). Access to green spaces is linked to better mental health and higher QoL by offering opportunities for relaxation, recreation, and social interaction (Hartig et al. 2014). Conversely, poor environmental conditions, such as pollution, lead to health problems and diminished well-being (Evans et al. 2003).

In summary, the integrated framework in Figure 1 highlights that quality of life is influenced by a complex interaction of various factors such as health and environment, community and relationships, freedom and opportunity, living standards, peace and security. These factors collectively shape an individual's overall quality of life, which in turn influences their life satisfaction. Life satisfaction, encompassing both affective and evaluative well-being, is thus a multifaceted outcome of these dynamic interactions. Understanding these interconnected dimensions provides a comprehensive framework for assessing and improving overall well-being.

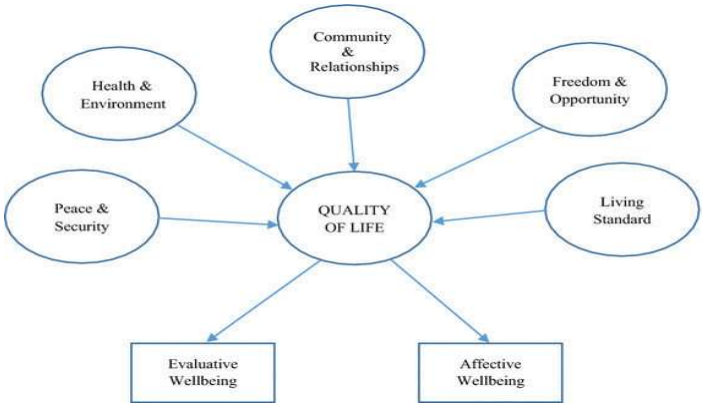

Figure 1:A Quality of Life Framework (Maridal 2016).

2.3 Theoretical Framework

The theoretical framework for this dissertation aims to establish a comprehensive understanding of life satisfaction and its determinants by integrating several key theories. This framework examines life satisfaction and QoL, by synthesizing existing theories, this framework elucidates the complex interactions between different QoL factors that shape life satisfaction.

2.3.1 Life Satisfaction and QoL

Life satisfaction is a complex construct shaped by various theoretical perspectives. The bottom-up theory posits that satisfaction in specific life domains, such as work, family, and health, accumulates to form overall life satisfaction (Heller et al. 2004). In contrast, the top-down theory suggests that an individual's disposition and personality traits influence their satisfaction across different life domains (Zacher and Rudolph 2020). The needs theory emphasizes the fulfilment of basic psychological needs—autonomy, competence, and relatedness—as key to life satisfaction (Magno and Cassia 2024), aligning with Maslow's hierarchy of needs (Maslow 1954). Cognitive processes also play a role, as social comparison theory suggests that life satisfaction is influenced by comparing oneself to others, with upward comparisons potentially lowering satisfaction and downward comparisons enhancing

it (Suls and Wills 2024; Buunk and Gibbons 2007). Adaptation theory, or the hedonic treadmill, highlights how life satisfaction tends to return to a baseline after significant events (Diener et al. 2006). Cross-cultural research further illustrates that life satisfaction varies across societies due to cultural values and economic conditions, with individualistic cultures generally reporting higher satisfaction (Sagioglou and Hommerich 2024; Oishi et al. 2009). Additionally, while higher income correlates with increased life satisfaction, this relationship diminishes beyond a certain point (Jebb et al. 2018). These theories collectively underscore the multifaceted nature of life satisfaction. Following the above justification of several key theories associated with life satisfaction, it is therefore expedient to buttress on theories that link QoL factors to life satisfaction.

Many theoretical frameworks underpin the dimensions of QoL, integrating them into a comprehensive understanding of life satisfaction (Diener et al. 2003). Veenhoven (2011) argues that life satisfaction is not only a subjective measure but also correlates strongly with objective indicators of QoL. This perspective aligns with the objective list theory, which posits that life satisfaction is determined by the possession of universally valued objective goods like health, wealth, and education (Nussbaum and Sen 2010).

Maslow's hierarchy of needs complements this view by positing that fulfilling basic needs, such as physiological necessities and safety, forms the foundation for achieving higher levels of QoL, including love, esteem, and self-actualization (Maslow 1954). Securing these fundamental needs is essential for deeper satisfaction and personal growth. Similarly, the World Health Organization (2012) QoL framework offers a multidimensional approach, emphasizing the interplay between physical health, psychological state, independence, social relationships, and environmental factors. This framework recognizes that life satisfaction stems from a balance of various life aspects.

Diener's Subjective Well-Being (SWB) theory (Diener et al. 2003) further integrates life satisfaction, positive affect, and the absence of negative affect as critical components of QoL. This highlights that life satisfaction is not merely the absence of negative experiences but also the presence of positive emotions and fulfilling life evaluations. Expanding on these concepts, the capability approach by Sen and Nussbaum (2010) evaluates QoL based on individuals' abilities to pursue valued goals, emphasizing opportunities and freedoms. This approach shifts the focus from mere resource availability to what individuals can actually do with those resources, underscoring the importance of empowerment and potential in enhancing life satisfaction.

The Social Production Function (SPF) theory by Ormel et al. (1999) posits that achieving functional goals in areas like affection, status, and comfort contributes to overall QoL. This theory suggests that life satisfaction arises from the successful attainment of these social and psychological goals, aligning well with the bottom-up theory where domain-specific satisfactions contribute to overall life satisfaction. Additionally, the Environmental Quality of Life Theory by Pacione (2003) emphasizes the impact of environmental factors on QoL, highlighting the need for sustainable and healthy living conditions. This theory notes that life satisfaction is significantly influenced by the quality of one's living environment, including housing, neighbourhood safety, and access to green spaces. This ties in with the objective list theory, which includes environmental quality as a universally valued good contributing to life satisfaction.

Economic stability, as discussed in the objective list theory, enhances access to healthcare and better living conditions, which are foundational for fulfilling basic needs and achieving higher life satisfaction (Nussbaum and Sen 2010). Strong social support networks, aligning with the top-down theory, buffer against the negative effects of health problems and economic stress, fostering emotional well-being and a sense of belonging (Zacher and

Rudolph 2020). Psychological resilience, connected to the adaptation theory, enables individuals to cope with adverse environmental conditions, maintaining a positive outlook despite challenges (Diener et al. 2006).

In conclusion, integrating these frameworks provides a comprehensive understanding of the complex and multifaceted nature of life satisfaction and QoL. By examining the interplay between various theoretical perspectives, this dissertation aims to elucidate the determinant of life satisfaction and how they contribute to overall well-being.

2.4 Hypotheses Development

Empirical research on life satisfaction has expanded significantly, offering insights into how various QoL elements influence life satisfaction (Lucas 2007). This research explores methodologies such as large-scale surveys, longitudinal studies, cross-sectional analyses, and predictive models to understand these relationships (Chida and Steptoe 2008). Key sources like the World Happiness Report and the European Social Survey (ESS) provide extensive datasets that facilitate the examination of life satisfaction across different demographics and regions (Deaton 2008).

These studies identify significant determinants of life satisfaction, including physical and mental health, social support networks, economic stability, psychological well-being, and environmental quality. The findings highlight the variability of these determinants across different contexts and emphasize the relative importance of each one. This section will explore the interaction between these QoL factors and life satisfaction, with a focus on how these relationships are moderated by age, as illustrated in Figure 2.

The empirical evidence informs the hypotheses to be tested in this study, which will examine how QoL factors interact with life satisfaction, considering variations across different age groups.

2.4.1 Health Factors and Life Satisfaction

Health is a crucial predictor of life satisfaction, with both physical and mental health significantly contributing to overall well-being (Marmot 2005). Empirical studies employing diverse and robust methodologies provide comprehensive insights into how health influences life satisfaction.

To begin with, Deaton (2008) utilized data from the Gallup World Poll, analysing self-reported health status and life satisfaction across multiple countries. His findings revealed a strong positive correlation between better health and higher life satisfaction. This underscores the significant role of physical health in enhancing overall well-being and sets the stage for the hypothesis that better mental health has a positive relationship with life satisfaction.

Further reinforcing this hypothesis, Chida and Steptoe (2008) conducted a meta-analysis of longitudinal studies to examine the long-term effects of chronic illnesses and disabilities. Their synthesis of data from multiple studies demonstrated that chronic health conditions significantly negatively impact life satisfaction due to activity limitations and increased dependency. This highlights the crucial importance of mental health, as chronic conditions often lead to mental health challenges such as depression and anxiety, further supporting the notion that better mental health improves life satisfaction.

Moreover, Lucas (2007) explored the impact of major health events using longitudinal data from the German Socio-Economic Panel (GSOEP). His findings showed that major health events, like the onset of chronic diseases, have a lasting negative effect on life satisfaction. The use of fixed-effects regression models to control for individual heterogeneity allowed Lucas to isolate the impact of these health events, reinforcing the belief that maintaining good mental health is essential for sustaining life satisfaction.

Similarly, Diener and Chan (2011) focused on mental health conditions in their analysis of the Midlife in the United States (MIDUS) study. They found that mental health disorders

such as depression and anxiety are significant predictors of lower life satisfaction. This study further emphasized that chronic pain exacerbates these effects, providing robust support for the hypothesis that better mental health is positively associated with life satisfaction.

In addition to mental health, the quality of healthcare services also plays a critical role in life satisfaction. Uchino et al. (2018) found that individuals who reported higher satisfaction with healthcare services also reported higher overall life satisfaction. This study, which used data from the Health and Social Support (HeSSup) study in Finland, highlights the positive impact of accessible, efficient, and patient-centred healthcare services. This underscores the significance of quality healthcare services in enhancing life satisfaction and sets the stage for the hypothesis that quality of healthcare services has a positive relationship with life satisfaction. Similarly, the European Quality of Life Survey (EQLS) by Eurofound (2012) showed a strong correlation between perceptions of healthcare quality and life satisfaction across different European countries, further supporting this hypothesis.

However, it is important to acknowledge the complexities in the relationship between health and life satisfaction. Steiner et al. (2013) found that increased awareness and treatment of chronic conditions can lead to higher stress levels and reduced life satisfaction due to constant management and medicalization. This mixed-methods study suggests that while physical health improvements are beneficial, the associated stress can temporarily decrease life satisfaction. Likewise, Fenne et al. (2014) noted that the stress and lifestyle changes required for health improvements might lead to a temporary drop in life satisfaction, although the long-term benefits are generally positive.

In conclusion, empirical findings consistently demonstrate that health factors are associated with higher life satisfaction. Thus, the hypothesis derived is:

Hypothesis 1: Health factors (health status, mental health, Chronic health issues, healthcare access and healthcare quality) are positively associated with life satisfaction.

2.4.2 Social Factors and Life Satisfaction

Social factors, including social support networks, family relationships, and community engagement, play a crucial role in life satisfaction (Holt-Lunstad et al. 2010). Empirical studies employing robust methodologies have provided comprehensive insights into these relationships.

Helliwell and Putnam (2004) utilized data from the World Values Survey to analyse social capital, which includes social trust, civic engagement, and the quality of personal relationships. Their regression analysis revealed that strong social ties and supportive relationships significantly enhance life satisfaction. This underscores the importance of social activities and sets the stage for the hypothesis that time for social activities is positively associated with life satisfaction.

Similarly, Bjornskov (2008) conducted a comparative study across 44 countries using data from the European Social Survey (ESS) and the World Values Survey. He found that social trust and community engagement are strongly correlated with higher life satisfaction, reinforcing the idea that time dedicated to social activities enhances life satisfaction.

Holt-Lunstad et al. (2010) supported these findings through a meta-analysis of studies on social relationships, showing that strong social relationships reduce mortality risk and significantly enhance life satisfaction over the long term. This further substantiates the idea that time for social activities positively impacts life satisfaction.

In addition to social activities, family relationships are another critical aspect of life satisfaction. Umberson and Jennifer (2011) utilized data from the National Longitudinal Study of Adolescent to Adult Health to explore the impact of marital status on life satisfaction. Their fixed-effects regression models indicated that married individuals generally report higher life satisfaction compared to their unmarried counterparts. This likely

stems from the emotional support and stability that marriage provides. These findings set the stage for the hypothesis that family life satisfaction has a positive relationship with life satisfaction.

Therefore, it is crucial to consider the quality of these family relationships. Amato (2010) demonstrated that conflicting or abusive relationships can detract from life satisfaction, emphasizing the importance of healthy family dynamics.

Predictive modelling techniques have further illuminated the impact of social factors on life satisfaction. Layard et al. (2014) used machine learning algorithms to analyse data from the UK Understanding Society survey, which included various social factors. They found that social support networks and the quality of family relationships are among the most significant predictors of life satisfaction, highlighting the importance of both social activities and family life.

Conversely, some studies highlight the complexities and potential negative impacts of social factors on life satisfaction. Baumeister and Leary (1995) found that high levels of social pressure and expectations within family and community contexts can lead to stress and decreased life satisfaction. Similarly, Brannan et al. (2013) highlighted that over-dependence on social networks can result in a lack of autonomy and increased stress, potentially lowering life satisfaction. Helliwell et al. (2019) indicated that excessive community engagement might lead to burnout and decreased well-being if not balanced with personal time and resources.

In conclusion, empirical findings underscore the importance of social capital, family relationships, and community engagement in fostering well-being, while also highlighting the complexities involved. Thus, the hypothesis derived is:

Hypothesis 2: Social factors (time for social activities, community engagement, social support network, social exclusion, and family life satisfaction) are positively associated with life satisfaction.

2.4.3 Economic Factors and Life Satisfaction

Economic factors play a pivotal role in shaping life satisfaction. Empirical studies using large-scale surveys, regression analyses, and longitudinal data provide insights into how these dimensions influence life satisfaction across different demographics and regions (Jebb et al. 2018).

To begin with, Koslowsky et al. (2024) and Clark (2010) explored the role of job satisfaction in overall life satisfaction. Using data from the British Household Panel Survey (BHPS) and the National Longitudinal Survey of Youth (NLSY), respectively, they found that job satisfaction, encompassing job security, work-life balance, and workplace environment, is positively correlated with life satisfaction. Clark (2010) emphasized that job satisfaction can mitigate the adverse effects of low income and financial insecurity, setting the stage for the hypothesis that job satisfaction is positively associated with life satisfaction.

Similarly, Easterlin (2001) introduced the "Easterlin Paradox," suggesting that while richer individuals within a country are happier than poorer ones, increases in income over time do not necessarily lead to increased life satisfaction. Jebb et al. (2018) confirmed that income impacts life satisfaction up to a threshold, beyond which additional income has a marginal effect. Using data from the Gallup World Poll and controlling for factors such as age, gender, and employment status, their findings emphasize that relative income and financial security are more critical than absolute income, setting the stage for the hypothesis that economic satisfaction is positively associated with life satisfaction.

Furthermore, Winkelmann (2014) highlighted the substantial negative impact of unemployment on life satisfaction. Using longitudinal data from the German Socio-Economic

Panel (GSOEP), Winkelmann showed that unemployment reduces income and affects psychological well-being and social status, leading to a significant decline in life satisfaction. This supports the notion that economic stability is crucial for life satisfaction.

To deepen the understanding of economic factors influencing life satisfaction, Layard et al. (2014) used machine learning algorithms on data from the UK Understanding Society survey. This study identified job satisfaction and household financial security as the most significant predictors of life satisfaction, underscoring their critical role.

Conversely, some studies highlight the complexities and potential negative impacts of economic factors. For instance, high levels of financial pressure and job insecurity can lead to stress and decreased life satisfaction (Brannan et al. 2013). This suggests that while economic factors are crucial, their impacts can vary based on individual circumstances.

In conclusion, empirical findings suggest a complex relationship between economic factors and life satisfaction. Thus, the hypothesis derived from this empirical analysis is:

Hypothesis 3: Economic factors (job satisfaction, economy satisfaction, job security, household financial well-being and basic-need affordability) are positively associated with life satisfaction.

2.4.4 Psychological Factors and Life Satisfaction

Psychological factors such as self-esteem, optimism, perceived control, and psychological resilience significantly impact life satisfaction (Masten 2001). Various empirical studies provide insights into these relationships.

Firstly, Baumeister et al. (2003) found that individuals with high self-esteem and optimism report higher life satisfaction due to a positive self-image and the expectation of favourable outcomes. Similarly, Lachman and Weaver (1998) demonstrated that perceived control over one's life enhances life satisfaction, showing that individuals who believe they have control navigate challenges better and achieve personal goals. This sets the stage for the hypothesis

that higher levels of subjective well-being (self-esteem, optimism, resilience, and perceived control) are positively associated with higher life satisfaction.

Furthermore, Masten (2001) emphasized psychological resilience, the ability to recover from adversity, as crucial for maintaining life satisfaction. Longitudinal tracking showed that resilient individuals cope with stress and adapt to changing circumstances better, maintaining life satisfaction even in difficulties.

Additionally, Greenhaus and Powell (2006) explored work-life balance and job stress, revealing that conflicts between work and personal life negatively impact life satisfaction. Caldwell (2005) highlighted the importance of engaging in hobbies and leisure activities to reduce work-related stress and enhance life satisfaction. These findings set the stage for the hypothesis that better work-life balance is positively associated with higher life satisfaction.

However, some studies highlight the complexities in the relationship between psychological factors and life satisfaction. Baumeister et al. (2003) noted that high self-esteem might sometimes lead to narcissistic tendencies, resulting in social friction and reduced life satisfaction. Similarly, Schwartz et al. (2002) suggested that while perceived control is beneficial, an excessive desire for control can lead to stress and frustration when outcomes are not as expected.

To further understand the impact of psychological factors on life satisfaction, Diener et al. (2018) used machine learning algorithms to analyse data from the Gallup World Poll. The models identified self-esteem and perceived control as significant predictors of life satisfaction, underscoring their critical role.

In conclusion, these empirical findings underscore the significant role of psychological factors in life satisfaction. Thus, the hypothesis derived from this analysis is:

Hypothesis 4: Psychological factors (subjective well-being, work-life balance, working hours life balance) are positively associated with life satisfaction.

2.4.5 Environmental Factors and Life Satisfaction

Environmental factors, including living conditions, neighbourhood safety, access to green spaces, and environmental quality, significantly influence life satisfaction (Evans et al. 2003). This section examines these dimensions through various empirical studies, employing methodologies like surveys, cross-sectional analyses, and longitudinal studies to assess their impact comprehensively.

Firstly, access to local amenities is consistently associated with higher life satisfaction (Hartig et al. 2014). Hartig et al. (2014) demonstrated through a cross-sectional survey that access to green spaces correlates with enhanced mental health and increased life satisfaction, offering opportunities for relaxation, recreation, and social interaction. Acuff and Kaffine (2013) corroborated these findings using longitudinal data, showing that green spaces provide a natural respite from urban stressors, promoting well-being. Mitchell and Popham (2008) further supported this relationship by using geographic information systems (GIS) to measure green space availability and health outcomes, highlighting the positive impact of green spaces on life satisfaction. Thus, it can be hypothesized that access to local amenities is positively associated with life satisfaction.

Moreover, adequate housing is fundamental to life satisfaction (Pei 2024; Evans et al. 2003). Evans et al. (2003) conducted a cross-sectional analysis revealing that poor living conditions significantly increase stress and reduce life satisfaction. Their study emphasized the importance of adequate housing in mitigating stress-related health issues. Similarly, Pei (2024) used a multilevel analysis approach to demonstrate that housing quality significantly affects residents' perceptions of their overall quality of life. Therefore, it can be hypothesized that housing quality is positively associated with life satisfaction.

Furthermore, neighbourhood safety plays a vital role in life satisfaction (Pei 2024). Pei (2024) showed that higher levels of perceived safety and collective efficacy within

neighbourhoods correlate with increased life satisfaction, suggesting that community cohesion enhances well-being. Based on this evidence, it is hypothesized that neighbourhood safety is positively associated with life satisfaction.

To deepen the understanding of these positive relationships, various predictive models have been employed. For instance, Hartig et al. (2014) applied logistic regression to quantify the association between green space access and mental health outcomes, controlling for confounding variables like socioeconomic status and demographic factors. Similarly, Acuff and Kaffine (2013) utilized random forest to give insights into the relative importance of various environmental factors in predicting life satisfaction. These models highlight the critical role of green spaces and environmental quality in shaping life satisfaction.

The policy implications of these findings are substantial. Improving environmental conditions, ensuring adequate housing, and enhancing neighbourhood safety are essential for boosting life satisfaction. Policies that promote access to green spaces and reduce environmental pollutants can significantly enhance the quality of life. Comparative studies, such as those by Diener and Suh (1997), indicate that countries with higher environmental quality generally report higher average life satisfaction, underscoring the importance of robust environmental policy measures.

In conclusion, empirical findings underscore the significant role of environmental factors in life satisfaction. Thus, the hypothesis derived from this analysis is:

Hypothesis 5: Environmental factors (access to local amenities, housing quality, and neighbourhood safety) are positively associated with life satisfaction.

2.4.6 The Moderating Role of Age

The moderating role of age in the relationship between QoL factors and life satisfaction is crucial for understanding how these factors impact individuals at different life stages (Easterlin 2003). Easterlin (2003) highlighted that age influences how QoL factors affect life satisfaction, a concept further supported by Blanchflower and Oswald's (2008) U-shaped curve model, which shows lower satisfaction in midlife and higher satisfaction in early adulthood and old age. This suggests that the determinants of life satisfaction shift as individuals progress through different stages of life.

Deaton (2008) found that health becomes increasingly important for life satisfaction as people age. Similarly, Antonucci et al. (2010) demonstrated that while social relationships are important across all ages, the nature and impact of these relationships vary. Younger individuals tend to prioritize peer interactions, while older adults focus more on family and community relationships. Economic factors also show age-specific effects, as Plagnol (2011) found that the positive impact of income on life satisfaction diminishes with age, whereas job satisfaction becomes more significant. Environmental factors, such as housing satisfaction, neighbourhood safety, and access to local amenities, are particularly crucial for older adults, as noted by Leslie and Cerin (2008). Additionally, Lachman and Weaver (1998) emphasized the importance of perceived control and autonomy for older adults, contrasting with younger individuals who derive life satisfaction more from achievements.

However, it is important to note that not all QoL factors are moderated by age, as some determinants of life satisfaction remain consistent across age groups (Blanchflower and Oswald 2008). Understanding these nuances is essential for developing effective interventions that cater to the distinct needs of different age demographics. Therefore, the hypotheses developed includes;

Hypothesis 6: The impact of health factors (health status, mental well-being, chronic health issues, access to healthcare services, and health service quality) on life satisfaction is positively moderated by age.

Hypothesis 7: The impact of social factors (community engagement, time for social activities, family life satisfaction, and social exclusion) on life satisfaction is positively moderated by age.

Hypothesis 8: The impact of economic factors (job security, job satisfaction, economic satisfaction, household well-being, and basic-need affordability) on life satisfaction is positively moderated by age.

Hypothesis 9: The impact of environmental factors (housing satisfaction, neighbourhood safety, and access to local amenities) on life satisfaction is positively moderated by age.

Hypothesis 10: The impact of psychological factors (work-life balance, subjective well-being, and work hours life balance) on life satisfaction is positively moderated by age.

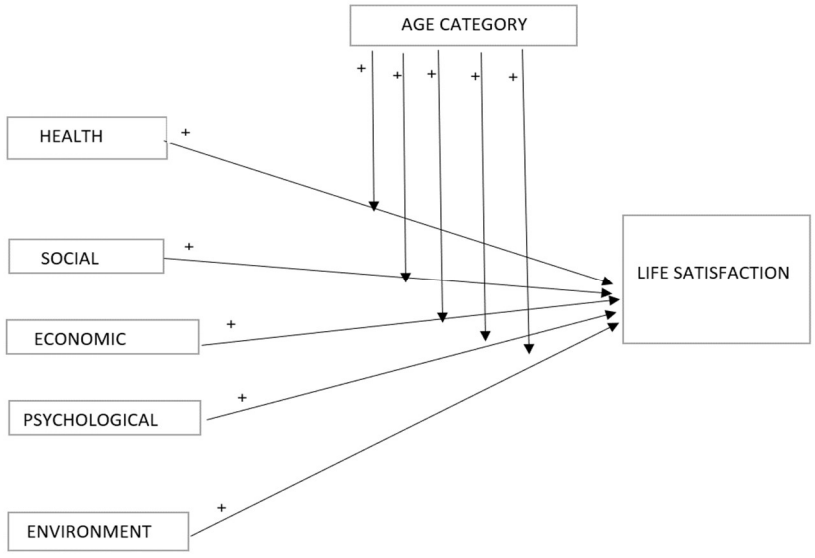

Figure 2: Empirical Framework

CHAPTER III: METHODOLOGY

3.1. Methodology and Research Design

3.1.1. Research Philosophy

Research philosophy provides the conceptual foundation for knowledge acquisition, guiding the research process (Ryan 2018). This study adopts a positivist philosophy, which is suitable for quantitative research and involves the objective interpretation of empirical evidence (Bryman 2012).

Positivism emphasizes deriving general laws from observations (Neuman 2014) and aligns with rigorous hypothesis testing through statistical analysis (Creswell 2014). The core belief is that knowledge should be grounded in observable phenomena and empirically verified (Saunders et al. 2019). This approach is appropriate for investigating the impact of various quality of life factors on life satisfaction in Europe, with age category as a moderating variable.

Using quantitative methods, this study examines the relationships between QoL factors and life satisfaction. This allows for precise measurement and statistical analysis, facilitating objective evaluation of hypotheses and identification of significant patterns within the data. Positivism supports using large-scale surveys and statistical techniques to ensure the reliability and validity of findings, providing a robust foundation for understanding life satisfaction determinants across different age categories in Europe.

3.1.2. Research Approach

Research approaches are divided into deductive, inductive, and abductive. The inductive approach involves observing patterns and developing new hypotheses (Bell et al. 2022). The deductive approach formulates hypotheses based on existing theories or findings and tests

them. Abductive research starts with unexpected observations and seeks the best explanations.

Saunders et al. (2019) note that deductive approaches can lack clarity in theory selection, while inductive approaches may struggle with insufficient data. Abductive approaches combine elements of both.

This study employs a deductive approach, suitable for testing specific hypotheses derived from existing empirical findings on the impact of quality of life factors on life satisfaction in Europe, with age category as a moderating variable. By testing hypotheses using quantitative methods, this research will evaluate relationships between variables and contribute to the validation or refinement of theoretical frameworks.

3.1.3. Research Method

Research is conducted systematically to identify and understand various phenomena, ultimately contributing to the expansion of knowledge (Saunders et al. 2019). This study will employ scientific analytical methods to evaluate and interpret data, as these methods provide a clear understanding of the group or sample dataset. A quantitative approach will be utilized to achieve the research objectives.

Utilizing a quantitative approach is advantageous for this study as it allows for the precise measurement and analysis of data related to quality of life factors and their impact on life satisfaction in Europe. By applying statistical techniques, this research will systematically test hypotheses and identify significant patterns and relationships within the data. This approach is particularly suitable for examining the moderating effect of age on the relationship between various quality of life factors and life satisfaction, providing robust and generalizable findings.

3.2 Data Collection

3.2.1 Data Access

The data used in this dissertation comes from the European Quality of Life Survey (EQLS) 2016, which was collected between September 2016 and February 2017. The EQLS survey is conducted periodically by the European Foundation for the Improvement of Living and Working Conditions to assess the quality of life across European countries. The EQLS 2016 survey includes a total of 148 questions and was administered to over 37,000 individuals across the 28 EU Member States and 5 candidate countries (Albania, the former Yugoslav Republic of Macedonia, Montenegro, Serbia, and Turkey). The survey covers a wide range of topics, such as health, social relationships, employment, housing, financial situation, and overall life satisfaction. This choice of data is due to its comprehensiveness, recent collection date, and the large, representative sample size, making it a credible and reliable source for examining the quality of life factors influencing life satisfaction in Europe.

3.2.2. Data Restriction

The EQLS 2016 dataset comprises 142,435 observations and 657 variables. To enhance the depth of the analysis, 9 additional variables were created by aggregating related questions via composite mean (See Table A1 in Appendix A). This process increased the total number of variables to 676. These composite variables were included to provide a more comprehensive measure of the underlying constructs, ensuring a robust analysis. For consistency with the original item scales, the composite scores were rounded to the nearest whole number (DeVellis 2017).

Additionally, the outcome variable was transformed into a dummy variable, where values above or equal to the average were coded as 1, indicating the presence of the outcome, and

values below the average were coded as 0. This transformation was deemed relevant for management purposes, as it clearly indicates the presence or absence of the outcome. After variable selection and data cleaning, the final sample included 12,056 observations and 28 quality of life variables.

3.2.3. Variable Definition

Following the data selection and preparation, the EQLS dataset consisted of 12,056 observations and 28 variables, including the outcome variable, explanatory variables, moderator, and control variables. Table A1 in Appendix A defines each selected variable. The degree to which a dataset is internally consistent can be determined by assessing the homogeneity of its categories (Taber 2018). Conducting high-quality reliability tests is essential for ensuring the dependability of the data used in research. Cronbach's alpha is a commonly used measure for testing data reliability (Tavakol and Dennick 2011). Developed by Cronbach, alpha provides a measure of the internal consistency of a test or scale, expressed as a number between 0 and 1. Internal consistency refers to the degree to which all items on a test assess the same concept or construct, which is related to the interrelationships between the items.

The recommended cut-off for using Cronbach's alpha to infer variable dependability is a minimum of 0.70 (DeVellis 2017) and a maximum of 0.90 (Tavakol and Dennick 2011). The results of the reliability test for this research are shown in Table 1, with values falling within the recommended range of 0.70 to 0.90. This indicates that the set of merged variables for this research are consistent and reliable enough for analysis. Testing the reliability of the scales used to measure the independent variables, dependent variables, and control variables—such as those related to quality of life factors and life satisfaction—plays a crucial role in the accuracy of the study's results.

In this study, the "psych" library in R was utilized to calculate Cronbach's alpha, confirming that the composite variables are internally consistent. Given that the alpha values fell within the recommended range, rounding the composite scores to the nearest whole number was justified. This decision ensured consistency with the original item scales and simplified interpretation without compromising data integrity (DeVellis 2017).

The final dataset, with its reliable variables, provides a solid foundation for analysing the factors influencing quality of life and life satisfaction, as explored in the subsequent sections of this study.

3.3. Analytics Method

3.3.1. Data Analysis Tool

This study will utilize the R programming language to analyse and visualize the data. R was selected because it is an open-source, free-to-use statistical computing and graphics programming language that provides a wide range of capabilities for data cleaning, analysis, and visualization. R offers several statistical and graphical techniques, including linear and nonlinear modelling, traditional statistical tests, time-series analysis, classification, and clustering (RCT 2022).

RStudio, an integrated development environment (IDE) for R, will be employed in this research to derive insights and create visually appealing dashboards, interactive graphs, and spreadsheets. RStudio enhances the functionality of R by providing a user-friendly interface, tools for writing and debugging code, and capabilities for integrating with other data sources and formats, making it an ideal choice for comprehensive data analysis and visualization in this study.

3.3.1.1. Non-Linear Regression Analysis

This study will utilize RStudio to perform logistic regression analysis, given that the outcome variable is binary. Logistic regression is a robust method for analysing binary outcome variables and provides reliable insights into the relationships between predictor variables and the outcome (Hosmer and Lemeshow 2000) This regression technique is specifically designed to predict the likelihood of a binary outcome based on one or more explanatory variables. In logistic regression, the independent variables (also known as explanatory variables) are not influenced by other variables, while the dependent or outcome variable is binary.

Equation 1;

$$\text{logit}(P(\text{Life\_satisfaction}=1)) = \beta_0 + \beta_1 X_{\text{QoL\_factors}} + \beta_2 X_{\text{control}} + \mu$$

The outcome variable for this research is life satisfaction. The explanatory variables include various quality of life factors, with control variables incorporated into the model as shown in the equation (1) above. This approach will help answer the study hypothesis regarding the impact of these factors on life satisfaction. Additionally, a Pearson Correlation matrix will be employed to explore the relationships between life satisfaction and the quality of life factors, thereby determining the direction and strength of these relationships. The study will adopt a significance level of p-value less than or equal to 0.05, as this threshold is widely accepted in statistical research for its simplicity and ease of interpretation (Segall and Cook 2018).

3.3.1.2. Logistic Moderation Model

In this study, a Logistic Moderation Model will be employed to explore how age moderates the relationship between quality of life (QoL) factors and life satisfaction. This approach allows for a nuanced understanding of how the interaction between an independent variable

X and a dependent variable Y is influenced by a moderating variable Z, in this case, age as shown in figure 3 (Hayes 2018; Fairchild and MacKinnon 2008). The approach involves the following steps:

Test the Hypothesis: The hypothesis that the independent variable is a significant predictor of the outcome variable is tested by running a regression of the outcome variable on the independent variable, revealing the marginal effect estimations.

Test for Interaction Effect: The interaction between the independent variable and the moderator is included in the regression model to see if it significantly predicts the outcome variable. This involves regressing the outcome variable on the independent variable, the moderator, and their interaction term. The result will show the interaction effect, indicating moderation (Hayes 2018).

Simple Slope Analysis: To further probe the interaction effect, a simple slopes analysis is conducted. This method calculates the effect of the independent variable on the outcome variable at different levels of the moderator. By examining these simple slopes, we can determine how the relationship between the predictor and the outcome changes across different levels of the moderator. This analysis complements the marginal effects by offering a more detailed view of the interaction, illustrating how the impact of the predictor varies at distinct points of the moderator scale (Preacher et al. 2006).

The logistic regression model for this study is represented by the following;

Equation 2;

$$\text{logit}(P(\text{Life\_satisfaction}=1)) = \beta_0 + \beta_1 X_{\text{QoL\_factors}} + \beta_2 Z_{\text{age}} + \beta_3 X^{*} Z_{(\text{QoL\_factors} * \text{age})} + \mu$$

For this detailed moderation analysis, the "margins" package in R will be utilized, allowing for precise calculation of the interaction effects. Additionally, the "ggplot2" package will be employed to visualize the results, offering clear and insightful representations of how age influences the relationship between quality of life factors and life satisfaction.

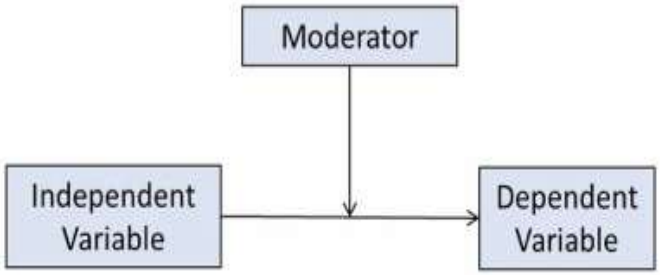

Figure 3: Moderating Model (Söderlund 2024).

3.3.1.3. Logistic Prediction Model (LPM)

After using the logistic regression model to answer the hypothesis in this study, a further step was taken to evaluate how well quality of life (QoL) factors can predict life satisfaction. To ensure the robustness of the model, a 10-fold cross-validation procedure was implemented. This technique enhances the estimated performance and goodness of fit when the model is applied to new data, effectively mitigating the risk of overfitting and providing a more accurate assessment of predictive accuracy (Probst et al. 2019). Cross-validation involves dividing the dataset into ten equal-sized subsets. The model is trained on nine subsets and tested on the remaining subset, with this process repeated ten times to average the results for a reliable performance estimate (Harrell 2015).

For this research, the data was split into 80% training data and 20% testing data. The training dataset contains 9,644 observations, while the testing dataset contains 2,412 observations, each with 28 variables. The training set was used to build and optimize the logistic regression model, while the testing set provided an independent evaluation of the model's predictive accuracy. This approach mirrors the procedure used in other predictive modelling techniques and ensures that the model's performance is not biased by the specific data used for training.

LPM) offers insights into its ability to predict life satisfaction based on QoL factors. Performance metrics, including accuracy, sensitivity, specificity, and the Area Under the Receiver Operating Characteristic Curve (AUC), were calculated to assess the model's predictive power. These metrics help determine the model's effectiveness in correctly identifying positive cases (those with high life satisfaction) and avoiding false positives (incorrectly predicting high satisfaction when it is not present).

By assessing the predictive performance of the logistic regression model used in this study, this research provides a clear and thorough understanding of its capabilities concerning life satisfaction. The results validate the use of logistic regression as a robust method for analysing non-linear relationships between QoL factors and life satisfaction, demonstrating its effectiveness in accurately predicting life satisfaction outcomes.

CHAPTER IV: DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the analysis and results of the study on the effects of quality of life factors on life satisfaction, using data from EQLS 2016. It includes descriptive analysis, Pearson correlation analysis, hypothesis testing analysis, and the analysis and evaluation of predictive model.

4.2 Descriptive Analysis

Table 1: Descriptive Statistics of Variables

Variables	Min	Max	Mean	SD	Alpha Values
Life Satisfaction	0	1	0.70	0.45	
Health Status	1	5	1.97	0.76	
Chronic Health Issues	0	1	0.17	0.37	
Access to Healthcare Services	1	3	2.58	0.51	0.76
Mental Well-being	1	6	4.97	1.08	0.84
Health Services Quality	1	10	6.53	2.25	
Community Engagement	1	5	3.92	1.21	
Time for Social activities	1	3	2.20	0.48	0.72
Family Life Satisfaction	1	10	8.09	1.86	
Social Exclusion	1	5	3.94	0.85	0.77
Job Security	1	5	4.03	1.09	
Job Satisfaction	1	10	7.43	2.02	
Economic Satisfaction	1	10	5.08	2.28	
Household Financial Well-being	1	6	3.04	1.23	

Basic-Need Affordability	0	1	0.84	0.36	0.84
Housing Satisfaction	1	10	7.71	1.88	
Neigbourhood Safety	1	5	1.90	0.87	
Access to Local Amenities	1	4	3.20	0.75	0.84
Subjective Well-being	1	6	4.00	1.23	0.76
Working Hours Life Balance	1	5	2.07	0.76	0.73
N = 12,056					

Table 2: Descriptive Statistics for Demographics/Categorical Variables

Variables	**Categories**	**Number**	**% distribution**
Age (years)	18-24	549	4.55
	25-34	2762	22.91
	35-49	5001	41.48
	50-64	3523	29.22
	65+	221	1.83
Gender	Male	5864	48.64
	Female	6192	51.36
Marital Status	Never Married	3302	27.39
	Married	6937	57.54
	Separated	446	3.70
	Widowed	273	2.26
	Divorced	1098	9.11

Education	Lower Secondary	1876	15.56
	Upper Secondary	5492	45.55
	Tertiary	4688	38.89
Work Sector	Govt Admin	1770	14.68
	Other Public Sector	1812	15.03
	Private Sector	8057	66.83
	Others	417	3.46
Social Support	Family Member	7071	58.65
	Non-family member	4260	35.34
	Service Provider	352	2.92
	Nobody	373	3.09

N = 12,056

Table 1 and 2 presents the descriptive statistics for this study, including the outcome variable, explanatory variables, and control variable (demographics). The descriptive analysis of some key explanatory variables of life satisfaction are exhibited in this section with relevant figures.

Figure 4 and 5 demonstrate that health plays a pivotal role in shaping life satisfaction. Individuals without health issues are more likely to report being satisfied with their lives (71.1%) compared to those with health issues (66.6%). Additionally, easy access to

healthcare services significantly boosts life satisfaction, with 76% of those finding it easy to access healthcare reporting satisfaction. Conversely, only 38.8% of those who find it very difficult to access healthcare feel satisfied. This underscores the critical need for improving health conditions and ensuring accessible healthcare to enhance life satisfaction.

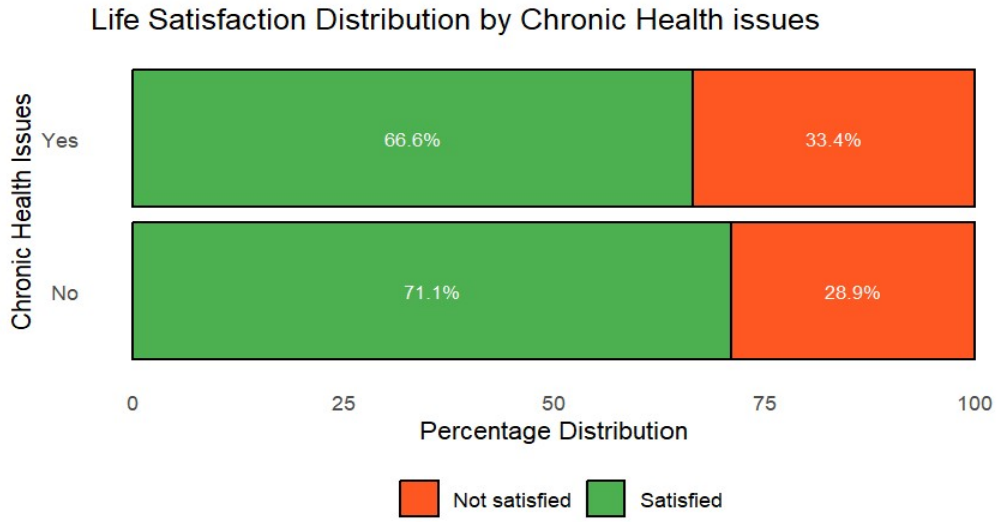

Figure 4: Life satisfaction by health issues

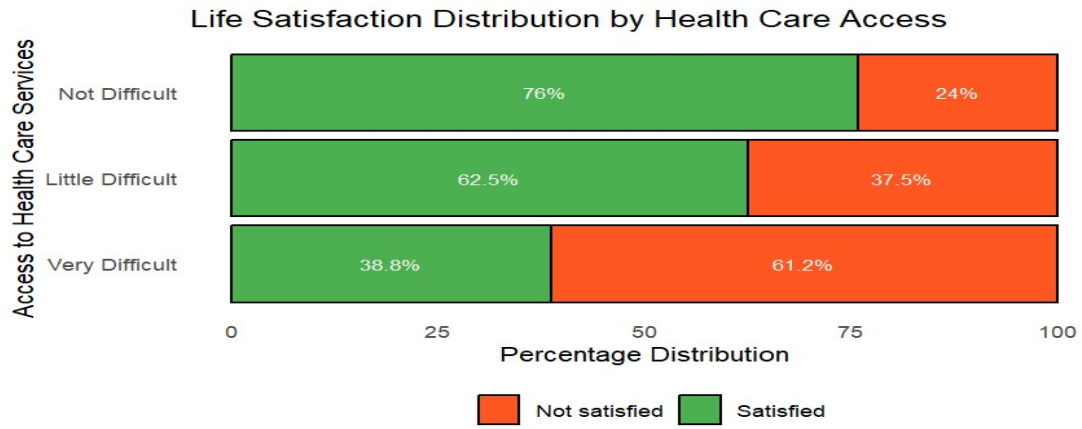

Figure 5: Life satisfaction by health care services

Social connections and activities are essential components of a fulfilling life. Engaging in social activities is closely associated with higher life satisfaction, as indicated in Figure 6. According to the data, 72.9% of individuals who frequently participate in social activities report being satisfied with their lives. This underscores the importance of maintaining strong

social networks and active engagement in social life as key contributors to personal well-being and life satisfaction.

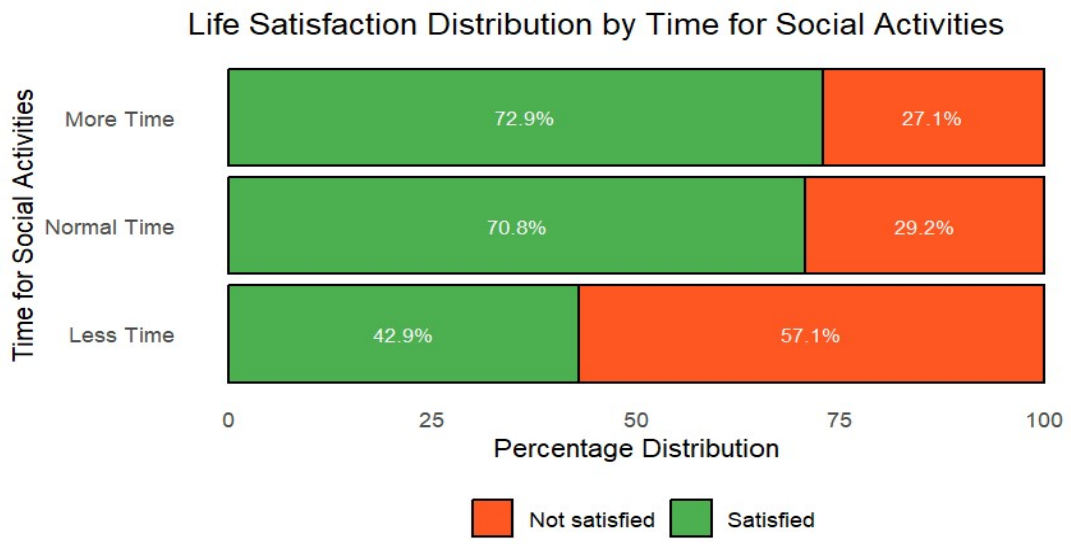

Figure 6: Life satisfaction by time for social activities

The environment in which people live greatly influences their life satisfaction as described in figure 7 and 8. Feeling safe in one's neighbourhood is closely linked to higher life satisfaction, with 78.8% of those who strongly agree that their neighbourhood is safe reporting being satisfied. Conversely, only 57.6% of those who strongly disagree feel satisfied. Access to local amenities also plays a crucial role; 76.5% of those who find it very easy to access amenities report high life satisfaction, compared to just 47.3% of those who find it very difficult. Ensuring safe and well-equipped neighbourhoods can substantially improve people's satisfaction of life.

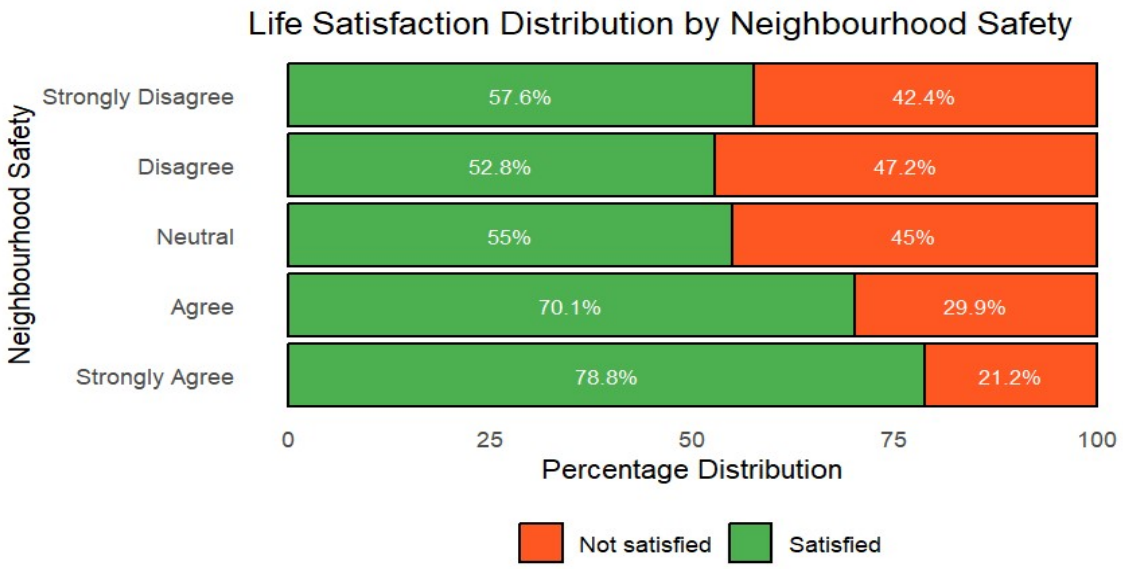

Figure 7: Life satisfaction by neighbourhood safety

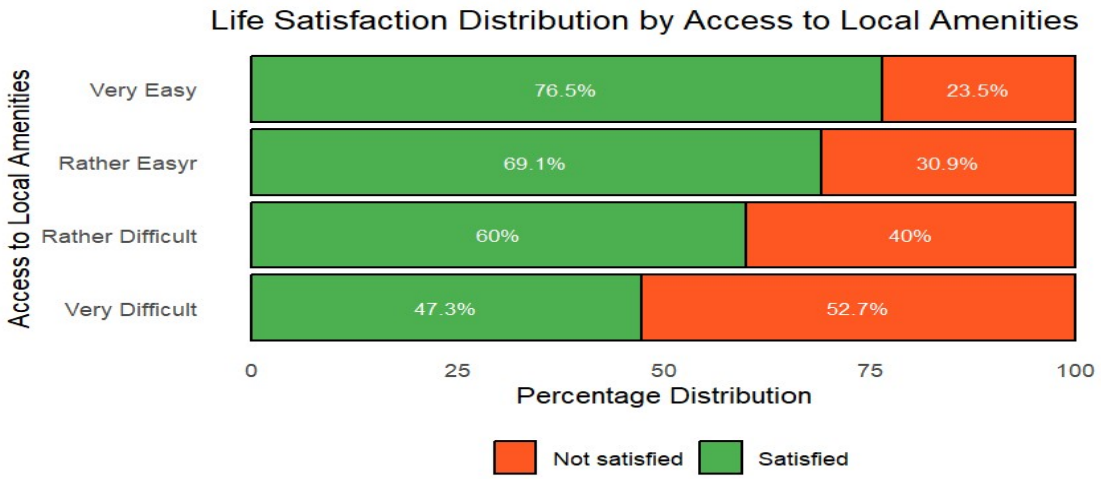

Figure 8:Life satisfaction by access to local amenities

Economic stability is a cornerstone of life satisfaction (Jebb et al. 2018). The ability to afford basic needs such as food, housing, and healthcare is directly tied to how satisfied people feel as described in figure 9. Those who can afford their basic needs report much higher life satisfaction (76%) compared to those who struggle with affordability (39.5%). This indicates that financial security and the ability to meet fundamental needs are essential for a happy and content life.

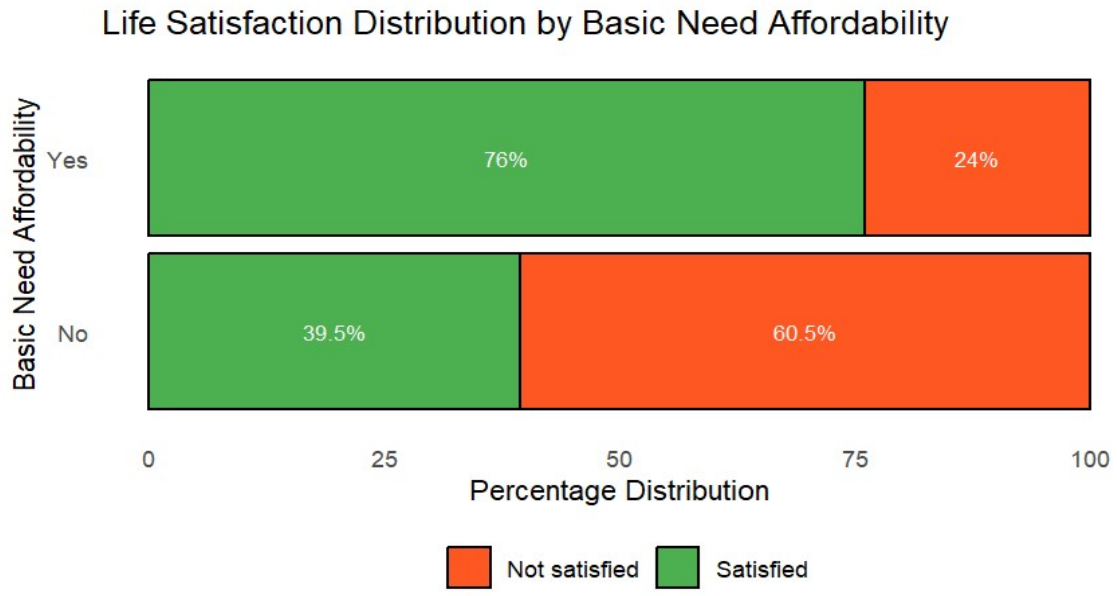

Figure 9: Life satisfaction by basic need affordability

Psychological health, including aspects like optimism and a sense of purpose which are holistically referred to as subjective well-being, profoundly impacts life satisfaction. Figure 10 show that individuals who strongly agree with positive statements about their subjective well-being exhibit the highest levels of life satisfaction (88.8%), whereas those who strongly disagree report the lowest satisfaction levels (17%). Promoting psychological health and fostering a positive outlook on life are crucial for enhancing overall life satisfaction.

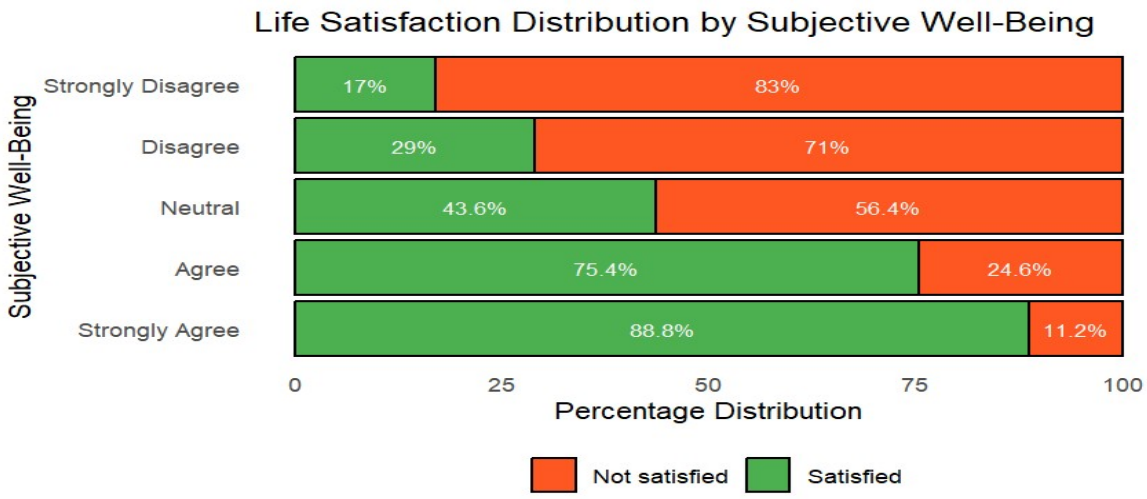

Figure 10: Life satisfaction by subjective well-being

Lastly, figure 11 presents the life satisfaction distribution by age category. The highest satisfaction levels are observed in the 65+ age group (73.8% satisfied), while the lowest satisfaction levels are found in the 50-64 age group (67.3% satisfied). These results indicate that life satisfaction varies across different age groups and further justifies studying the effects of quality of life factors on life satisfaction across different age categories.

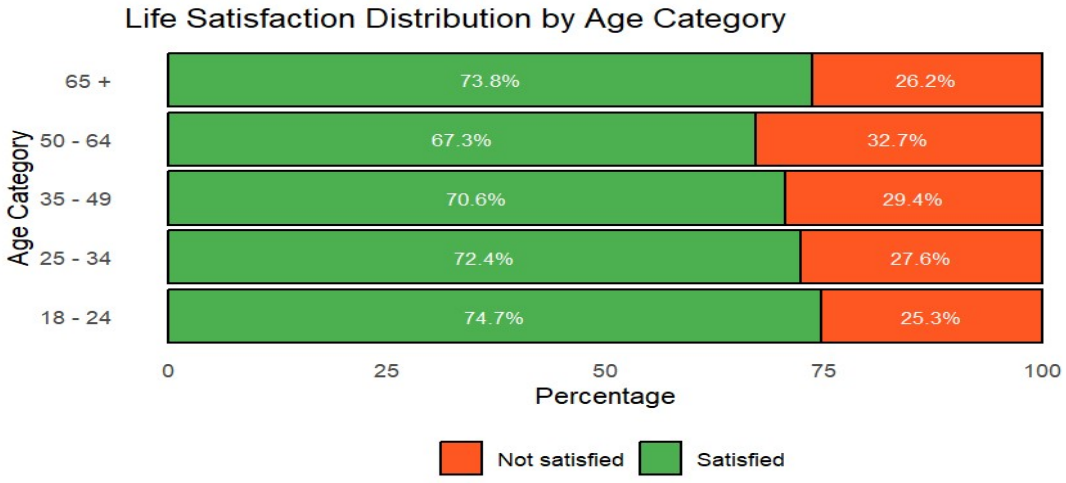

Figure 11: Life satisfaction by age category

4.3 Pearson Correlation Analysis

Using Pearson's r correlation, linear relationships between various quality of life (QoL) factors, were examined (Cummins 2015). The analysis was conducted based on the Pearson correlation coefficient (r-value) and significance (P-value). The r-value ranges from -1 (negative correlation) to +1 (positive correlation), with 0 indicating no linear correlation. P-values range from 0 to 1, with common significance thresholds being 0.05, 0.01, and 0.001, corresponding to 95%, 99%, and 99.9% confidence levels, respectively. Lower P-values indicate higher significance and greater influence (Segall and Cook 2018).

The correlation matrix in Figure 12 visually represents the linear relationships among the QoL factors. Positive correlations are indicated in green, while negative correlations are shown in orange. The analysis reveals that life satisfaction is strongly positively correlated with job satisfaction, and economy satisfaction. This suggests that individuals with higher job satisfaction and economic stability report greater life satisfaction. Job satisfaction is positively correlated with job security, implying that individuals who feel secure in their jobs tend to have higher job satisfaction. Health care access shows a positive correlation with mental well-being and healthcare quality, indicating that better access to healthcare services is associated with better mental health and health service quality. Social support is positively correlated with neighbourhood safety and subjective well-being, emphasizing the importance of social connections in enhancing safe neighbourhoods.

Conversely, a notable negative correlation is observed between chronic health issues and life satisfaction, suggesting that higher levels of chronic health issues are associated with lower life satisfaction.

The P-values associated with these correlations are summarized in Table B1 in Appendix B, with significant correlations highlighted ($P<0.05$). This detailed correlation analysis provides

valuable insights into how different QoL factors interrelate and contribute to overall life satisfaction.

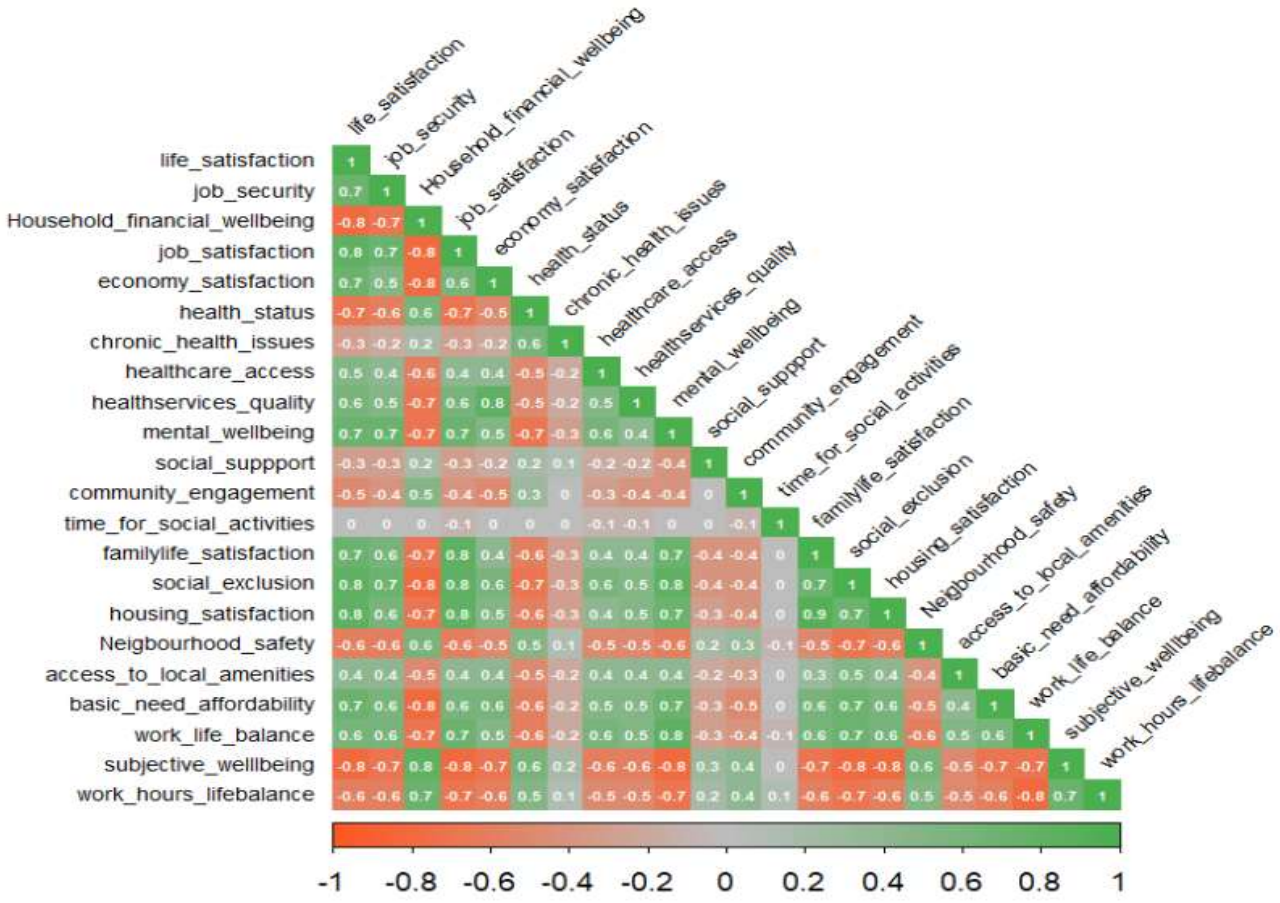

Figure 12: Correlation Matrix

4.4 Hypotheses Testing

4.4.1 Non-Linear Regression Analysis

Table 3: Logit Regression Model

Variables	AME	p-values
access_to_local_amenities	0.0020	(0.6608)
basic_need_affordability	0.0381	(0.0001)***
chronic_health_issues	0.0144	(0.1402)
community_engagement	-0.0174	(0.0000)***
economy_satisfaction	0.0259	(0.0000)***
familylife_satisfaction	0.0255	(0.0000)***
health_status	-0.0362	(0.0000)***
healthcare_access	0.0009	(0.8951)
healthservices_quality	0.0078	(0.0000)***
Household_financial_wellbeing	-0.0296	(0.0000)***
housing_satisfaction	0.0160	(0.0000)***
job_satisfaction	0.0225	(0.0000)***
job_security	0.0077	(0.0179)**
mental_wellbeing	0.0238	(0.0000)***
neigbourhood_safety	-0.0181	(0.0000)***
social_exclusion	0.0259	(0.0000)***
social_suppport non-family	-0.0065	(0.3762)
social_suppport service provider	0.0399	(0.02900)*
social_suppport nobody	-0.0080	(0.6785)
subjective_welllbeing	-0.0632	(0.0000)***
time_for_social_activities	0.0357	(0.0000)***

work_hours_lifebalance	0.0005	(0.9133)
work_life_balance	0.0043	(0.1796)
age_category25 - 34	-0.0144	(0.4095)
age_category35 - 49	-0.0192	(0.2713)
age_category50 - 64	-0.0348	(0.0596)*
age_category65 +	-0.0087	(0.7876)
education_levelTertiary	0.0073	(0.4857)
education_levelUpper Secondary	-0.0101	(0.2870)
genderMale	-0.0351	(0.0000)***
marital_statusDivorced	-0.0148	(0.2727)
marital_statusMarried	-0.0067	(0.4485)
marital_statusSeparated	-0.0226	(0.2121)
marital_statusWidowed	-0.123	(0.0000)***
work_sectorOther Public Sector	0.0147	(0.2505)
work_sectorOthers	0.0166	(0.4100)
work_sectorPrivate Sector	0.0115	(0.2661)

Method;
Maximum Likelihood Estimation (MLE)
Dependent Variable: Life Satisfaction
AIC = 10160
N = 12,056
Significance codes: *** $p < 0.001$,
** $p < 0.01$, * $p < 0.05$

Using a logit regression model to test the hypotheses, the relationships between various QoL factors and life satisfaction were examined, with the average marginal effect (AME) representing the change in probability of life satisfaction associated with a one-unit change in each predictor variable, holding other variables constant. The findings in Table 3 reveal

significant positive associations between life satisfaction and several key QoL factors with few exceptions.

The analysis shows partial support for Hypothesis 1, with varied impacts of health factors on life satisfaction. Mental well-being (AME = 0.0238, $p < 0.001$) significantly enhances life satisfaction; a one-point increase in mental well-being raises the probability of life satisfaction by 2.38 percentage points, aligning with Diener and Chan's (2011) emphasis on mental health's critical role. Similarly, higher perceived healthcare quality (AME = 0.0078, $p < 0.001$) boosts life satisfaction by 0.78 percentage points per unit increase, reflecting the importance of receiving quality care, as noted by Uchino et al. (2018).

In contrast to Chida and Steptoe (2008), chronic health issues (AME = 0.0144, $p = 0.1402$) and healthcare access (AME = 0.0009, $p = 0.8951$) do not have significant effects on life satisfaction. This suggests that people may adapt to chronic health problems over time, reducing their impact on overall satisfaction. Additionally, simply having access to healthcare may not be enough to boost life satisfaction; what seems to matter more is the quality and effectiveness of the care received, rather than just access itself.

Notably, health status (AME = -0.0362, $p < 0.001$), ranging from 1 (very good) to 5 (very bad), shows a strong negative impact on life satisfaction. As perceived health worsens, life satisfaction decreases by 3.62 percentage points per unit, highlighting how declining health can significantly undermine overall life satisfaction.

Social factors have varied impacts on life satisfaction, providing partial support for Hypothesis 2. Time for social activities (AME = 0.0357, $p < 0.001$) and family life satisfaction (AME = 0.0255, $p < 0.001$) significantly enhance life satisfaction, increasing it by 3.57 and 2.55 percentage points, respectively. These findings highlight the critical role of social interactions and family support in promoting well-being, consistent with Helliwell and Putnam (2004).

Additionally, the reduction in social exclusion (AME = 0.0259, $p < 0.001$), as individuals move from strongly agreeing to strongly disagreeing with exclusion feelings, increases life satisfaction by 2.59 percentage points. Coupled with this, community engagement (AME = -0.0174, $p < 0.001$) reveals that less frequent participation—from daily to never—reduces life satisfaction by 1.74 percentage points, emphasizing the importance of both social inclusion and active community involvement. Support from service providers (AME = 0.0399, $p = 0.0290$) further contributes positively, enhancing life satisfaction by 3.99 percentage points. This contrasts with the lack of significant effects from non-family support (AME = -0.0065, $p = 0.3762$) and no support (AME = -0.008, $p = 0.6785$), underscoring the greater impact of structured, professional help over informal or absent support networks.

Hypothesis 3 is strongly supported, with all economic factors showing significant associations with life satisfaction. Job satisfaction (AME = 0.0225, $p < 0.001$) and economic satisfaction (AME = 0.0259, $p < 0.001$) both positively impact life satisfaction, increasing the likelihood of being satisfied with life by 2.25 and 2.59 percentage points, respectively. These findings underscore the importance of fulfilling work and perceived economic stability in enhancing overall well-being, aligning with research by Clark (2010) and Dolan et al. (2008). Basic-need affordability (AME = 0.0381, $p = 0.0001$) emerges as a particularly strong predictor, boosting life satisfaction by 3.81 percentage points per unit increase, highlighting the critical role of meeting essential needs.

Job security (AME = 0.0077, $p = 0.0179$) also contributes positively, with a 0.77 percentage point increase in life satisfaction for each additional unit of perceived job security, reflecting the importance of stable employment. Additionally, household financial well-being (AME = -0.0296, $p < 0.001$) significantly influences life satisfaction. As it becomes harder for households to make ends meet, moving from "very easily" to "very difficult," life satisfaction decreases by 2.96 percentage points. This finding highlights the substantial negative impact

that financial strain can have on overall well-being, emphasizing the crucial role of financial security in life satisfaction.

Hypothesis 4 is partially supported, with psychological factors having varied effects on life satisfaction. Subjective well-being, encompassing future optimism and freedom to do what one likes (AME = -0.0632, $p < 0.001$), shows a significant negative relationship with life satisfaction. As subjective well-being worsens—indicating less optimism or restricted freedom—the probability of being satisfied with life decreases by 6.32 percentage points, thereby supporting the study of Diener and Biswas (2002) and Masten (2001). This highlights the crucial role of psychological well-being in life satisfaction and underscores the importance of government policies that foster optimism and personal freedom. When people feel hopeful and empowered, their life satisfaction is significantly higher, emphasizing the need for supportive environments.

On the other hand, unlike the findings of Henry (2024) and Caldwell (2005), work-life balance (AME = 0.0043, $p = 0.1796$) and work-hours life balance (AME = 0.0005, $p = 0.9133$) do not show statistically significant associations with life satisfaction. Although these factors were expected to positively influence life satisfaction, their lack of significance suggests that the relationship between work-life dynamics and life satisfaction may be more complex or influenced by other factors. This further reinforces the idea that while work-life balance is important, broader psychological well-being, supported by an environment that promotes personal freedom and future optimism, plays a more crucial role in enhancing life satisfaction.

Finally, hypothesis 5 is partially supported, with environmental factors showing varied effects on life satisfaction. Housing satisfaction (AME = 0.016, $p < 0.001$) is positively associated with life satisfaction, where each additional unit of satisfaction increases the likelihood of being satisfied with life by 1.6 percentage points. In agreement with Pei (2024)

findings, this highlights the significant role that comfortable and satisfactory living conditions play in enhancing overall well-being. Similarly, neighbourhood safety (AME = -0.0181, $p < 0.001$) is crucial, with lower perceived safety leading to a 1.81 percentage point decrease in life satisfaction as perceptions of safety decline from strongly agree to strongly disagree. This emphasizes how feeling safe in one's environment significantly contributes to overall life satisfaction.

Contrary to Hartig et al. (2014) findings, access to local amenities (AME = 0.002, $p = 0.6608$) does not have a statistically significant association with life satisfaction, suggesting that simply having access to amenities may not be sufficient to enhance life satisfaction. While certain environmental factors like housing satisfaction and neighbourhood safety significantly affect life satisfaction, others, such as access to amenities, do not (Greenhaus and Powell 2006).

4.4.2 Moderation Analysis

Table 4 below provides a thorough demonstration of the coefficients and p-values from the logit moderation analysis employed in this study. Due to limitations with the "margins" function in R Studio, it was not possible to calculate the marginal effects for the interaction term X*Z directly. Therefore, only the coefficients of significant interactions were converted to average marginal effects, as detailed in Appendix C. A significant interaction indicates that the effect of an independent variable (X) on the outcome variable (Y) varies across values of the moderator (Z). However, the coefficients' values and signs alone do not provide clear insights into this interaction. To further explore the dynamics of these interactions, the study computed the effect of X on Y at specific values of Z, known as simple effect coefficients or simple slopes. Marginal effects, as a form of simple slope effects, were utilized to provide a deeper understanding of how the relationship between X and Y changes at different levels of Z (Jaccard 2001).

Table 4:Logit Moderation Result for Interaction Term

Interaction Term	Coefficient	Pr(>|t|)
Health Status (HS)*Age Category		
Intercept	2.09	0.00***
HS*18 - 24 (Ref group)	Ref group	Ref group
HS*25 – 34	-0.04	0.74
HS*35 – 49	-0.09	0.49
HS*50 – 64	-0.15	0.76
health*status*65+	-0.39	0.1
AIC	14014	
Mental Wellbeing (MW)*Age Category		
Intercept	-2.41	0.00***
MW*18 - 24 (Ref group)	Ref group	Ref group
MW*25 - 34	-0.19	0.06
MW*35 – 49	-0.09	0.31
MW*50 – 64	-0.1	0.28
MW*65+	0.24	0.22
AIC	13526	
Chronic Health Issues (CHI)*Age Category		
Intercept	1.11	0.00***
CHI*18 - 24 (Ref group)	Ref group	Ref group
CHI*25 - 34	0.2	0.52
CHI*35 - 49	0.14	0.63
CHI*50 - 64	0.05	0.87
CHI*65+	0.04	0.91
AIC	14650	
Healthcare Access (HA)*Age Category		
Intercept	-0.13	0.73
HA*18 - 24 (Ref group)	Ref group	Ref group
HA*25 - 34	0.07	0.71
HA*35 - 49	0.22	0.25
HA*50 - 64	0.18	0.36
HA*65+	0.85	0.02*
AIC	14350	
Health Services Quality (HSQ)*Age Category		
Intercept	-0.31	0.00***
HSQ*18 - 24 (Ref group)	Ref group	Ref group
HSQ*25 - 34	0.01	0.78
HSQ*35 - 49	0.00	0.92
HSQ*50 - 64	0.06	0.16
HSQ*65+	0.16	0.05*
AIC	13916	
Community Engagement (CE)*Age Category		
Intercept	1.31	0.00***
CE*18 - 24 (Ref group)	Ref group	Ref group
CE*25 - 34	-0.1	0.23

CE*35 - 49	-0.21	0.01*
CE*50 - 64	-0.32	0.00***
CE*65+	-0.31	0.05*
AIC	14387	
Time for Social Activities (TSA)*Age Category		
Intercept	0.13	0.77
TSA*18 - 24 (Ref group)	Ref group	Ref group
TSA*25 - 34	0.13	0.56
TSA*35 – 49	-0.07	0.74
TSA*50 - 64	-0.34	0.14
TSA*65+	-0.71	0.13
AIC	14578	
Famiy Life Satisfaction (FLS)*Age Category		
Intercept	-1.62	0.00***
FLS*18 - 24 (Ref group)	Ref group	Ref group
FLS*25 - 34	0.08	0.16
FLS*35 - 49	0.1	0.07
FLS*50 - 64	0.05	0.32
FLS*65+	0.24	0.03*
AIC	13195	
Social Exclusion (SE)*Age Category		
Intercept	-2.25	0.00***
SE*18 - 24 (Ref group)	Ref group	Ref group
SE*25 – 34	-0.14	0.28
SE*35 - 49	0.07	0.55
SE*50 - 64	0.01	0.93
SE*65+	0.48	0.06
AIC	13282	
Job Security (JS)*Age Category		
Intercept	0.11	0.70
JS*18 - 24 (Ref group)	Ref group	Ref group
JS*25 - 34	0.28	0.00**
JS*35 - 49	0.18	0.02*
JS*50 - 64	0.26	0.00**
JS*65+	0.11	0.42
AIC	13932	
Job Satisfaction (JS)*Age Category		
Intercept	-1.55	0.00***
JS*18 - 24 (Ref group)	Ref group	Ref group
JS*25 - 34	0.05	0.36
JS*35 - 49	0.06	0.21
JS*50 - 64	0.03	0.49
JS*65+	0.25	0.02*
AIC	12957	
Economy Satisfaction (ES)*Age Category		
Intercept	-0.52	0.00***
ES*18 - 24 (Ref group)	Ref group	Ref group
ES*25 - 34	0.00	0.87
ES*35 - 49	-0.03	0.50

ES*50 - 64	0.04	0.30
ES*65+	0.10	0.26
AIC	13444	
Household Financial Wellbeing (HFW)*Age Category		
Intercept	2.75	0.00***
HFW*18 - 24 (Ref group)	Ref group	Ref group
HFW*25 - 34	-0.12	0.19
HFW*35 - 49	-0.18	0.04*
HFW*50 - 64	-0.26	0.00**
HFW*65+	-0.31	0.05
AIC	13022	
Basic Need Affordability (BNA)*Age Category		
Intercept	-0.25	0.00***
BNA*18 - 24 (Ref group)	Ref group	Ref group
BNA*25 - 34	-0.29	0.26
BNA*35 - 49	-0.01	0.95
BNA*50 - 64	-0.25	0.33
BNA*65+	0.77	0.1
AIC	13722	
Housing Satisfaction (HS)*Age Category		
Intercept	-1.67	0.00***
HS*18 - 24 (Ref group)	Ref group	Ref group
HS*25 - 34	0.05	0.36
HS*35 - 49	0.06	0.22
HS*50 - 64	0.05	0.32
HS*65+	0.23	0.05
AIC	13107	
Neighborhood Safety (NS)*Age Category		
Intercept	1.82	0.00***
NS*18 - 24 (Ref group)	Ref group	Ref group
NS*25 - 34	-0.10	0.33
NS*35 - 49	-0.07	0.48
NS*50 - 64	-0.13	0.22
NS*65+	0.01	0.94
AIC	14278	
Access to Local Amenities (ALA)*Age Category		
Intercept	0.37	0.36
ALA*18 - 24 (Ref group)	Ref group	Ref group
ALA*25 - 34	0.29	0.03*
ALA*35 - 49	0.11	0.41
ALA*50 - 64	0.19	0.15
ALA*65+	0.06	0.77
AIC	14432	
Work Life Balance (WLB)*Age Category		
Intercept	-0.56	0.06
WLB*18 - 24 (Ref group)	Ref group	Ref group
WLB*25 - 34	-0.02	0.72
WLB*35 - 49	0.03	0.72
WLB*50 - 64	0.01	0.89

WLB*65+	0.07	0.62
AIC	13958	
Subjective Wellbeing (SW)*Age Category		
Intercept	3.13	0.00***
SW*18 - 24 (Ref group)	Ref group	Ref group
SW*25 - 34	0.05	0.74
SW*35 - 49	-0.07	0.25
SW*50 - 64	-0.16	0.28
SW*65+	-0.46	0.10
AIC	13057	
Work Hours Life Balance (WHLB)*Age Category		
Intercept	2.60	0.00***
WHLB*18 - 24 (Ref group)	Ref group	Ref group
WHLB*25 - 34	0.18	0.20
WHLB*35 - 49	0.11	0.40
WHLB*50 - 64	0.21	0.12
WHLB*65+	-0.04	0.86
AIC	14214	
Gender * Age Category		
Intercept	1.13	0.00***
Male*25 - 34	-0.30	0.15
Male*35 - 49	-0.02	0.89
Male*50 - 64	0.19	0.36
Male*65+	-0.10	-0.77
AIC	14634	
Work Sector* Age Category		
Intercept	1.21	0.00***
Other public sector*25 - 34	-0.42	0.40
Private sector*25-34	-0.13	0.73
Others*25-34	0.03	0.96
Other public sector*35 - 49	-0.25	0.59
Private sector*35-49	-0.03	0.91
Others*35-49	0.06	0.91
Other public sector*50 - 64	-0.37	0.45
Private sector*50-64	-0.10	0.77
Others*50-64	-0.59	0.34
Other public sector*65+	-0.77	0.36
Private sector*65+	-0.82	0.16
Others*65+	-0.41	0.63
AIC	14620	
Marital Status* Age Category		
Intercept	1.11	0.00***
Married*25 - 34	-0.14	0.63
Separated*25-34	0.77	0.23
Widowed*25-34	0.14	0.92
Divorced*25-34	11.00	0.92
Married*35-49	0.04	0.88
Separated*35-49	0.53	0.37
Widowed*35-49	-0.04	0.95

Divorced*35-49	11.28	0.92
Married*50-64	0.05	0.87
Separated*50-64	0.68	0.26
Widowed*50-64	0.42	0.63
Divorced*50-64	11.62	0.92
Married*65+	-0.86	0.30
Separated*65+	-0.76	0.50
Widowed*65+		
Divorced*65+	11.05	0.92
AIC	14568	
Education Level* Age Category		
Intercept	0.56	0.01*
Upper Secondary*25 - 34	-0.07	0.78
Tertiary*25-34	-0.05	0.87
Upper Secondary*35 – 49	-0.24	0.37
Tertiary*35-49	0.11	0.71
Upper Secondary*50- 64	-0.52	0.05·
Tertiary*50-64	-0.20	0.53
Upper Secondary*65+	-0.32	0.46
Tertiary*65+	0.33	0.52
AIC	14321	
Social Support* Age Category		
Intercept	1.32	0.00***
Non-family*25 - 34	-0.00	0.96
Service provider*25-34	-0.12	0.83
Nobody*25-34	0.47	0.38
Non-family*35 – 49	0.28	0.19
Service provider*35-49	0.25	0.66
Nobody*35-49	0.63	0.22
Non-family*50- 64	-0.28	0.18
Service provider*50-64	0.47	0.41
Nobody*50-64	1.03	0.04*
Non-family*65+	-0.00	0.98
Service provider*65+	0.67	0.59
Nobody*65+	0.86	0.28
AIC	14614	
Method; Maximum Likelihood Estimation (MLE) Dependent Variable: Life Satisfaction N = 12,056 Significance codes: *** p < 0.001, ** p < 0.01, * p < 0.05		

The moderation analysis in Table 4 provides partial support for Hypothesis 6, which proposed that age moderates the impact of health factors on life satisfaction. The analysis

shows that age significantly influences the relationship between access to healthcare, the quality of health services, and life satisfaction. Specifically, the simple slope analysis (Figure 13, Appendix C1) reveals that the positive effect of healthcare access and service quality on life satisfaction increases with age, peaking in the 65+ category. This pattern is expected, as older adults often have a greater need for and reliance on healthcare services, making the quality and accessibility of these services more crucial to their overall life satisfaction. This result aligns with research showing that older adults derive greater life satisfaction from these services (Smith et al. 2002). In contrast, health status, mental well-being, and chronic health issues did not show significant moderation by age. This suggests that these factors influence life satisfaction consistently across age groups, as health status and chronic conditions are crucial to well-being at any age. Both younger and older individuals may similarly prioritize their overall health and mental well-being, leading to a uniform impact on life satisfaction. These findings are consistent with literature indicating the universal significance of health and mental well-being in determining overall life satisfaction (Diener et al. 2018).

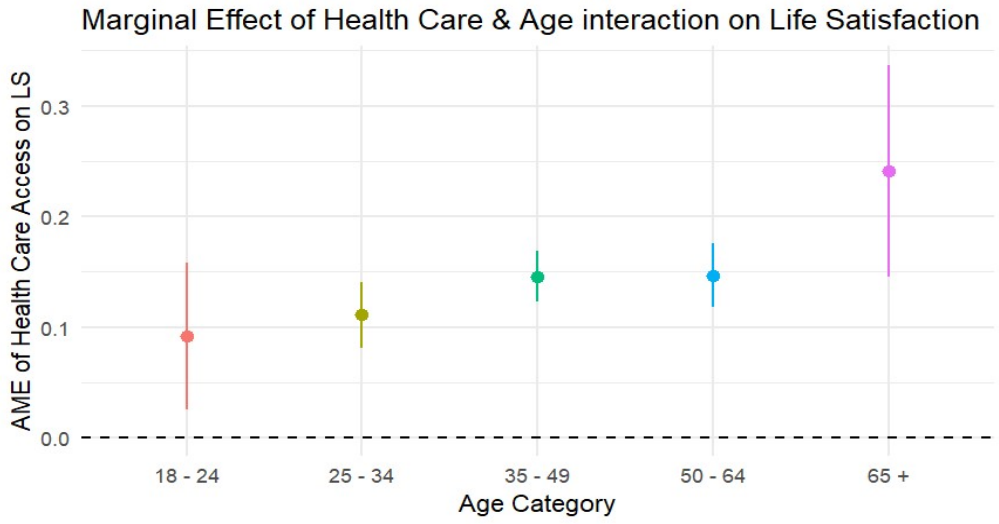

Figure 13: Health Care and Age interaction on Life Satisfaction

The moderation analysis for social factors, detailed in Table 4, provides partial support for Hypothesis 7, which proposed that age moderates the impact of social factors on life satisfaction. The analysis shows that age significantly moderates the relationship between both community engagement and family life satisfaction with life satisfaction.

For community engagement, the simple slopes and marginal effects (Figure 14) indicate that as age increases, the negative impact of lower community engagement (less frequent engagement) on life satisfaction decreases. Specifically, for the 25-34 age group, a one-unit decrease in community engagement is associated with a decrease in the odds of high life satisfaction by approximately 3%. For the 35-49 age group, the odds decrease by about 5%, and for the 50-64 age group, the odds decrease by 8%. In the 65+ category, the odds decrease by 7%. This suggests that while lower community engagement negatively impacts life satisfaction across all age groups, this impact lessens with age, possibly because older adults may have more established social networks and community ties, which compensate for less frequent engagement (Putnam 2000). Similarly, family life satisfaction significantly impacts life satisfaction across all age groups, with a more substantial effect observed in the 65+ age category, as shown in Figure 15. Specifically, a one-unit increase in family life satisfaction is associated with a 9% increase in the odds of high life satisfaction for those aged 65 and older. This indicates that older individuals derive greater life satisfaction from family life, which may be due to the increasing importance of close family relationships as other social roles and responsibilities diminish with age (Antonucci et al. 2004).

In contrast, time for social activities and social exclusion did not show significant moderation by age, indicating that these factors impact life satisfaction similarly across age groups. This uniform impact suggests that the availability of time for social activities and the experience of social exclusion are universally important for maintaining life satisfaction, regardless of age. The consistent detrimental effects of social exclusion and the benefits of social activities

likely stem from their fundamental role in human connection and well-being, which are critical at any age (Holt-Lunstad et al. 2010).

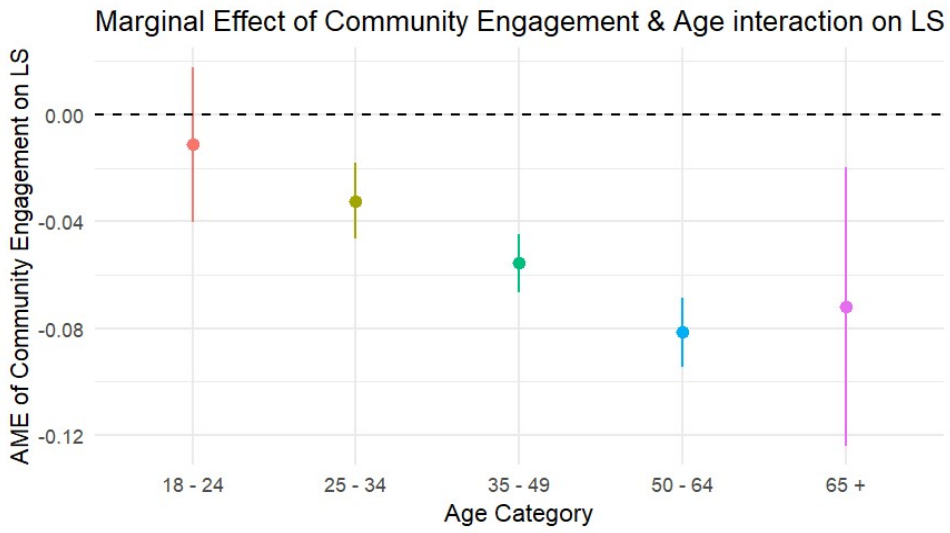

Figure 14: Community Engagement and Age interaction on Life Satisfaction

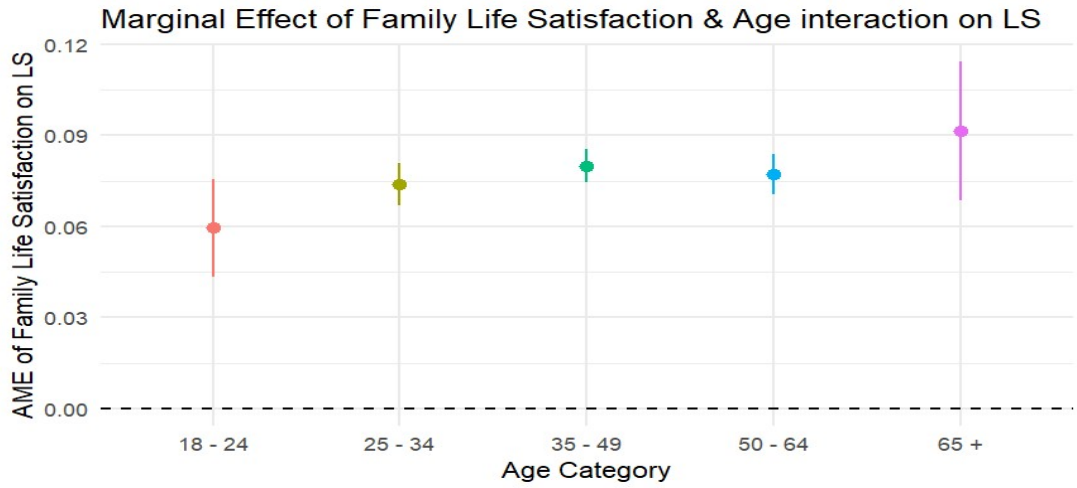

Figure 15: Family Life Satisfaction and Age interaction on Life Satisfaction

The moderation analysis for economic factors, detailed in Table 4, provides partial support for Hypothesis 8, which proposed that age moderates the impact of economic factors on life satisfaction. The analysis shows that age significantly moderates the relationship between job security, job satisfaction, and household financial well-being with life satisfaction.

For job security, the simple slopes and marginal effects (Figure 16) indicate that the positive impact of job security on life satisfaction is most pronounced in the 50-64 age group, where a one-unit increase in perceived job security is associated with a 10% increase in the odds of high life satisfaction. This effect is followed by the 25-34 age group (9%) and the 35-49 age group (8%). The slightly reduced impact in the 65+ group (7%) suggests that while job security remains important across all age groups, it is particularly crucial for those nearing retirement or in mid-career, likely due to heightened concerns about financial stability and employment continuity as they approach retirement age. This finding contrasts with Greenhalgh and Rosenblatt (1984), who argued that job insecurity impacts life satisfaction more uniformly across different age groups.

Similarly, job satisfaction shows a significant moderation effect by age, particularly in older adults, as shown in Figure 17. A one-unit increase in job satisfaction leads to a 10% increase in the odds of high life satisfaction for those aged 65 and older. This supports the idea that as individuals age, job satisfaction becomes increasingly crucial for their overall well-being, possibly because job satisfaction may be more closely tied to a sense of purpose and achievement in later life (Kahneman and Deaton 2010).

For household financial well-being, Figure 18 demonstrates that financial difficulties negatively impact life satisfaction, with this effect becoming more pronounced with age. A one-unit decrease in household financial well-being is associated with a 14% decrease in the odds of high life satisfaction in the 65+ age group, 12% in the 50-64 age group, and 12% in the 35-49 age group. This indicates that financial well-being becomes increasingly critical for older adults, aligning with research that emphasizes the importance of financial security in later life (Lusardi et al. 2010).

In contrast, economic satisfaction and basic need affordability do not show significant moderation by age. This suggests that perceptions of economic satisfaction and the ability to

afford basic needs are equally important across all age groups. This finding is consistent with research showing that economic stability is a fundamental determinant of life satisfaction for everyone, regardless of age (Kahneman and Deaton 2010).

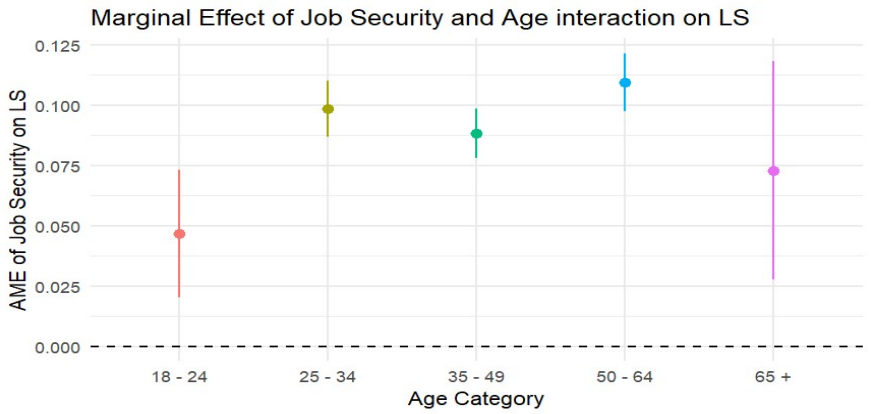

Figure 16: Job Security and Age Interaction on Life Satisfaction

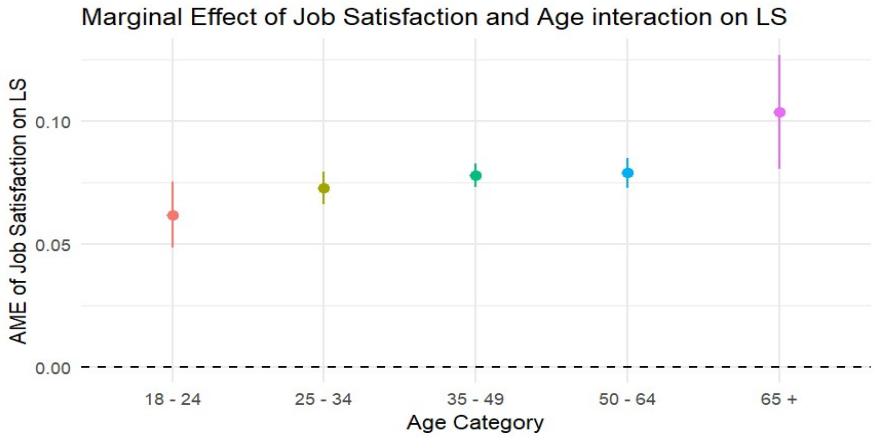

Figure 17: Job Satisfaction and Age Interaction on Life Satisfaction

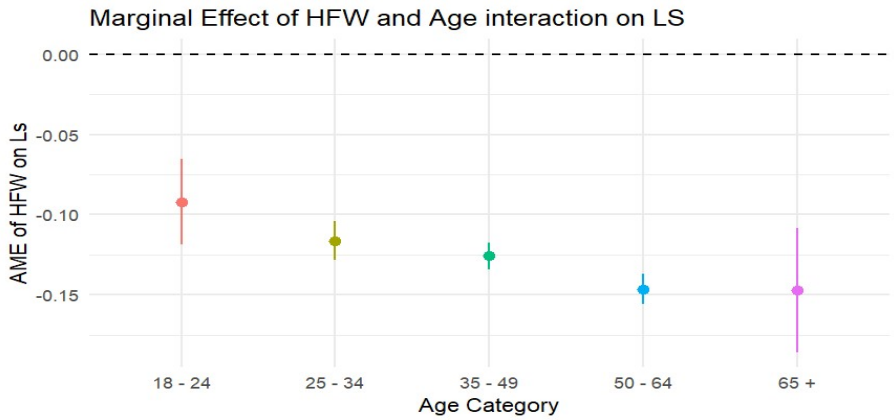

Figure 18: Household Financial Well-being and Age interaction on Life Satisfaction

The moderation analysis for environmental factors, detailed in Table 4, provides partial support for Hypothesis 9, which proposed that age moderates the impact of environmental factors on life satisfaction. The analysis shows that age significantly moderates the relationship between housing satisfaction and access to local amenities with life satisfaction. For housing satisfaction, the simple slopes and marginal effects (Figure 19) indicate that its positive impact on life satisfaction becomes more substantial with age. Specifically, for the 65+ age group, a one-unit increase in housing satisfaction is associated with a 10% increase in the odds of high life satisfaction. This effect reflects the critical importance of a stable and secure living environment in later life, as older adults often place greater value on housing stability (Oswald et al. 2015). In younger age groups, the impact is slightly less pronounced but still positive, with a 7-8% increase in the odds of high life satisfaction for those aged 25-64. Access to local amenities also shows a significant moderation effect, particularly in the 25-34 and 50-64 age groups, as illustrated in Figure 20. A one-unit increase in access to local amenities leads to a 9% increase in the odds of high life satisfaction for the 25-34 age group and an 8% increase for the 50-64 age group. This finding suggests that these age groups, which may have higher mobility needs and a greater reliance on nearby resources, derive more benefit from improved access to local amenities (Murray 2015). However, for the 18-24

and 65+ age groups, the effect is not significantly different from zero, indicating that access to local amenities does not significantly impact life satisfaction in these groups, possibly due to different lifestyle needs or mobility patterns.

In contrast, neighbourhood safety does not show significant moderation by age, indicating that perceptions of neighbourhood safety impact life satisfaction similarly across all age groups. This uniform effect suggests that feeling safe in one's neighbourhood is equally important for life satisfaction regardless of age (Pei 2024)

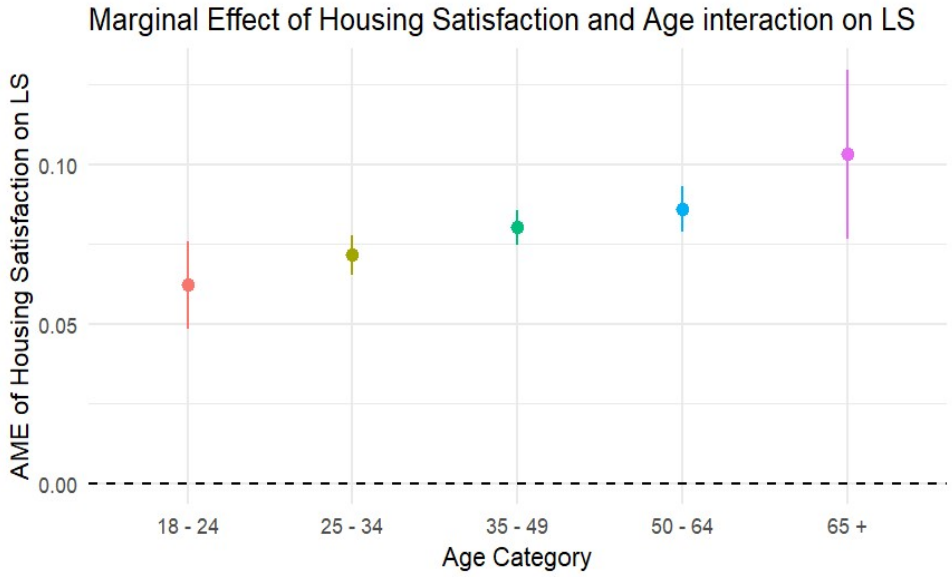

Figure 19: Housing Satisfaction and Age interaction on Life Satisfaction

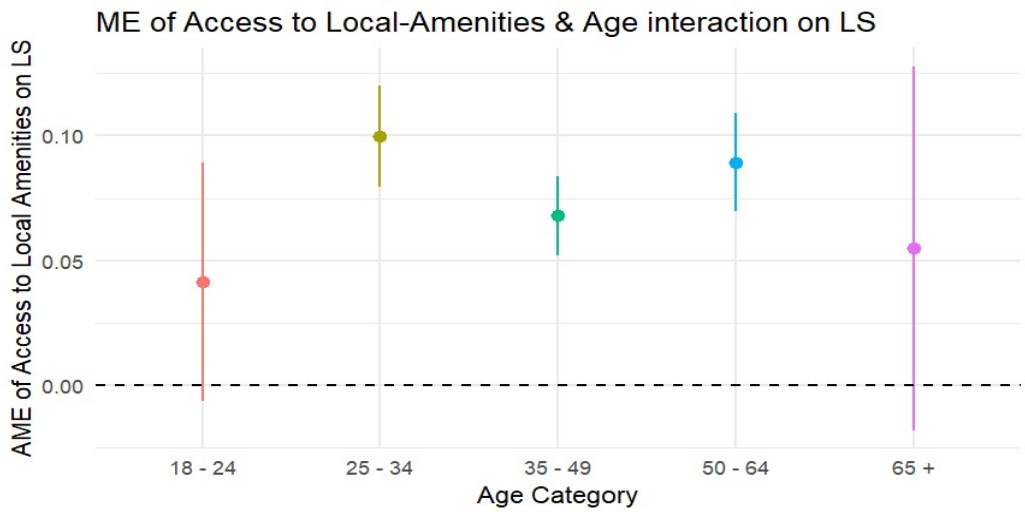

Figure 20: Access to Local Amenities and Age Interaction

Finally, the moderation analysis for psychological factors, detailed in Table 4, does not support Hypothesis 10, which proposed that age moderates the impact of psychological factors on life satisfaction. None of the interaction terms for work-life balance, subjective well-being, or work hours life balance are statistically significant, indicating that these factors influence life satisfaction consistently across different age groups (Blanchflower and Oswald 2008). The universal importance of maintaining a healthy work-life balance, feeling good about oneself (subjective well-being), and managing work hours likely explains why these factors remain critical to life satisfaction regardless of age. Whether individuals are early in their careers, mid-career, or approaching retirement, these concerns are fundamental to overall well-being.

Given the absence of significant age interactions, Hypothesis 10 is rejected. These findings suggest that the influence of psychological factors on life satisfaction is stable throughout life, highlighting their consistent role in shaping well-being across all age groups. This consistency underscores the idea that challenges related to balancing work and life, sustaining subjective well-being, and managing work hours are universally relevant, making them key determinants of life satisfaction at any stage of life.

4.5 Predicting Using Machine Learning

4.5.1 Logit Prediction Model Performance

After performing logistic regression, it was essential to validate the model's predictive power and generalizability.

The logistic regression model was trained using 10-fold cross-validation, ensuring robust evaluation and mitigating overfitting by averaging performance across different data splits. During cross-validation, the model achieved an average accuracy of 80.50% and a Kappa statistic of 0.5027, a measure that accounts for the possibility of agreement occurring by chance and evaluates the agreement between predicted and actual classifications.

Upon evaluating the model on the test data, it yielded an overall accuracy of 79.64%, this accuracy metric aligns with Harrell's (2015) study on regression modelling strategies that an accuracy above 70% is indicative of a robust model. The sensitivity of 56.22% and a specificity of 89.82% indicate a good balance between correctly identifying positive cases and avoiding false alarms (see Table 5 for the confusion matrix).

To further assess the model's performance, the Receiver Operating Characteristic (ROC) curve was utilized. The ROC curve graphically represents the classifier's ability to discriminate between positive and negative classes across various threshold settings. The Area Under the ROC Curve (AUC) was calculated by plotting the true positive rate (sensitivity) against the false positive rate (1-specificity) at different threshold levels, resulting in an AUC of 0.8507. This result signifies excellent discriminative power, aligning with the benchmarks outlined by Hosmer et al. (2013) in their study on applied logistic regression. According to these benchmarks, an AUC between 0.8 and 0.9 in social sciences especially is considered to indicate very good performance, highlighting the model's effectiveness in distinguishing between classes (see Figure 21 for the ROC curve) (Fawcett 2006).

Table 5: Confusion Matrix Table for LPM

	Reference	
Prediction	Not Satisfied	Satisfied
Not Satisfied	411	171
Satisfied	320	1509

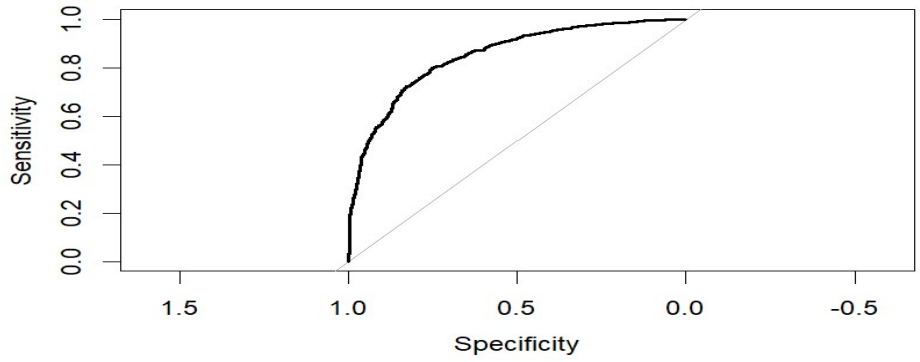

Figure 21: ROC curve for Logit Prediction Model

In summary, the logistic regression model exhibited strong predictive performance, supported by the accuracy and AUC values, which align with the benchmarks set by Harrell (2015) and Hosmer et al. (2013). The model's consistent performance across training, cross-validation, and testing phases underscores its generalizability and reliability, affirming its suitability and significance in the context of this research.

CHAPTER V: CONCLUSION

5.1 Summary

This dissertation has developed predictive models to examine how various quality of life (QoL) factors—spanning health, social, economic, psychological, and environmental dimensions—influence overall life satisfaction across different age groups in Europe. Age was investigated as a moderating variable to explore its effect on these relationships, providing nuanced insights into how life satisfaction determinants interact across the lifespan. By employing advanced logistic regression analysis, this study offers a detailed understanding of the predictors of life satisfaction and their varying impact based on age.

The key findings indicate that the examined hypotheses, which encompass critical aspects of health, social, economic, psychological, and environmental factors, generally show a significant impact on life satisfaction. The moderation analysis revealed that age significantly influences the relationship between several QoL factors and life satisfaction. Specifically, access to healthcare, quality of health services, community engagement, family life satisfaction, job security, job satisfaction, household financial well-being, housing satisfaction, and access to local amenities were all found to be moderated by age. In contrast, psychological factors such as work-life balance, subjective well-being, and work hours-life balance showed a consistent impact across all age groups, highlighting their universal importance.

The analysis also uncovered that older adults place a higher value on access to healthcare and housing stability, reflecting their greater reliance on these factors as they age. Conversely, younger individuals benefit more from community engagement and access to local amenities, which are more relevant to their active lifestyles. Financial well-being and job security were found to be increasingly critical for older adults, emphasizing their concerns about stability and security as they approach or navigate retirement. The consistent importance of factors

like work-life balance and subjective well-being across age groups suggests that these elements are fundamental to life satisfaction at any stage of life.

The logistic regression model used in this study demonstrated robust predictive performance, with high accuracy and an Area Under the ROC Curve (AUC) that indicated excellent discriminative power. The model's consistent performance across training, cross-validation, and testing phases affirms its reliability and generalizability. This confirms that the model is well-suited for predicting life satisfaction outcomes and underscores the importance of considering age-specific strategies to effectively enhance life satisfaction.

5.2 Implications

5.2.1 Theoretical Implications

This study reinforces the multifaceted nature of life satisfaction by demonstrating its influence by a broad spectrum of QoL factors. The findings highlight the significant moderating role of age in these relationships, emphasizing the importance of demographic variables in theoretical models of life satisfaction. Different age groups value health care access, community engagement, and financial well-being differently, providing a nuanced understanding of life satisfaction across the lifespan. The universal importance of psychological well-being, such as work-life balance and subjective well-being, across all age groups suggests that theoretical frameworks should account for the consistent impact of psychological health on life satisfaction.

The study supports several existing theories, including Diener's Subjective Well-Being (SWB) theory, Maslow's hierarchy of needs, and Pacione's Environmental Quality of Life Theory, which emphasize the complex, interrelated factors contributing to life satisfaction. The study’s use of advanced machine learning tools and regression model illustrates the potential for these methodologies to enhance theoretical research in the social sciences,

demonstrating the value of integrating machine learning techniques for more accurate and robust theoretical constructs. The results underscore the interplay between multiple dimensions of QoL, indicating that life satisfaction cannot be fully understood by examining single factors in isolation. Theoretical models should incorporate these interactions to provide a comprehensive understanding of life satisfaction.

Additionally, the study's findings have implications for policy and practice, supporting theories that advocate for targeted, demographic-specific strategies to enhance well-being. By identifying key areas where interventions can improve life satisfaction, such as enhancing health care access for older adults or increasing community engagement for younger individuals, the research promotes the development of comprehensive and inclusive theoretical models in the study of well-being. These theoretical implications contribute to a deeper understanding of life satisfaction and provide a foundation for future research to build upon.

5.2.2. Managerial implications and recommendations

The findings of this study highlight several important managerial implications and actionable recommendations to enhance life satisfaction through targeted interventions across various quality of life (QoL) dimensions. Access to health care and health services significantly impacts life satisfaction, particularly for older adults. Therefore, organizations should invest in comprehensive health and wellness programs, offering regular health check-ups, mental health support, and wellness activities. Psychological well-being, including work-life balance, is universally important across all age groups, suggesting that companies should promote flexible working hours, remote work options, and employee assistance programs to maintain a healthy work-life balance.

Job security and financial well-being are critical for life satisfaction, especially for older employees. Employers should provide competitive salaries, robust retirement plans, and job

security assurances, along with financial planning workshops. Community engagement and strong social support networks enhance life satisfaction, particularly for younger individuals. Encouraging community involvement through corporate social responsibility initiatives and volunteer programs can foster social connections and a sense of belonging. Housing satisfaction and environmental quality significantly affect life satisfaction, especially for older adults, indicating the need for housing assistance programs, relocation support, and promoting a healthy work environment with access to green spaces.

Different age groups value various QoL factors differently, requiring tailored interventions. Organizations should develop age-specific programs that address the unique needs of different demographic groups, such as career development opportunities and social engagement activities for younger employees, and health care access and financial planning support for older employees. Implementing regular surveys and feedback mechanisms can help gauge employee satisfaction and identify areas for improvement, ensuring that programs meet the evolving needs of the workforce. By adopting these strategies, organizations can enhance life satisfaction among their employees, leading to a more motivated, productive, and loyal workforce, ultimately contributing to the overall success and sustainability of the organization.

5.3 Limitations

Despite the valuable insights provided by this study, several limitations should be noted. The reliance on self-reported data from the European Quality of Life Survey (EQLS) may introduce biases, such as social desirability or recall bias, which could affect the accuracy of the results. The study focused exclusively on employed individuals, which may limit the generalizability of the findings to other groups, such as the unemployed or retired. Although advanced machine learning tools and regression models were used, unmeasured confounding

variables, such as genetic predispositions or personality traits, might still influence the results. Additionally, the emphasis on age as the primary moderating variable may overlook other potential moderators, such as gender, education, and socio-economic status. The European context of the study may also restrict the applicability of the findings to regions with different cultural, economic, and social contexts. Finally, while the study's model provides useful insights, comparing its performance with other models, such as random forests, and assessing variable importance could offer a more comprehensive understanding of the factors influencing life satisfaction.

5.4 Recommendation for Further Research

Future research should include unemployed and retired individuals to enhance generalizability, explore additional moderating variables such as gender, education, and socio-economic status, and employ longitudinal designs, such as tracking the same individuals over several years, to establish causality. Cross-cultural studies should also be conducted to examine the applicability of these findings in different regions. Incorporating qualitative methods, such as interviews and focus groups, could provide deeper insights into the mechanisms driving life satisfaction.

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APPENDICES

Appendix A: Variable Definitions

Table A1: Variables Definition Table

Variable	Definition	Data Values	Variable Type	Question code
Outcome Variable				
Life Satisfaction	A composite score was created for a single question assessing the extent to which a respondent is satisfied with their life. This question is on a Likert scale of 1 to 10, measuring the level of life satisfaction, with higher scores indicating greater satisfaction.	1 = "Satisfied" 0 = "Not Satisfied"	Dummy Variable	Q4
Explanatory Variables				
Health Status	Composite score based on 1 question demonstrating the health status of the respondent. Each question is on a Likert scale of 1 to 5, assessing the level of agreement and disagreement to the question	1 = "Very Good" 5 = "Very Bad"	Ordinal Variable	Q48
Chronic Health Issues	A composite score based on a question about the presence of chronic physical or mental health problems, illness, or disability. This question uses a binary scale where 1 indicates "yes" and 0 indicates "no,"	1 = "Yes" 0 = "No"	Dummy Variable	Q49

	allowing us to assess the prevalence of chronic health issues among respondents.			
Access to Healthcare Services	A composite score based on four questions regarding access to health care services. These questions use a Likert scale from 1 to 3, assessing the ease of access to health care services among respondents.	1 = "Very Difficult" 3 = "Not Difficult at all"	Ordinal Variable	Q61a, Q61b, Q61c, Q61d
Mental Well-being	A composite score was based on three questions regarding mental well-being. These questions assess feelings such as loneliness, tension, and depression, using a Likert scale from 1 to 6. This composite score allows us to gauge the mental well-being of respondents comprehensively.	1 = "All of The Time" 6 = "At No Time"	Ordinal Variable	Q52a, Q52b, Q52c
Health Services Quality	A composite score based on a single question relating to the quality of health services. This question uses a Likert scale from 1 to 10, allowing us to assess the perceived quality of health services among respondents.	1 = "Very Poor Quality" 10 = "Very High Quality"	Ordinal Variable	Q58a
Social Support Network	A composite score based on a single question relating to the social support network. This question assesses the type of social support available, allowing us to understand the	1 = "Family Member" 2= "Non-Family Member" 3= "Service Provider"	Nominal Variable	Q40d

	primary source of social support for respondents.	4 = “Nobody”		
Community Engagement	A composite score was generated based on a single question assessing the frequency of social interaction, specifically social activities. This question uses a Likert scale from 1 to 5, allowing us to measure how often respondents engage in social activities.	1 = “Everyday” 5 = “Never”	Ordinal Variable	Q27d
Time for Social activities	A composite score was based on four questions assessing the time available for social activities, such as family contacts, non-family contacts, and hobbies. This question uses a Likert scale from 1 to 3, allowing us to measure the amount of time respondents spend for social activities.	1 = “Spend Less Time” 3 = “Spend More Time”	Ordinal Variable	Q47a, Q47b, Q47c
Family Life Satisfaction	A composite score based on a single question assessing family life satisfaction. This question uses a Likert scale from 1 to 10, allowing us to measure the respondents' satisfaction with their family life.	1 = “Very Dissatisfied” 10 = “Very Satisfied”	Ordinal Variable	Q6e
Social Exclusion	A composite score based on four questions about social exclusion, such as feeling left out of society or being looked down upon. These questions use	1 = “Strongly Agree” 5 = “Strongly Disagree”	Ordinal Variable	Q36a, Q36b, Q36c, Q36d

	a Likert scale from 1 to 5, allowing us to measure the extent of social exclusion experienced by respondents.			
Job Security	A composite score based on one question assessing job security, specifically the likelihood of losing one's job in the next six months. These questions use a Likert scale from 1 to 5, allowing us to measure the respondents' perceptions of their job security.	1 = "Very Likely" 5 = "Very Unlikely"	Ordinal Variable	Q21
Job Satisfaction	A composite score was generated based on a single question assessing job satisfaction. This question uses a Likert scale from 1 to 10, allowing us to measure the respondents' overall job satisfaction.	1 = "Very Dissatisfied" 10 = "Very Satisfied"	Ordinal Variable	Q6b
Economic Satisfaction	A composite score was based on a single question assessing satisfaction with the economy. This question uses a Likert scale from 1 to 10, allowing us to measure the respondents' overall satisfaction with the economic situation.	1 = "Very Dissatisfied" 10 = "Very Satisfied"	Ordinal Variable	Q32
Household Financial Well-being	A composite score was based on a single question assessing the financial situation per household. This question	1 = "Very Easily" 6 = "Great Difficulty"	Ordinal Variable	Q88

	evaluates how easily households can make ends meet, using a Likert scale from 1 to 6, allowing us to measure the respondents' overall financial well-being.			
Basic-Need Affordability	A composite score was generated based on six questions assessing the basic need affordability of respondents, with questions such as affording warmth and holiday, using a binary scale to measure the ability of households to afford basic necessities.	1 = "Yes" 0 = "No"	Dummy Variable	Q89a, Q89b, Q89c, Q89d, Q89e, Q89f
Housing Satisfaction	A composite score based on a single question assessing housing satisfaction. This question uses a Likert scale from 1 to 10, allowing us to measure the respondents' overall satisfaction with their housing situation.	1 = "Very Dissatisfied" 10 = "Very Satisfied"	Ordinal Variable	Q6d
Neighbourhood Safety	A composite score was generated based on two questions assessing neighbourhood safety, such as feeling safe from crime. These questions use a Likert scale from 1 to 10, allowing us to measure the respondents' perceptions of safety in their neighbourhood.	1 = "Strongly Agree" 5 = "Strongly Disagree"	Ordinal Variable	Q55a, Q55b

Access to Local Amenities	A composite score was based on six questions assessing access to local amenities. These questions use a Likert scale from 1 to 4, allowing us to measure the respondents' ease of access to various local amenities.	1 = "Very Difficult" 4 = "Very Easy"	Ordinal Variable	Q56a, Q56b, Q56c, Q56d
Work- Life Balance	A composite score based on three questions assessing work-life balance. These questions include items such as coming home too tired due to work and difficulty in fulfilling family responsibilities, using a Likert scale from 1 to 6, allowing us to measure the respondents' ability to balance work and personal life.	1 = "Everyday" 6 = "Never"	Ordinal Variable	Q20a, Q20b, Q20c
Subjective Well-being	A composite score was based on three questions assessing subjective well-being, such as future optimism. These questions use a Likert scale from 1 to 5, allowing us to measure the respondents' overall subjective well-being and outlook on the future.	1 = "Strongly Agree" 5 = "Strongly Disagree"	Ordinal Variable	Q7a, Q7c, Q7d
Working Hours Life Balance	A composite score based on a single question assessing working hours and life balance. This question evaluates how well working hours fit with family and social lives, using a	1 = "Very Well" 4 = "Not At All Well"	Ordinal Variable	Q19

	Likert scale from 1 to 4, allowing us to measure the respondents' ability to balance their working hours with their personal and social lives.			
Moderator Variable				
Age	Age group of respondents	1 = "18 - 24" 2 = "25 – 34" 3 = "35 – 49" 4 = "50 – 64" 5 = "65 +"	Nominal Variable	Agegroup
Control Variables				
Gender	Gender of respondents	1 = "Male" 0 = "Female"	Dummy Variable	HH2a
Marital Status	Marital status of respondents	1 = Never Married 2 = Married 3 = Separated 4 = Widowed 5 = Divorced	Nominal Variable	Q37
Education Level	Education status of respondents	1 = Lower Secondary or Below 2 = Upper Secondary or Post-Secondary 3 = Tertiary	Nominal Variable	Education_3categories
Employment Status	Employment status of respondents	1 = employed 2 = unemployed <12 months	Nominal Variable	Empstatus_8categories _TREND

		3 = unemployed >12 months 4 = unable to work due to illness or disability 5 = retired 6 = homemaker 7 = student 8 = other		
Work Sector	Work sector of respondents	1 = Government Administration 2 = Other Public Sector 3 = Private Sector 4 = others	Nominal Variable	Q13

Appendix B: Pearson Correlation

Table B1: P-values for correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
LS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
JS	.00	.00	.00	.00	.00	.00	.77	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.40	.33	.00	.00
HFW	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.54	.00	.00	.00	.00
JS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.73	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.79	.00	.00
ES	.00	.00	.00	.00	.00	.00	.78	.00	.00	.00	.18	.00	.35	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00
HS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.49	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.57	.00
CHI	.00	.77	.00	.00	.78	.00	.00	.58	.53	.00	.00	.00	.00	.05	.02	.09	.40	.93	.02	.69	.00	.02	.00	.00	.00	.00	.23
HA	.00	.00	.00	.00	.00	.00	.58	.00	.00	.00	.00	.10	.14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.17	.42	.00	.00
HQ	.00	.00	.00	.00	.00	.00	.53	.00	.00	.00	.64	.00	.72	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.06	.03	.00	.00
MW	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
SS	.00	.00	.01	.00	.18	.00	.00	.00	.64	.00	.00	.01	.53	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.14	.01	.06	.34
CE	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TSA	.00	.00	.26	.73	.35	.49	.00	.14	.72	.00	.53	.04	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.61	.00	.56	.71	.00
FLS	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.12	.00	.00	.00	.00
SE	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.47	.00	.00
HS	.00	.00	.00	.00	.00	.00	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.34	.00	.00
NS	.00	.00	.00	.00	.00	.00	.40	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.30	.00	.00
ALA	.00	.00	.00	.00	.00	.00	.93	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.16	.74	.49	.23	.00
BNA	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.97	.21	.00	.00	.00
WLB	.00	.00	.00	.00	.00	.00	.69	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.60	.00	.00
SW	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00
WL	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	.05	.00	.00

Appendix C: Hypothesis Testing
Table C1: Result for logit moderation analysis

Main and Interaction Effects	Coefficient	Pr(>|t|)	AME
Health Status (HS)*Age Category			
Intercept	2.09	0.00***	
HS	-0.58	0.00***	
18-24	Ref group	Ref group	
25-34	0.01	0.94	
35-49	0.14	0.59	
50-64	0.29	0.29	
65+	1.32	0.03*	
HS*18 - 24 (Ref group)	Ref group	Ref group	
HS*25 – 34	-0.04	0.74	
HS*35 – 49	-0.09	0.49	
HS*50 – 64	-0.15	0.76	
health*status*65+	-0.39	0.10	
AIC	14014		
Mental Wellbeing (MW)*Age Category			
Intercept	-2.41	0.00***	
MW	0.73	0.00***	
18-24	Ref group	Ref group	
25-34	0.78	0.10	
35-49	0.22	0.64	
50-64	0.01	0.96	
65+	-1.48	0.14	
MW*18 - 24 (Ref group)	Ref group	Ref group	
MW*25 - 34	-0.19	0.06	
MW*35 – 49	-0.09	0.31	
MW*50 – 64	-0.1	0.28	
MW*65+	0.24	0.22	
AIC	13526		
Chronic Health Issues (CHI)*Age Category			
Intercept	1.11	0.00***	
CHI	-0.29	0.33	
18-24	Ref group	Ref group	
25-34	-0.13	0.22	

35-49	-0.21	0.04*	
50-64	-0.33	0.00**	
65+	0.01	0.95	
CHI*18 - 24 (Ref group)	Ref group	Ref group	
CHI*25 - 34	0.2	0.52	
CHI*35 - 49	0.14	0.63	
CHI*50 - 64	0.05	0.87	
CHI*65+	0.04	0.91	
AIC	14650		
Healthcare Access (HA)*Age Category			
Intercept	-0.13	0.73	
HA	0.49	0.00**	
18-24	Ref group	Ref group	
25-34	-0.30	0.55	
35-49	-0.80	0.10	
50-64	-0.88	0.08	
65+	-2.21	0.01*	
HA*18 - 24 (Ref group)	Ref group	Ref group	0.09
HA*25 - 34	0.07	0.71	0.11
HA*35 - 49	0.22	0.25	0.14
HA*50 - 64	0.18	0.36	0.14
HA*65+	0.85	0.02*	0.24
AIC	14350		
Health Services Quality (HSQ)*Age Category			
Intercept	-0.31	0.00***	
HSQ	0.21	0.00***	
18-24	Ref group	Ref group	
25-34	-0.16	0.61	
35-49	-0.19	0.52	
50-64	-0.73	0.02*	
65+	-1.01	0.06	
HSQ*18 - 24 (Ref group)	Ref group	Ref group	0.03
HSQ*25 - 34	0.01	0.78	0.04
HSQ*35 - 49	0.00	0.92	0.04
HSQ*50 - 64	0.06	0.16	0.05
HSQ*65+	0.16	0.05*	0.06
AIC	13916		
Community Engagement (CE)*Age Category			
Intercept	1.31	0.00***	
CE	-0.05	0.44	
18-24	Ref group	Ref group	
25-34	0.28	0.42	
35-49	0.64	0.06	
50-64	0.68	0.00**	
65+	1.20	0.07	
CE*18 - 24 (Ref group)	Ref group	Ref group	-0.01
CE*25 - 34	-0.1	0.23	-0.03

CE*35 - 49	-0.21	0.01*	-0.05
CE*50 - 64	-0.32	0.00***	-0.08
CE*65+	-0.31	0.05*	-0.07
AIC	14387		
Time for Social Activities (TSA)*Age Category			
Intercept	0.13	0.77	
TSA	0.44	0.04*	
18-24	Ref group	Ref group	
25-34	-0.42	0.40	
35-49	-0.07	0.87	
50-64	0.35	0.48	
65+	1.47	0.15	
TSA*18 - 24 (Ref group)	Ref group	Ref group	
TSA*25 - 34	0.13	0.56	
TSA*35 – 49	-0.07	0.74	
TSA*50 - 64	-0.34	0.14	
TSA*65+	-0.71	0.13	
AIC	14578		
Family Life Satisfaction (FLS)*Age Category			
Intercept	-1.62	0.00***	
FLS	0.34	0.00***	
18-24	Ref group	Ref group	
25-34	-0.73	0.11	
35-49	-1.01	0.02*	
50-64	-0.79	0.08	
65+	-1.94	0.02*	
FLS*18 - 24 (Ref group)	Ref group	Ref group	0.05
FLS*25 - 34	0.08	0.16	0.07
FLS*35 - 49	0.1	0.07	0.07
FLS*50 - 64	0.05	0.32	0.07
FLS*65+	0.24	0.03*	0.09
AIC	13195		
Social Exclusion (SE)*Age Category			
Intercept	-2.25	0.00***	
SE	0.89	0.00***	
18-24	Ref group	Ref group	
25-34	0.41	0.40	
35-49	-0.57	0.23	
50-64	-0.55	0.26	
65+	-2.13	0.03*	
SE*18 - 24 (Ref group)	Ref group	Ref group	
SE*25 – 34	-0.14	0.28	
SE*35 - 49	0.07	0.55	
SE*50 - 64	0.01	0.93	
SE*65+	0.48	0.06	
AIC	13282		
Job Security (JS)*Age Category			
Intercept	0.11	0.70	

JS	0.26	0.00**	
18-24	Ref group	Ref group	
25-34	-1.23	0.00***	
35-49	-1.01	0.00**	
50-64	-1.54	0.00***	
65+	-0.65	0.28	
JS*18 - 24 (Ref group)	Ref group	Ref group	0.04
JS*25 - 34	0.28	0.00**	0.09
JS*35 - 49	0.18	0.02*	0.08
JS*50 - 64	0.26	0.00**	0.10
JS*65+	0.11	0.42	0.07
AIC	13932		
Job Satisfaction (JS)*Age Category			
Intercept	-1.55	0.00***	
JS	0.37	0.00***	
18-24	Ref group	Ref group	
25-34	-0.51	0.19	
35-49	-0.73	0.05.	
50-64	-0.73	0.05.	
65+	-2.23	0.00**	
JS*18 - 24 (Ref group)	Ref group	Ref group	0.06
JS*25 - 34	0.05	0.36	0.07
JS*35 - 49	0.06	0.21	0.07
JS*50 - 64	0.03	0.49	0.07
JS*65+	0.25	0.02*	0.10
AIC	12957		
Economy Satisfaction (ES)*Age Category			
Intercept	-0.52	0.00***	
ES	0.31	0.00***	
18-24	Ref group	Ref group	
25-34	-0.02	0.92	
35-49	0.02	0.93	
50-64	-0.46	0.07	
65+	-0.44	0.32	
ES*18 - 24 (Ref group)	Ref group	Ref group	
ES*25 - 34	0.00	0.87	
ES*35 - 49	-0.03	0.50	
ES*50 - 64	0.04	0.30	
ES*65+	0.10	0.26	
AIC	13444		
Household Financial Wellbeing (HFW)*Age Category			
Intercept	2.75	0.00***	
HFW	-0.52	0.00***	
18-24	Ref group	Ref group	
25-34	0.25	0.44	
35-49	0.44	0.16	
50-64	0.49	0.13	
65+	0.78	0.17	

HFW*18 - 24 (Ref group)	Ref group	Ref group	-0.09
HFW*25 - 34	-0.12	0.19	-0.11
HFW*35 - 49	-0.18	0.04*	-0.12
HFW*50 - 64	-0.26	0.00**	-0.12
HFW*65+	-0.31	0.05	-0.14
AIC	13022		
Basic Need Affordability (BNA)*Age Category			
Intercept	-0.25	0.00***	
BNA	1.71	0.00***	
18-24	Ref group	Ref group	
25-34	0.05	0.80	
35-49	-0.26	0.22	
50-64	-0.23	0.29	
65+	-0.64	0.11	
BNA*18 - 24 (Ref group)	Ref group	Ref group	
BNA*25 - 34	-0.29	0.26	
BNA*35 - 49	-0.01	0.95	
BNA*50 - 64	-0.25	0.33	
BNA*65+	0.77	0.10	
AIC	13722		
Housing Satisfaction (HS)*Age Category			
Intercept	-1.67	0.00***	
HS	0.38	0.00***	
18-24	Ref group	Ref group	
25-34	0.46	0.25	
35-49	0.80	0.04*	
50-64	1.00	0.01*	
65+	-2.12	0.02*	
HS*18 - 24 (Ref group)	Ref group	Ref group	0.06
HS*25 - 34	0.05	0.36	0.07
HS*35 - 49	0.06	0.22	0.08
HS*50 - 64	0.05	0.32	0.08
HS*65+	0.23	0.05.	0.10
AIC	13107		
Neighborhood Safety (NS)*Age Category			
Intercept	1.82	0.00***	
NS	-0.34	0.00***	
18-24	Ref group	Ref group	
25-34	0.07	0.78	
35-49	-0.12	0.61	
50-64	-0.19	0.45	
65+	-0.17	0.68	
NS*18 - 24 (Ref group)	Ref group	Ref group	
NS*25 - 34	-0.10	0.33	
NS*35 - 49	-0.07	0.48	
NS*50 - 64	-0.13	0.22	
NS*65+	0.01	0.94	
AIC	14278		

Access to Local Amenities (ALA)*Age Category			
Intercept	0.37	0.36	
ALA	0.22	0.09	
18-24	Ref group	Ref group	
25-34	-1.03	0.02*	
35-49	-0.55	0.20	
50-64	-0.96	0.03*	
65+	-0.24	0.74	
ALA*18 - 24 (Ref group)	Ref group	Ref group	0.04
ALA*25 - 34	0.29	0.03*	0.09
ALA*35 - 49	0.11	0.41	0.06
ALA*50 - 64	0.19	0.15	0.08
ALA*65+	0.06	0.77	0.05
AIC	14432		
Work Life Balance (WLB)*Age Category			
Intercept	-0.56	0.06	
WLB	0.43	0.00***	
18-24	Ref group	Ref group	
25-34	0.00	0.97	
35-49	-0.31	0.33	
50-64	-0.52	0.11	
65+	-0.68	0.28	
WLB*18 - 24 (Ref group)	Ref group	Ref group	
WLB*25 - 34	-0.02	0.72	
WLB*35 - 49	0.03	0.72	
WLB*50 - 64	0.01	0.89	
WLB*65+	0.07	0.62	
AIC	13958		
Subjective Wellbeing (SW)*Age Category			
Intercept	3.13	0.00***	
SW	-1.00	0.00***	
18-24	Ref group	Ref group	
25-34	-0.16	0.64	
35-49	0.30	0.38	
50-64	0.20	0.55	
65+	1.12	0.09	
SW*18 - 24 (Ref group)	Ref group	Ref group	
SW*25 - 34	0.05	0.74	
SW*35 - 49	-0.07	0.25	
SW*50 - 64	-0.16	0.28	
SW*65+	-0.46	0.10	
AIC	13057		
Work Hours Life Balance (WHLB)*Age Category			
Intercept	2.60	0.00***	
WHLB	-0.71	0.00***	
18-24	Ref group	Ref group	
25-34	-0.52	0.12	

35-49	-0.45	0.16
50-64	-0.89	0.00**
65+	-0.19	0.71
WHLB*18 - 24 (Ref group)	Ref group	Ref group
WHLB*25 - 34	0.18	0.20
WHLB*35 - 49	0.11	0.40
WHLB*50 - 64	0.21	0.12
WHLB*65+	-0.04	0.86
AIC	14214	

Gender * Age Category		
Intercept	1.13	0.00***
Male	-0.10	0.60
25-34	0.04	0.77
35-49	-0.19	0.17
50-64	-0.45	0.00**
65+	0.02	0.93
Male*25 - 34	-0.30	0.15
Male*35 - 49	-0.02	0.89
Male*50 - 64	0.19	0.36
Male*65+	-0.10	-0.77
AIC	14634	

Work Sector* Age Category		
Intercept	1.21	0.00***
Other public sector	0.34	0.47
Private sector	-0.19	0.58
Others	-0.36	0.53
25-34	0.01	0.97
35-49	-0.17	0.61
50-64	-0.26	0.45
65+	0.60	0.27
Other public sector*25 - 34	-0.42	0.40
Private sector*25-34	-0.13	0.73
Others*25-34	0.03	0.96
Other public sector*35 - 49	-0.25	0.59
Private sector*35-49	-0.03	0.91
Others*35-49	0.06	0.91
Other public sector*50 - 64	-0.37	0.45
Private sector*50-64	-0.10	0.77
Others*50-64	-0.59	0.34
Other public sector*65+	-0.77	0.36
Private sector*65+	-0.82	0.16
Others*65+	-0.41	0.63
AIC	14620	

Marital Status* Age Category		
Intercept	1.11	0.00***
Married	0.06	0.82

Separated	-1.11	0.05.
Widowed	-1.17	0.17
Divorced	-11.67	0.92
25-34	-0.08	0.51
35-49	-0.22	0.08
50-64	-0.39	0.01*
65+	0.76	0.32
Married*25 - 34	-0.14	0.63
Separated*25-34	0.77	0.23
Widowed*25-34	0.14	0.92
Divorced*25-34	11.00	0.92
Married*35-49	0.04	0.88
Separated*35-49	0.53	0.37
Widowed*35-49	-0.04	0.95
Divorced*35-49	11.28	0.92
Married*50-64	0.05	0.87
Separated*50-64	0.68	0.26
Widowed*50-64	0.42	0.63
Divorced*50-64	11.62	0.92
Married*65+	-0.86	0.30
Separated*65+	-0.76	0.50
Widowed*65+		
Divorced*65+	11.05	0.92
AIC	14568	

Education Level* Age Category		
Intercept	0.56	0.01*
Upper Secondary	0.48	0.06
Tertiary	0.94	0.00**
25-34	-0.16	0.52
35-49	-0.18	0.43
50-64	-0.06	0.79
65+	-0.01	0.96
Upper Secondary*25 - 34	-0.07	0.78
Tertiary*25-34	-0.05	0.87
Upper Secondary*35 – 49	-0.24	0.37
Tertiary*35-49	0.11	0.71
Upper Secondary*50- 64	-0.52	0.05·
Tertiary*50-64	-0.20	0.53
Upper Secondary*65+	-0.32	0.46
Tertiary*65+	0.33	0.52
AIC	14321	

Social Support* Age Category		
Intercept	1.32	0.00***
Non-Family	-0.42	0.03*
Service provider	-0.45	0.41
Nobody	-1.32	0.00**
25-34	0.12	0.41
35-49	0.37	0.01*

50-64	0.55	0.00***
65+	0.16	0.47
Non-family*25 - 34	-0.00	0.96
Service provider*25-34	-0.12	0.83
Nobody*25-34	0.47	0.38
Non-family*35 – 49	0.28	0.19
Service provider*35-49	0.25	0.66
Nobody*35-49	0.63	0.22
Non-family*50- 64	-0.28	0.18
Service provider*50-64	0.47	0.41
Nobody*50-64	1.03	0.04*
Non-family*65+	-0.00	0.98
Service provider*65+	0.67	0.59
Nobody*65+	0.86	0.28
AIC	14614	

Method;
Maximum Likelihood Estimation (MLE)
Dependent Variable: Life Satisfaction
N = 12,056
Showing AME for only significant interactions
Significance codes: *** p < 0.001,
** p < 0.01, * p < 0.05

Figure C1: Marginal Effect of Health Services Quality and Age on Life Satisfaction.