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Life Satisfaction of Elderly in Institutions

The Importance of the Living Environment and Quality of Care for a Good Old Day

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Life Satisfaction of Elderly in Institutions:

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ABSTRACT

Population ageing increases the importance of taking care of the elderly. Although many studies investigate which factors influence elderly well-being, not much is known about the determinants of well-being for the specific subgroup of institutionalized elderly yet. We contribute to existing knowledge in this field by investigating the determinants of subjective well-being of residents in Dutch elderly institutions. Specifically, we investigate to what extent the quality of these institutions influences their residents' life satisfaction. This study provides evidence that Dutch elderly institutions are indeed able to contribute to their residents' subjective well-being. Satisfaction with privacy in the living environment is the most important determinant of life satisfaction for our sample. The quality of care influences satisfaction with life as well; both medical care and nursing care are important. Changes in health status as well as limitations in activities of daily living caused by pain are significantly related to life satisfaction. Interestingly, the living environment is more important than the quality of care in determining subjective well-being. Next to institutional quality, other factors play an important role: mental problems and loneliness are strongly negatively related to life satisfaction. Our results suggest scope for improvement in institutional quality in the Netherlands, especially with respect to diagnosing mental problems and adequate pain management. The factors that are the most important in determining life satisfaction appear to be important in explaining happiness as well. However, our results show differences in the determinants of life satisfaction as opposed to happiness too. In existing literature, life satisfaction and happiness are regularly used as subjective well-being measures and they are often used interchangeably. In this study, we show that for our sample, life satisfaction and happiness are somewhat different concepts and should therefore be treated distinctively.

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I thank my partner Freek Kamphuis and our daughter Eva Kamphuis for providing me with a substantial extent of happiness and for their contribution to my high satisfaction with life. Because of their tremendous positive influence on my state of mind, I succeeded in continuing my education and going through the process of writing this thesis.

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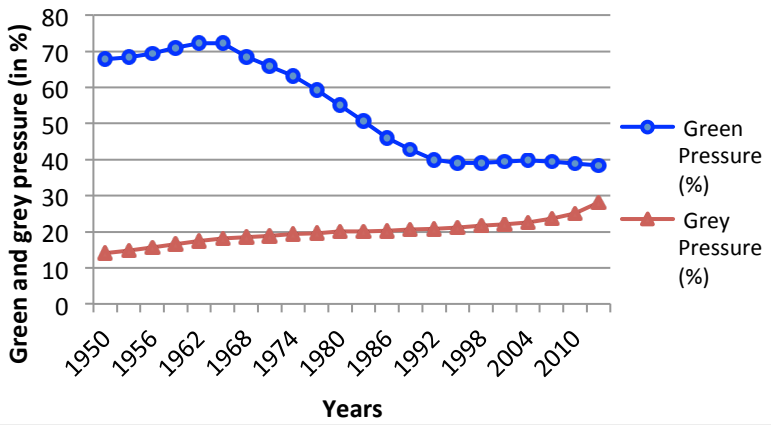
Chapter 1 Introduction

This study provides an insight in the determinants of subjective well-being among institutionalized elderly. Specifically, this study investigates to what extent Dutch elderly institutions can contribute to their residents' life satisfaction and happiness.

The Dutch population is ageing, as well as populations of many other European countries. Soon after World War II, in the late 1940s, many babies were born. This cohort is called the baby-boom generation (www.cbs.nl). After this explosive demographic boom, the Dutch birth rate has decreased over the years (Statline, CBS). Although the ageing process may be slower than in other OECD countries, population ageing is an important demographic trend in the Netherlands and is therefore a relevant topic of concern for policy makers. Two reasons for the Dutch population ageing exist: the relative number of elderly increases and at the same time life expectancy increases.

Statistics Netherlands (CBS) forecasts population growth in the Netherlands and expects the ageing process to continue in the upcoming years. In 2011, 15.2% of the Dutch population included people aged 65 years and above. The expected share of elderly in the Dutch population amounts to 18.5% in 2017 and is expected to increase to a maximum of 25.8% in 2037. Relatively, the group of elderly becomes an increasingly substantial part of society. The relative proportion of elderly in the population is often illustrated by the concept 'grey pressure'. Statistics Netherlands defines 'grey pressure' as "the number of people aged 65 and older to the number of people aged 20 - 64 years". Accompanied by the green pressure, the grey pressure gives an insight in the demographic composition. 'Green pressure' is defined as "the ratio of people aged 0 - 20 years to the number of people aged 20 - 64 years" (www.cbs.nl). Graph 1 below demonstrates the first reason for population ageing mentioned above; the rising share of elderly in the population. The graph illustrates the development of the grey pressure and green pressure from 1950 up until 2013.

Graph 1: Green and Grey Pressure (%) 1950 - 2013
This graph displays the development of the Dutch green pressure and grey pressure from 1950 up until 2013
(Source: CBS Statline)

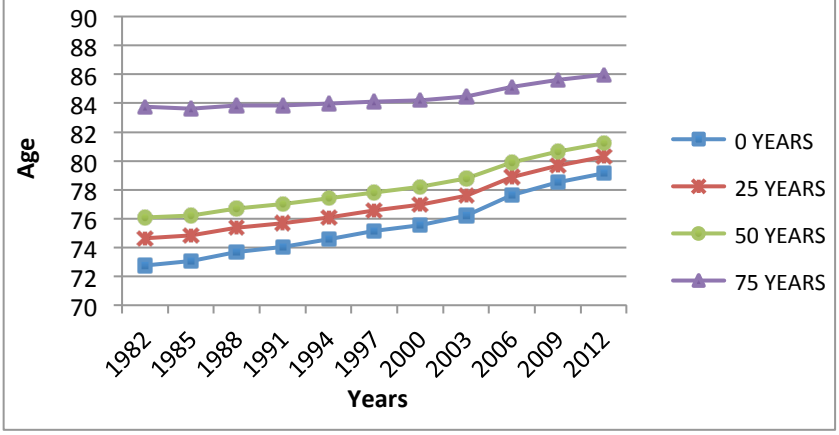


As Graph 1 shows, the grey pressure has increased substantially in the previous years whereas at the same time, the green pressure has sharply decreased. The green pressure fell from 69.9% in 1950 to 39.0% in 1995 and has flattened thereafter. The grey pressure has doubled over the years; it increased from 14.0% in 1950 to 28.0% in 2013. Comparing the different years reveals the change in the composition of the Dutch population towards a more 'grey' society.

The next graphs demonstrate the second reason for Dutch population ageing: a rising life expectancy. The increase in the life expectancy of Dutch males (Graph 2) and Dutch females (Graph 3) from 1982 up until 2012 is illustrated for different ages.

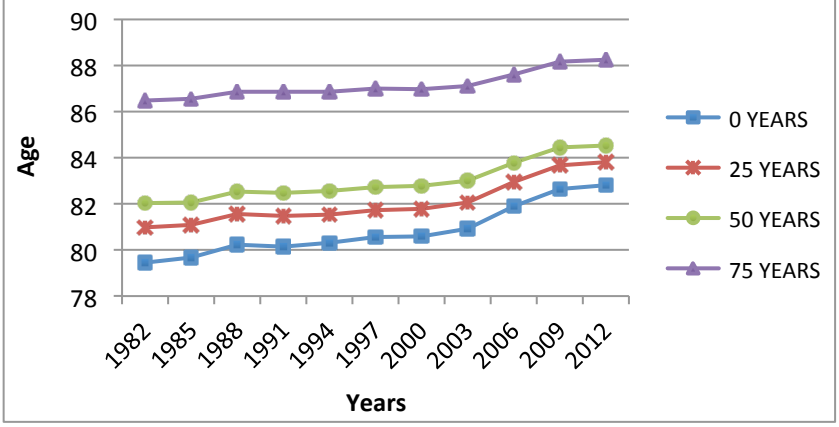
Graph 2: Male Life Expectancy 1982 -2012

This graph shows the life expectancy for Ducth males at birth, at age 25, age 50 and age 75 for the period 1982 up until 2012 (Source: CBS Statline)



Graph 3: Female Life Expectancy 1982 - 2012

This graph shows the life expectancy for Dutch females at birth, at age 25, age 50 and age 75 for the period 1982 up until 2012 (Source: CBS Statline)



As these two graphs show, life expectancy has risen substantially for both Dutch males and females. The increase in life expectancy is the largest for Dutch males. Life expectancy at birth for males has increased from 72.75 years in 1982 to 79.14 years in 2012. For females, life expectancy at birth has increased from 79.44 years in 1982 to 82.82 in 2012.

One of the effects of population ageing is the rise in demand for elderly care. As the development towards a more grey society increases the burden on (elderly) healthcare, the elderly care sector becomes an increasing area of concern for policy makers. The rising burden on elderly care especially concerns Long Term Care. The Dutch Long Term Elderly Care (LTEC) sector is the main sector of interest in this paper. As an increasing part of Dutch society contains old-aged people, of whom many live in elderly homes, attention should be directed towards their well-being. We consider providing these people with the help they need to experience at least a certain extent of well-being, also in their final stages of life, of high importance. Policy makers and caregivers must be provided as much insight as possible in the determinants of elderly well-being. Many scientists in different disciplines (for example economics, sociology, psychology, health-care and gerontology) share the view that the well-being of the elderly should be of increasing importance (Angelini et al., 2012; Cheng et al, 2011; Lacruz et al, 2010; Momtaz et al., 2010; Svensson et al. 2012).

Although elderly institutions may not be able to influence all aspects of their elderly residents' well-being, there may be some that are within the scope of influence of institutions. The main aim of this paper is to investigate the influence of elderly institutions' quality of care on their residents' well-being. Moreover, we investigate which other factors are important determinants of well-being for Dutch elderly in institutions. Next, we examine the data to see if differences in the importance of the determinants of subjective well-being exist between Dutch elderly residents of nursing homes and Dutch elderly living in residential homes. The focus of this study is on self-perceived well-being that is measured by life satisfaction. Although life satisfaction and happiness are two different concepts (on this, we elaborate further in the methodology section), they are used interchangeably in many studies. Therefore, we also consider whether the two concepts should be investigated separately for the Dutch elderly care sector. The research questions for this study are:

1) *What influences does the quality of care provided by elderly institutions have on their residents' overall subjective well-being?*
2) *What other determinants of subjective well-being are important for the Dutch institutionalized elderly?*
3) *Are the determinants of elderly subjective well-being different between elderly residents in nursing homes and elderly in residential homes?*
4) *Are there differences between the conceptually differing notions of subjective well-being as measured by life satisfaction and happiness for Dutch institutionalized elderly?*

According to the Netherlands Institute for Social Research (SCP) information about elderly living conditions is reported regularly (de Klerk, 2005). Although extensive literature investigating elderly well-being exists, mainly community-dwelling elderly (elderly living in the community) are discussed as the institutionalized elderly population is often excluded from national databases (Leedahl, 2013). Leedahl

(2013) and Wolff (2013) provide intuitive explanations for the exclusion of institutionalized elderly: the sample of institutionalized elderly may differ too much from samples containing community-dwelling elderly. Moreover, difficulties in assessing institutionalized elderly and potential measurement differences may play a role. At this point in time, still little knowledge exists on subjective well-being of institutionalized elderly. Obtaining more knowledge about the determinants of subjective well-being for the subpopulation of institutionalized elderly is highly relevant. This study contributes to current knowledge in this field in three ways. Firstly, we add knowledge to existing literature regarding the determinants of elderly subjective well-being for the subpopulation of institutionalized elderly. Specifically, we investigate the importance of the quality of elderly institutions in determining their residents' well-being. To the best of our knowledge, no other research has been done on the relationship between quality of Dutch elderly institutions and their residents' well-being. Secondly, as far as we know, we are the first to distinguish between nursing homes and residential homes in investigating the determinants of elderly well-being. Thirdly, we contribute to existing literature by distinguishing between the concepts of life satisfaction and happiness. Often, the concepts are used interchangeably although they are conceptually different. Some authors distinguish between the two concepts and regard them as different measures of subjective well-being (Mannel & Dupuis, 1996; OECD, 2013; Paim, 1995; Tse et al. 2013; Gueldner et al. 2013). In this study, we investigate whether the various determinants of life satisfaction are of different importance in determining happiness. We show that happiness and life satisfaction are indeed perceived as being different concepts by our sample's respondents and one should therefore distinguish between the two.

The remainder of this paper is organized as follows: Chapter 2 provides a description of the Dutch LTEC sector. In Chapter 3 we propose our conceptual framework and provide an overview of existing literature regarding our field of interest. Chapter 4 outlines the methodology, followed by a description of the dataset in Chapter 5. In Chapter 6 we present our results as well as an analysis of the results. Chapter 7 contains a robustness check. In Chapter 8, we start with a summary of the results, we provide policy recommendations and conclude with a discussion of the study limitations.

Chapter 2 Institutional setting: Dutch Long Term Elderly Care

Long Term Elderly Care in the Netherlands is part of the Long Term Care and is mostly covered by the AWBZ (Algemene Wet Bijzondere Ziektekosten) (www.rijksoverheid.nl). The AWBZ is a public insurance, covering all chronic care. The LTC consists of three major categories: informal care, formal care at home and formal care at institutions (Mot, 2010). For this study, our interest is directed to institutional elderly care, part of the sector 'care and nursing' (Verpleging en Verzorging, V&V).

2.1 Nursing homes and residential homes

Dutch institutional elderly care, also called inpatient care is divided, as the name of the sector already indicates, in two types of institutions: residential homes for the elderly, in Dutch 'verzorgingshuizen' and nursing homes, in Dutch 'verpleeghuizen' (Mot, 2010). Residential homes for the elderly are institutions with a focus on elderly with a relative low medical care need; they are especially relevant for the

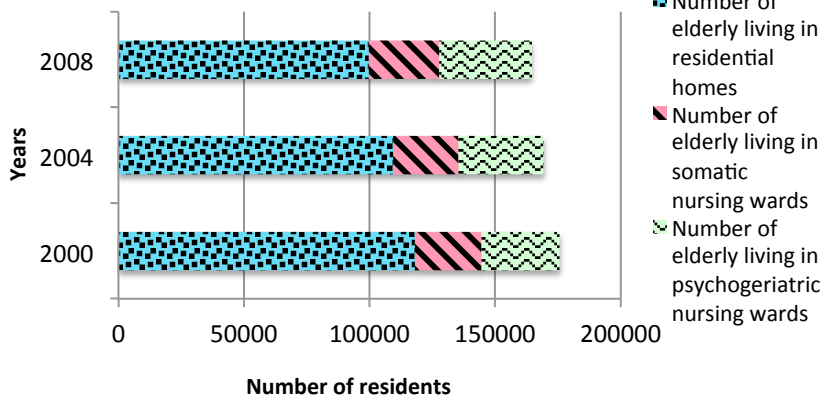
relatively healthy elderly who are not able to live on their own anymore. Nursing homes provide care to elderly in need of more intensive (medical) care (www.rijksoverheid.nl). Nursing homes can be distinguished in two subtypes: somatic nursing homes and psychogeriatric nursing homes. Somatic nursing homes host elderly in need of medical care as a result of physical limitations. Psychogeriatric nursing homes are meant for elderly with a certain extent of mental limitations, often accompanied by physical limitations, making them unable to live on their own. These homes are especially designed for treating people suffering from Alzheimer or comparable diseases. Although originally the difference between the types of nursing homes is obvious, the difference between the two types of elderly institutions became less clear in the last years as a result of several policy measures induced by Dutch government (Mot, 2010).

2.2 Facts and figures

The SCP published information about Dutch elderly institutions for the years 2000, 2004 and 2008 (de Klerk, 2011). In this study, we investigate subjective well-being of Dutch elderly in 2008 as our dataset contains only 2008 information. In 2008, a total of 164,582 Dutch elderly lived in institutions. This total contains 99,631 residents in residential homes and 64,951 residents in nursing homes. Nursing home residents are divided among somatic nursing wards (28,017 elderly) and psychogeriatric nursing wards (36,934 elderly). The 2008 residents were spread over a total of 1,989 institutions: 1,292 nursing homes, 299 somatic nursing wards and 398 psychogeriatric nursing wards. With respect to the institutions, the grand totals may actually be a bit lower than the numbers presented here due to the existence of combined nursing homes. Combined nursing homes contain somatic wards as well as psychogeriatric wards. Therefore, some nursing home institutions may be counted twice. According to de Klerk (2011), there is a lack of good registration of Dutch elderly institutions. For example, in counting the number of elderly institutions over the years, different registrations are used. Graph 4 depicts the information given above regarding the number of residents in elderly institutions in 2008, as well as the numbers for 2000 and 2004 as a reference:

Graph 4: Elderly in institutions 2000-2008

This graph provides an overview of the number of Dutch elderly living in residential homes, somatic nursing wards and psychogeriatric nursing wards for the years 2000, 2004 and 2008.
Source: de Klerk (2011)



Although the number of elderly has increased over the years, the institutionalized elderly population has decreased, as is illustrated in Graph 4. The large decrease of elderly in residential homes is accountable for that. According to the de Klerk (2011) the number of residential home inhabitants decreased from 118,082 in 2000 to 109,328 in 2004 to 99,631 in 2008. The number of nursing home residents has increased actually. The number of elderly in somatic nursing homes has increased from 26,391 in 2000 to 28,017 in 2008. Psychogeriatric nursing homes experienced an increase as well: together they took care of 31,224 elderly in 2000, which increased to 36,934 in 2008.

As we have seen, the decrease in the number of elderly in residential homes is accountable for the fall in the total institutionalized elderly population. This is the result of extramuralisation-measures, denoting the transition from inpatient care to outpatient care. Dutch policy makers strive to enable elderly to live longer in their own homes. Extramuralisation-measures are designed to release the burden on Long Term Elderly Care as a preparation for the substantial expected increase in the number of Dutch elderly. The measures especially target the relatively healthy elderly. For those who do not need intensive medical care, it is not always necessary to live in an elderly institution. Nursing care and help with domestic activities can also be received at home. The measures clearly have implications for elderly institutions other than only the current drop in residents. As the relatively healthy tend to live independently for a longer time, the population in Dutch elderly homes tends to consist of an increasing amount of elderly with more intensive medical care needs; making the population of institutionalized elderly to become frailer over the years.

To provide some insight in the expenses on Dutch elderly care, total expenses on elderly care as a percentage of GNP are depicted in Graph A.1.1, for the years 2001 up until 2012. The graph can be found in the appendix. Total expenditures on elderly care have increased, not only in absolute terms but also relatively to total GNP. Total expenditures on elderly care have increased from 9.9 billion euros in 2001 to 17.8 billion euros in 2012 (Statline, CBS). As Graph A.1.1 shows, elderly care expenses as a percentage of total Dutch GNP have risen as well, from 11.7% of Dutch GNP in 2001 to 15.4% of Dutch GNP in 2012.

Chapter 3 Literature review

In this chapter, we provide a conceptual framework in order to give a clear understanding of subjective well-being, which is our main concept of interest. We discuss both the theoretical aspects and measurement issues regarding subjective well-being. Moreover, we provide an overview of existing literature with respect to subjective well-being and its determinants. We distinguish between studies investigating the relationship between institutional quality and subjective well-being and studies investigating other determinants of subjective well-being. We also devote some attention to literature where quality of care is investigated as the dependent variable instead of an independent variable such as in this study.

3.1 Subjective well-being: a conceptual framework

Paim (1995) provides an overview of the different interpretations of the concept 'well-being'. In short

"well-being can be defined in various ways, either in direct or indirect, objective or subjective, and general or domain-specific terms". By defining well-being in direct terms, the focus is on intrinsic goods, for example consumption, whereas an indirect definition refers to resources available for obtaining well-being, for example disposable income that can be used for consumption. Objective well-being refers to measurable items, for example income and wealth, whereas subjective well-being refers to concepts as satisfaction and happiness, which cannot be measured in real terms but should be self-reported, intuitive assessments of well-being. Depending on the field and whether the purpose of measuring well-being is very specific, more specified domains of well-being can be used, for example housing, income, health status and social network. Well-being can also be used as a general concept, including all domain-specific determinants of overall-wellbeing. As explained by Paim (1995), choosing the specific definition and measurement of well-being depends on the specific study and the field of investigation. In this paper, our main aim is to investigate what factors influence perceived well-being of elderly in Dutch elderly institutions. As described by Angelini et al. (2012), measures of elderly well-being in economics have mainly focused on objective economic factors. They stress the importance of incorporating other, subjective non-economic factors in measuring well-being. Because of that and because our main interest lies in finding factors that contribute to providing elderly in institutions with positive satisfaction with life, in this paper we define well-being as a subjective concept.

The OECD provides a clear definition of subjective well-being that we will use as a guidance in this study; the concept contains:

"Good mental states, including all of the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences"

This definition includes first and foremost measures of how people experience and evaluate their life as a whole (OECD, 2013). It is mostly based on Diener et al. (2006) who define subjective well-being as "an umbrella term for the different valuations people make regarding their lives, the events happening to them, their bodies and minds, and the circumstances in which they live". As the OECD (2013) stresses, subjective well-being is not the same as overall well-being in general. Overall well-being contains objective measures of well-being alongside subjective measures. Subjective well-being consists of three main components: 'life evaluation', 'affect' and 'eudaimonia' (OECD, 2013).

Life evaluation involves the cognitive evaluation of the respondents' life, either regarding all aspects in life or distinct aspects of it. However, even when being interested in specific aspects, life evaluation always considers the entire life up until the point of evaluation. Life evaluation is often measured by means of life satisfaction. For instance, The Personal Well-Being Index is one of the most documented measures of life evaluation (OECD, 2013). It contains eight questions that all measure life satisfaction with different aspects in life. Van Praag et al. (2003) do something similar and measure life evaluation by means of rating satisfaction with different aspects in life. As life evaluations regard the entire life up until the measurement point in time, they are based on how people remember their experiences. The peak-end rule states that people base their overall evaluations mostly on the most intense emotional

experiences and the most recent emotion(s) experienced (Kahneman and Krueger, 2006). So although life evaluation refers to the entire life, it is not a weighted average of all experienced emotions in life.

Measuring subjective well-being at a certain point in time is captured by the second component of subjective well-being: affect. Psychologists use affect to measure persons' feelings and emotions. Kahneman and Krueger (2006) provide an intuitive explanation for the difference between life evaluation and affect: affect captures how people experience life rather than how they remember it. Affect is composed of two underlying dimensions: positive affect and negative affect. Positive affect captures, for example, joy and happiness and is said to be one-dimensional. The distinct positive dimensions are in general strongly correlated and can therefore be measured together. Examples of negative affect are anger, fear and sadness. They are not necessarily strongly correlated (one can perfectly experience fear but no anger at all). For that reason they are said to be multi-dimensional; they cannot be taken together in one measure.

The third component of subjective well-being is eudaimonia. It involves good psychological functioning and having a sense of meaning and purpose in life. Eudaimonia, in contrast to life evaluation and affect, does not regard experiences (current or recalled); it captures factors other than experiences in determining subjective well-being.

Figure 1 below summarizes the above information making up our conceptual framework. It depicts the relationship between overall well-being, objective well-being and subjective well-being as well as the three components of subjective well-being (life evaluation, affect and eudaimonia).

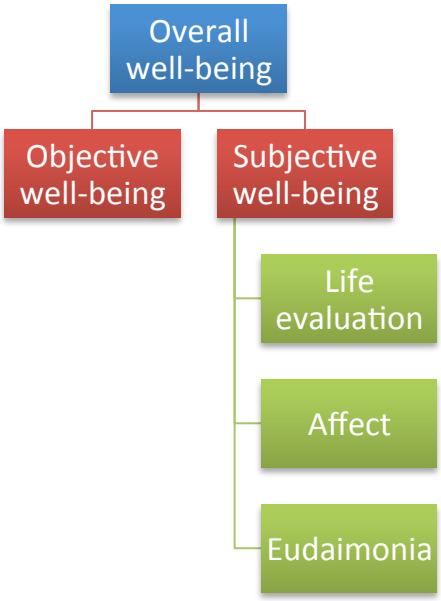


Figure 1 Conceptual Framework – This figure depicts the relationship between the concept overall well-being, objective well-being and subjective well-being as well as the determinants of subjective well-being, based on the definitions provided by the OECD (2013).

Now that we have a clear insight subjective well-being, we can investigate the determinants of it. We start by exploring the literature to get an insight in the relationship between the quality of elderly institutions and subjective well-being. A concept related to subjective well-being is quality of life. The distinction between the concepts of quality of life and subjective well-being is not very clear. Often, the concepts quality of life and subjective well-being as measured by life satisfaction are used interchangeably. Research on subjective quality of life often obeys life satisfaction as a central concept; all quality of life surveys contain questions on life satisfaction (Reig, 2003 and Lupien & Wan, 2004). Therefore, we explore the literature regarding the influence of quality of care on elderly subjective well-being as well as elderly quality of life in the next section.

3.2 Quality of care in elderly institutions and their residents' subjective well-being

In this section, we provide an overview of studies investigating the relationship between elderly institutions' quality of care and their residents' subjective well-being. As far as we know, literature investigating this relationship is quite limited. As subjective well-being and quality of life are closely related, we discuss literature using either of the measures as the dependent variable. Quality of care is a broad concept that can be measured by means of several indicators, different papers use different measures for quality of care. In our research methodology section that follows in the next chapter, we explain which quality indicators we use in our investigation of the relationship between quality of care and elderly subjective well-being.

Kane et al. (2004) show that differences in nursing home facilities[1] can indeed influence self-reported quality of life for their residents. As Kane et al. (2004) explain no full consensus exists regarding the extent to which a nursing home can influence the sociological and psychological domains of quality of life. Moreover, health status and disability are often considered as factors outside the scope of influence for nursing homes. One of the hypotheses of the study by Kane et al. (2004) is that nursing homes are likely to be able to influence quality of life even on such factors, especially regarding pain, functional status and depression. The sample used for the analysis consists of US nursing home facilities (N = 40) from five different states. Only self-reported evaluations of quality of life and control variables are examined, proxy respondents were excluded. Moreover, comatose residents as well as those younger than 65 years of age were excluded as well. The main findings are that facilities indeed differ regarding their residents' quality of life scores after controlling for individual heterogeneity. Significant differences between facilities on the following domains of quality of life were found: comfort, privacy, meaningful activity, food enjoyment, relationships, security, spiritual well-being and autonomy.

Kane et al. (2004) have shown that elderly residents' quality of life can indeed be influenced by the homes they live in. Next we provide two examples of studies that investigate which aspects in quality of care influence their residents' well-being. Tse et al. (2013) examine one specific quality indicator: pain management. Abrahamson et al. (2013) take several quality measures into account.

[1] In this study, the term 'nursing homes' refers to the total group of elderly institutions, containing both homes and wards providing especially extensive medical care (in Dutch: nursing homes) and homes and wards providing only a low extent of medical care and focusing more on nursing care (In Dutch: residential homes).

Tse et al. (2013) conduct research to the effect of pain on mental health and quality of life of elderly institutionalized in nursing homes[1] in Hong Kong. The authors stress the importance of getting more insight in adequate pain management in view of the increasing nursing home population as a result of the ageing process. The extent of pain can be seen as a measure of nursing home quality as by imposing pain therapy, the extent of pain could be limited substantially. The sample consists of 535 respondents aged 60 years and older (sample mean age equals 85.17), who all have been living in nursing homes for at least a year and do not suffer from cognitive impairment and mental disorders. Presence and intensity of pain is measured on an eleven-point numeric rating scale. Mental health is measured by four underlying concepts: subjective happiness (Subjective Happiness Scale), life satisfaction (measured using a tailor made Chinese version of the Life Satisfaction Index A Form Scale originally proposed by Neugarten et al. (1961)), depression (Geriatric Depression Scale) and loneliness (Revised UCLA Loneliness scale). The results confirm the need to gain more attention towards pain management. Of the respondents in the sample, 74.0% suffered from pain. Nursing homes' pain management in the sample was found to be inadequate: 12.4% of the respondents suffered from high pain intensity but did not receive any pain treatment; neither pain medication nor nondrug pain therapy methods. Tse et al. (2013) found that elderly suffering from pain experience less happiness, life satisfaction and quality of life and more depression than their pain-free counterparts.

Abrahamson et al. (2013) investigate the influence of nursing facility[1] characteristics on the quality of life of their residents for a sample of elderly (N = 388) institutionalized in Minnesota, United States. By means of a mixed-effect regression model, the relationship between facility characteristics and resident quality of life is examined. Quality of life is measured by means of the Minnesota Nursing Home Resident quality of life and Consumer Satisfaction Survey conducted in 2007. These surveys contain information regarding quality of life, resident satisfaction and mood. Cognitively severe impaired residents were excluded from the sample. The sample consists of both short-stay residents and long-stay residents in equal proportions. Resident characteristics were used as control variables. Next to general facility characteristics (part of chain or not, affiliated with hospital, ownership type), facility staffing and facility case mix, facility clinical quality indicators were assessed. The quality indicators used are: incidence of decline in activities of daily living, prevalence of moderate to severe pain, prevalence of restraints, incidence of worsening bladder incontinence, use of antipsychotics and new pressure scores. The results indicate that both high rates of incontinence and use of antipsychotics decrease resident quality of life. No significant relationship between the other facility clinical quality indicators and quality of life were found. Next to the significant relationship between quality of care and quality of life, significant influences of other facility characteristics on quality of life were found. Increasing the availability of activity staff members and nursing assistant staffing improve residents' quality of life. Donald et al. (2013) also stipulate the importance of high quality nursing staffing in improving life satisfaction in institutionalized elderly. The focus is on elderly in long-term care. Donald et al. (2013) provided a systematic review of studies examining the role of nursing staffing. The review shows that the appointment of higher educated nurses, the so-called Advanced Practice Nurses, positively influences the satisfaction in family members of residents regarding provided medical care. Moreover, residents experienced lower depression rates and improvements in meeting personal goals, which can be considered as part of quality of life. Moreover, health improvements were also attained in residents.

3.3 Other determinants of elderly subjective well-being

As stated above, literature investigating the determinants of well-being for institutionalized elderly is quite limited. We start this section by discussing a couple of studies on subjective well-being in institutionalized elderly. We proceed by examining some papers studying differences in subjective well-being between elderly in institutions and elderly living in the community. Finally, we provide a literature overview regarding subjective well-being in community-dwelling elderly and in elderly in general.

3.3.1 Elderly in institutions

Two recent studies add knowledge to the under-investigated issue regarding the determinants of well-being in institutionalized elderly. Both Leedahl (2013) and Wolff (2013) investigate the relationship between residents' social interactions and their well-being.

Wolff (2013) investigates the effect of individual characteristics, most importantly social interactions, on subjective well-being in French institutionalized elderly. Well-being is measured both by satisfaction with living conditions and by the presence and intensity of feelings of sadness or depression. The survey "Residents in Sheltered Accommodation for Elderly People" (SAEP) is used. This survey contains a representative sample of respondents (N = 2243) resided in all different types of elderly institutions in France, covering 418 institutions in total. The study does not only concern Long Term Elderly Care Institutions as in our study but considers Short Term Elderly Care as well. By means of a random effect ordered probit analysis, the role of individual characteristics, especially social interactions, on well-being is studied. The main finding is that the role of making friends within the elderly institution is a much more important determinant of well-being than visits from relatives and other family members.

Leedahl (2013) studies the relationship between social factors and health and the influence of facility characteristics on social factors and health variables. The facility characteristics of interest are the role of social workers and culture change involvement. She collected a sample by interviewing institutionalized elderly to obtain data on the individual level (N = 140) as well as social service directors and nursing home administrators to obtain facility-level data (N = 30). Health is measured in three ways: depression, functional health and well-being, where well-being is considered as a concept similar to mental health. Her main findings are that social networks and social group participation have a significant influence on functional health, well-being and depression through social engagement.

3.3.2 Comparison between elderly in institutions and community-dwelling elderly

In this section, we discuss two studies by Gueldner et al. (2001) and Böckerman et al. (2012) comparing subjective well-being between community-dwelling elderly and elderly in institutions.

Gueldner et al (2001) conduct a follow up study to their previous study regarding institutionalized elderly (Gueldner et al., 1994). They performed a study on life satisfaction of elderly in the United States by comparing a sample of institutionalized elderly (N = 70) with a sample of community-dwelling elderly (N = 68). The respondents used in two samples were all mentally alert, lived in the same region and obeyed a similar health status and age. Their findings confirmed their hypothesis: institutionalized elderly have lower levels of life satisfaction than elderly still living in the community, controlling for age and health status. Moreover, elderly living in institutions experienced significantly more feelings of

depression, anxiety and confusion than their counterparts living in the community. As Gueldner et al. (2001) explain, this result does not necessarily show causality between living institutionalized and worse life satisfaction for elderly, as information about pre-admission well-being is barely available. However, the results do show that differences exist in well-being between community-dwelling and institutionalized elderly. This is a useful insight for policy makers: awareness of the presence of relatively low satisfaction with life in elderly in institutions is important for people working at the institutions.

Böckerman et al. (2012) study life satisfaction of elderly in Finland and investigate whether differences in life satisfaction between the community-dwelling elderly (N = 2,527) and institutionalized elderly exist (N = 247). The sample consists of elderly aged 60 and above and excludes severe cognitively affected elderly. Elderly suffering from mild cognitive problems are included in the sample. Proxy respondents are used in that case, often being respondents' spouse or children. The results show a relationship between institutionalization and life satisfaction that is of opposite sign as compared with Gueldner et al. (2001). Böckerman et al. (2012) find that for the Finnish population, after controlling for health status, functional status, demographics and income, elderly in institutions experience higher levels of life satisfaction than their counterparts in the community. They also provide an intuitive explanation for this somewhat unexpected result: the Finnish elderly Long Term Care Sector is subject to queuing. Many fragile elderly, who can barely take care of themselves anymore, cannot move to an elderly institution when they actually need to as a result of waiting lists. These elderly are likely to experience low life satisfaction, influencing the life satisfaction of community-dwelling elderly in general.

3.3.3. Determinants of elderly subjective well-being in general

In this section we provide an overview of part of conducted research analyzing the determinants of subjective well-being, either regarding only community-dwelling elderly or without distinguishing between elderly living in the community and those in institutions.

Borg et al. (2006) investigate the determinants of life satisfaction among Swedish elderly with reduced self-care capacity aged 65 and above (N = 522). They stretch the importance of separating the case of elderly who are limited in performing their activities of daily living from elderly in general. Specifically they expect a difference in the perceived level of life satisfaction between people having experienced a decline in their degree of self-care capacity and people with preserved self-care capacity. Their results show that the extent of reduced self-care capacity is indeed an important determinant of life satisfaction. Moreover, poor self-reported health status, poor financial status in relation to needs, feeling lonely and feeling worried appeared to be important determinants of overall life satisfaction.

Angelini et al. (2012) conduct research regarding the relationship between age and subjective well-being in European elderly. Subjective well-being is measured by overall life satisfaction. By applying a vignette approach, they solve the problem of scale biases originating from individual heterogeneity in the adoption of benchmarks or scales in self-evaluation of life satisfaction. The main finding is that overall subjective well-being is affected by age in two opposite ways. Firstly, by using a standard ordered probit model, life satisfaction appears to increase with age when holding all other factors constant. Secondly, by using a Hopit model taking into account possible differences in reporting styles, an important additional result is found; older respondents seem to be more pessimistic in their assessment of life

satisfaction than younger respondents. Moreover, the authors show that health problems play a crucial role in determining life satisfaction. Health problems negatively influence subjective well-being directly but also indirectly by depressing respondents' mood in self-reporting well-being.

Ní Mhaoláin et al. (2012) investigate determinants of subjective well-being among community-dwelling elderly. Subjective well-being is measured by life satisfaction, using the Life Satisfaction Index A (Neugarten et al. 1961). The sample contains 466 elderly aged 65 and above, living in the area of Dublin. Medically unstable elderly and those suffering from dementia where excluded from the sample. The results suggest many determinants of life satisfaction. Depression, loneliness, neuroticism and feelings of exhaustion are all significantly negative related to life satisfaction. Positive significant relationships were found between life satisfaction and having an extrovert personality, having participated in any physical activities in the past two weeks from the moment of assessment and age.

3.4 Quality of care in elderly institutions

Castle & Ferguson (2010) examine United States nursing home quality and investigate the indicators used for measuring quality. Donabedian (1988) proposed structuring the several available quality indicators in three categories: structural measures, outcome measures and process measures. Although this distinction has been used often in existing literature, currently the division is not made so often anymore. Many researchers now use a mixture of the three types of quality indicators to assess quality of care (Castle & Ferguson, 2010). They emphasize the importance of using several quality indicators to provide insight in the overall quality standard of nursing homes[1]; no single quality indicator can represent overall quality. The main reason is that nursing homes provide care across several dimensions that cannot be evaluated by means of a single measure. They also stress that although the use of several indicators is important; it could lead to inconstant quality evaluations as well.

Many researchers have investigated quality of care in nursing homes. This already demonstrates the importance of and interest in the quality of care for the elderly sector. In many studies, quality of care is the main dependent variable of interest. Grabowski et al. (2013) investigate the relationship between nursing home[1] ownership and quality of care in the United States. Their main finding is that for short-stay patients, a better quality of care is received in non-profit nursing homes as opposed to for profit nursing homes. Bowblis and McHone (2013) conduct research for the United States as well and investigate whether continuing care retirement communities (CCRCs) provide a higher level of quality of care than traditional nursing homes. The main finding is that this is this hypothesis must be rejected: the quality of care for CCRCs is lower or similar to the quality provided in traditional nursing homes, depending on the relevant quality measure. Several studies have been investigating the relationship between efficiency and quality of care for nursing homes as well (Laine et al., 2005; Garavaglia, 2011).

Chapter 4 Methodology

In this chapter, the methods used in this study are explained. We start by explaining how we measure subjective well-being. Secondly, we specify our main empirical model (Model 1). Thirdly, measurement of the quality indicators is discussed and we state the hypotheses for the relationship between quality

indicators and subjective well-being. Fourthly, we discuss the measurement of control variables. Fifthly, we examine the relationship between life satisfaction, happiness and well-being. Then we will propose a second model, using happiness instead of life satisfaction as the dependent variable (Model 2). Finally we will discuss the procedure in arriving to our final model specifications.

4.1 Measuring overall subjective well-being

Our main goal is to investigate the determinants of subjective well-being in elderly. Angelini et al. (2012) state that using self-reported life satisfaction on an ordered scale for measuring subjective well-being is a widely recognized methodology. This approach is in line with the theoretical framework as proposed by OECD (2013), that we use as guidance in this study. Angelini et al. (2012) measure subjective well-being by the question: "How satisfied are you with your life in general?" with answer possibilities "Very dissatisfied", "Dissatisfied", "Neither satisfied nor dissatisfied", "Satisfied" and "Very satisfied". We follow their approach by focusing on subjective well-being and using self-reported life satisfaction as a measure for overall well-being. Our dataset contains respondents' answers on the question: "To what extent are you satisfied with your current life?" Answers are measured by means of an ordinal scale: "Dissatisfied", "Pretty Satisfied", "Satisfied", "Very satisfied" and "Exceptionally satisfied". This question is captured in the variable *LIFESATISFACTION*.

4.2 Empirical model

We specify our main empirical model as follows:

$$LS_i = \alpha_0 + Q_i'\beta + X_i'\gamma + \varepsilon_i \qquad \text{(Model 1)}$$

where LS_i is the level of life satisfaction for resident i. The vectors Q_i' contain different quality measures and the vectors X_i' contain the control variables.

4.3 Independent variables: quality measures

Several different variables for measuring quality of care are used in existing literature. For our analysis, we select the quality measures proposed by other authors for which our dataset contains a similar measure. In this section, we provide an overview of the quality measures relevant for this study. After having explained the choices regarding quality measurement, hypotheses with respect to the relationship between quality of care and life satisfaction are stated.

Bowblis and McHone (2013) measure quality by means of three different risk-adjusted post-acute care quality measures developed by Centers for Medicare and Medicaid Services. These are: a delirium quality measure, a measure for moderate to severe pain and a pressure ulcer quality measure. We do not have information about delirium and pressure ulcers, but our dataset does contain a pain quality measure. As Bowblis and McHone (2013) explain, many elderly in nursing homes suffer from pain as a result of several possible diseases and pain is not always treated. Untreated pain can have several consequences, both mental as well as physical. Therefore, it can be used as a measure for quality of care. Elderly homes that provide their residents with treatment to limit their pain level, provide, ceteris paribus a higher level of quality of care. Tse et al. (2013) and Abrahamson et al. (2013) consider inadequate pain management as a signal of low quality of care as well. Tse et al. (2013) show that the

extent to which elderly suffer from pain negatively influences their life satisfaction. They refer to Gran et al. (2010) and Murphy (2007) who investigate the possible effects of pain in elderly, which indeed appear to be both physical as well as mental. Important physical effects of pain are inactivity, increasing disability, decreasing quality of sleep and appetite. Mental effects of pain are social isolation, loneliness, helplessness and depression. Gran et al. (2007) show that especially untreated physical pain is an important determinant of quality of care. Although different authors regard the degree of pain as an indication of institutional quality, pain can be evaluated as a signal of health as well. Higher pain intensity is related to a poorer self-evaluation of overall health (Lindberg et al., 2012). Although pain can be seen as a signal of health, we follow Abrahamson et al. (2013), Bowblis and McHone (2013) and Tse et al. (2013) by using our pain measure as one of the quality indicators for this study. The relevant question is: "To what extent has pain limited your activities of daily living (ADL) in the past four weeks?" with answer possibilities "Not at all", "a little", "quite", "much" and "very much". Although this question does not directly measure the extent to which people experience pain, we regard it as implicitly doing so. Elderly who suffer from pain but do not obtain any treatment for it will most likely be limited in their ADL as a result. The relevant variable measuring limitation in ADL caused by pain in this study is denoted by *PAINLIM.* We expect to find a relationship between pain and life satisfaction that is similar to the relationship found by Tse et al. (2013). We state our first hypothesis:

H1: A higher extent of limitations in ADL caused by pain increases the probability of experiencing lower life satisfaction.

Laine et al. (2005) conduct research for the Finnish elderly Long Term Care, consisting of wards in health-center hospitals and residential homes. They investigate the relationship between technical efficiency and clinical quality of care. In measuring quality of care, three quality measures are used: the prevalence of weekly use of depressants and hypnotics, the prevalence of depression with no treatment and, similar to Bowblis and McHone (2013), the prevalence of pressure ulcers. We follow Laine et al. (2005) by measuring quality of care by means of the use of antidepressants and hypnotics as well as by the prevalence of depression without treatment. The relevant (dichotomous) questions in our dataset are: "Do you use medication?" and if answered with 'yes'; "Do these include antidepressants?" and "Do these include hypnotics?" Moreover, depression without treatment is measured by the question: "Given the patient has indicated presence of having been overstrung, anxious or depressed, did the patient obtain treatment in the past 12 months?" The labels we use for these quality indicators are *dANTIDEPRHYPN* and *dNOTREATMENT.* Laine et al. (2005) regard higher percentages of residents using antidepressants or hypnotics as being related to lower quality of care. Comparably, they regard higher prevalence of depression without treatment to be related to lower quality of care. We expect to find similar relationships: elderly using anti-depressants or hypnotics in general do so because they suffer from mental diseases like depression or have problems with sleeping. For these residents, expected quality of life is lower than for their counterparts not suffering from depressions and other problems. Besides, some people suffering from depression may not obtain treatment. We expect this group to have lower levels of life satisfaction than elderly not in this group, being either elderly without strong feelings of depression and elderly suffering from depression who do receive treatment. We expect that the relationship between depression without treatment and life satisfaction is negative and stronger

than the expected negative relationship between use of antidepressants and hypnotics and life satisfaction. We state the following hypotheses:

H2: The use of anti-depressants and hypnotics is related to lower levels of life satisfaction
H3: Suffering from depression without obtaining treatment result in lower levels of life satisfaction

Gutacker et al. (2013) conduct research with respect to hospital efficiency in providing health care. They investigate the relationship between variation in hospital costs and patients' health outcomes for the UK. For four different hospital procedures (knee replacement, hip replacement, varicose vein surgery and groin hernia repair), patients are asked to indicate the severity of their problems before and after surgery on several dimensions. The change in their status is then used as a measure for quality. They consider the change in mobility status, usual activities status, self-care status and overall health status. Although our dataset contains information about mobility, usual activities and self-care status, we cannot make a comparison between two time periods as our dataset only contains a single observation for each respondent. However, our dataset does contain a question about the change in health status between the moment of admission to the elderly home and the time of answering the questionnaire, as experienced by the respondent. We follow Gutacker et al. (2013) and use the change in health status as a quality measure for our analysis. The relevant question used is "Did your overall health status improved, remained the same or worsened?" Although curing people is not the main goal of elderly homes, oppositely to hospitals, this question still seems to be a good indicator of quality in elderly institutions. Curing people is not being the main goal does not mean that treatable health issues are not and should not be cured. Especially for the nursing homes as opposed to the residential homes, residents receive active medical treatment so their health status could actually improve by being admitted to such an institution. Moreover, health status is measured by means of self-assessment; it is not a factual objective assessment of health. In our view, self-assessed health status could improve as well for elderly not actually being cured. In the questionnaire, overall health status is not defined specifically, it contains whatever respondents consider it to contain. Intuitively, as elderly with health issues move from their own houses to elderly institutions, they could experience an increase in health status already before obtaining treatment, just because they do not have the full responsibility of taking care of themselves and their household anymore. They may feel better because they may not feel alone in having to solve everything themselves anymore. Besides, they are released from the burden of having to perform physical household activities, possibly changing their assessment of their health status as a result of a change in mood. From the question regarding the change in health status in our dataset, we create two dummy variables. The first dummy, *dHEALTHIMP* takes on value 1 in case the respondent has experienced an improvement in health status from the moment of admission and value 0 in case of decline or no change in health status. The second health change dummy, *dHEALTHDECL*, takes on value 1 in case the respondent has experienced a decline in health status and value 0 in case of health improvement or no change in health status. Our fourth and fifth hypotheses are given by:

H4: An improvement in health status increases the chance of experiencing higher levels of life satisfaction
H5: A decline in health status increases the chance of experiencing lower levels of life satisfaction

In addition to the quality measures used in the above-described empirical studies, another type of quality measures can be used as well. Rantz et al. (1998) provide a multidimensional theoretical model for measuring quality of care in nursing homes. They provide an insight in the important dimensions that can be taken into account when measuring quality. All dimensions focus on the residents and their families, as according to Rantz et al. (1998), they should be the starting point. The four most important dimensions they propose are the environment, care and treatment, milieu and staff. They suggest many examples of measures that belong to these four different dimensions and are important for measuring quality. Castle & Ferguson (2010) highlight the importance of including quality indicators other than those with a medical focus as well. By focusing on clinical quality indicators only, important dimensions of quality that residents (or their family members) value are excluded. From our dataset, we construct three additional variables for quality measurement, following Rantz et al. (1998). The first one is a measure for safety that is measured by the question "To what extent do you feel safe?" The second one is a measure for privacy, measured by the question "Do you experience having enough privacy?" The third variable measures the degree of individualized care and is composed by the answers on two separate questions from the questionnaire: "Can you decide for yourself when you wake-up?" and "Can you decide for yourself when you go to the toilet?" We construct dummy variables measuring the above questions of interest and label them as follows: *dSAFETY, dPRIVACY and dINDIVCARE.* Based on intuition and common sense, we state the following hypotheses:

H6: Elderly experiencing safety are more likely to have higher levels of life satisfaction
H7: Elderly experiencing having enough privacy are more likely to have higher levels of life satisfaction
H8: Elderly experiencing receiving individualized care are more likely to have higher levels of life satisfaction

The quality indicators we use for this study as well as the corresponding quality measures used in existing literature are summarized in Table A.2.1 in the Appendix.

4.4 Independent variables: control variables

Next to the quality measures that are used as explanatory variables, we need additional explanatory, control, variables.

In line with, among others, Angelini et al. (2012), Böckerman (2012), Borg et al. (2005), Gueldner et al. (2001), Tse et al. (2013) and Wolff (2013), health control variables as well as demographical control variables are used. Regarding health status, we add the following control variables: *HEALTHSTATUS, MOBILITY, dOTHERMEDIC, dSRMENTALPRBLMS and dLRMENTALPRBLMS. HEALTHSTATUS* is a variable indicating current self-rated overall health status, assessed by means of an ordinal measurement scale. In the questionnaire, no specification is given regarding what is exactly meant to be contained in the concept 'overall health status', therefore, the variable contains everything the respondents regard as being part of it. *MOBILITY* measures the extent to which the respondents are attached to their beds or (wheel) chairs. This variable is assessed by means of an ordinal measurement scale as well. The dummy variable *dOTHERMEDIC* indicates whether the respondent has used medication other than antidepressants and hypnotics recently. *dLRMENTALPRBLMS* is a dummy variable taking value 1 if the respondent suffers from long run mental problems, for example depression. *dSRMENTALPRBLMS* is a

dummy variable that equals one if the person has indicated suffering from mental problems but does not consider these as concerning the long-run.

With regard to demographic variables, we include the following control variables: *dMALE, dage55to65, dage65to75, dage75to85, dage85to95, dage95to105, dPARTNER, dWIDOW and dHIGHEDUC.* The dummy *dMALE* indicates the respondents' gender. We generate age dummies by creating age categories, following Angelini et al. (2012) who emphasize the flexibility of using age categories as opposed to just age and the square of age. Moreover they provide the argument that using this specification allows retaining an open mind with respect to the shape of the relationship between life satisfaction and age. The youngest respondent in our sample is 55 years old and the oldest respondent is 102 years old. Table A.2.2 in the appendix lists the chosen age dummies with the minimum age and maximum age in each category. Marital status is captured in the dummy variables *dPARTNER, dWIDOW* and *dSINGLE*, indicating whether the respondent currently has a partner (still married or having a partner without being married), whether the respondent is widowed and whether the respondent is single at the moment (not having a partner but not being widowed either). The dummy *dHIGHEDUC* indicates whether the person is highly educated. We regard possessing a bachelor's degree or master's degree as being highly educated. This definition coincides with having successfully finished one of the Dutch education degrees *Hoger Beroeps Onderwijs (HBO)*, *WO Bachelor* and *WO Master.*

Moreover, we add some variables measuring the social life of the elderly, as the contact with relatives and friends intuitively seems to contribute to overall well-being in general as well. Besides, Wolff (2013) and Tse et al. (2013) show the importance of adding social factors. The variables with respect to social life added to our model are the dummies: *dCNTCTCLOSEREL, dCNTCTOTHERFAMILY, dCNTCTFRIENDS* and *dLONELY. dCNTCTCLOSEREL* measures the extent to which the respondent has contact with his or her children and grandchildren. The dummy equals 1 in case the respondents has contact with (some of) their (grand) children at least once a week and 0 otherwise (less regular contact or having no (grand) children at all). d*CNTCTOTHERFAMILY* takes value 1 in case the respondent has contact with family members other than (grand) children at least every two weeks and 0 otherwise. *dCNTCTFRIENDS* equals 1 if the respondent has contact with friends at least every two weeks and zero otherwise. Important to note is that for all the three contact variables mentioned above, contact contains both physical contact as well as contact by telephone, mail or e-mail. *dLONELY* measures respondents' loneliness and takes value 1 if the respondent feels the desire to have contact with others more often and 0 otherwise.

Our final control variable added is *dNURSINGHOME*. This dummy equals 1 if the respondent lives in a nursing home and equals 0 if the respondent lives in a residential home.

4.5 Life satisfaction versus happiness

In many studies, life satisfaction is used as a measure for subjective well-being. Subjective well-being is often measured by means of the concept happiness as well (OECD, 2013). Happiness is, in fact, only a component of affect, being one of the three dimensions of subjective well-being. Life satisfaction contains much more than happiness does and the two should therefore not be used interchangeably. According to the OECD (2013), using happiness as a single measure for subjective well-being is technically incorrect and misleading as several distinctive positive as well as negative aspects together

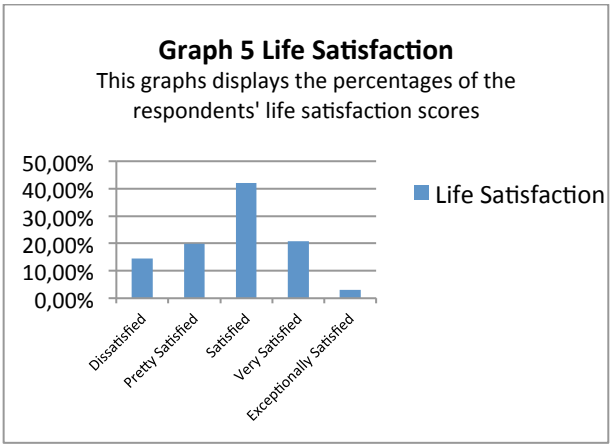
determine affect. Life satisfaction coincides with life evaluation and can therefore be used to measure subjective well-being in the sense of overall satisfaction with life (OECD, 2013). However, our question regarding life satisfaction seems to be somewhat in the middle between being a measure of life evaluation and being a measure of affect. It is a matter of interpretation, but in our opinion, it contains more than happiness. In our view, happiness evaluated at one day can be totally different from happiness evaluated at another day. One's assessment of happiness can even vary between different times during one day. Evaluation of current life seems to entail much more. However, it may, for most people, not be identical to the evaluation of life as a whole. Regarding the elderly respondents in our sample, 'current' life can be interpreted in many ways. To provide a few examples, it can be interpreted as 'the part of overall life from the moment of admission to the institution', 'the part of overall life from the moment of getting widowed', 'the part of overall life from the moment grandchildren were born', 'the part of overall life from the moment I decided to devote meaning to my life on earth by helping other human beings', 'the part of overall life from the moment I fought down my disease' or 'the part of overall life from the moment not having to worry about money anymore'. Of course, many more interpretations are possible. Religious persons for example, could interpret 'current' life as the whole life on earth, as because of their beliefs, they may regard life on earth as one of the two or even more lives they will lead. To summarize, in our view, 'current life' considers the part of life one is living right now and that has started at a certain important, maybe life changing, point in time. We regard the question used for measuring subjective well-being in this study as being multi-interpretable.

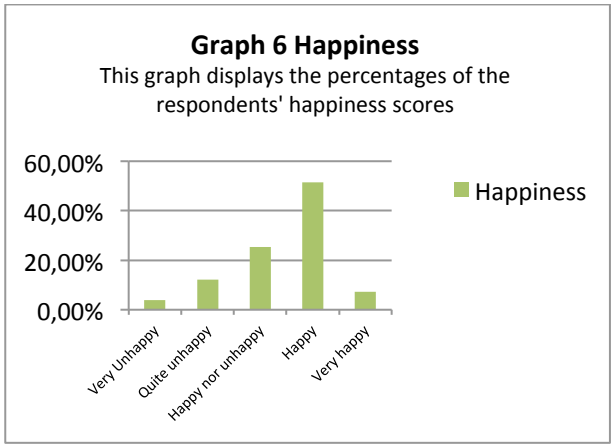
Next to Paim (1995) and OECD (2013) other authors distinguish life satisfaction from happiness. Among them are Mannel & Dupuis (1996) who separate life satisfaction from happiness in the following way: "life satisfaction and morale scales measure more enduring and stable cognitions, whereas happiness scales measure more temporary and transient affective states". This interpretation is fully in line with the OECD (2013) definition and points out the difference in timing between the two concepts. Many authors do not distinguish life satisfaction and happiness strictly. Often, life satisfaction is measured by means of several underlying concepts, among which happiness is used. Borg et al. (2006) use the Life Satisfaction Index Z (LSIZ), proposed by Wood et al. (1969), which measures overall life satisfaction by means of thirteen statements. LSIZ seems to consider happiness as being part of life satisfaction, as the LSIZ measures contain statements about happiness, for example "I am just as happy as I was when I was younger". LSIZ is a shortened version of Neugarten et al.'s (1961) Life Satisfaction Index A, which is used by Gueldner et al. (2001) as well as by authors in other studies. Life Satisfaction Index A contains twenty items to measure overall life satisfaction. As both Life Satisfaction Index Z and Life Satisfaction Index A as used by Borg et al. (2006) and Gueldner et al. (2001) seem to consider happiness as one of the components of life satisfaction, these measurement indices are not in line with the definition proposed by the OECD (2013). Tse et al. (2013) use life satisfaction (using Life Satisfaction Index A) and happiness, as well as depression and loneliness as measures of mental health. The way Tse et al. (2013) perceive the concepts differ from the perception of OECD (2013) as well. As explained above, Life Satisfaction Index A contains a happiness measure, which is not in line with the relationship as proposed by OECD (2013) as explained just above. Moreover, Tse et al. (2013) use happiness twice in measuring mental health, directly as one of the four measures accounted for but also indirectly through life satisfaction.

Ferrer-i-Carbonell and Frijters (2004) regard self-reported happiness even as a synonym for life satisfaction.

As the literature overview shows, happiness and life satisfaction are sometimes used interchangeably (Ferrer-i-Carbonell and Frijters, 2004; Wolff, 2013) whereas others consider them to be conceptually different but measuring the same underlying concept, that is subjective well-being (Mannel & Dupuis, 1996; OECD, 2013; Paim, 1995; Tse et al., 2013; Gueldner, 2013). To provide some insight in the concepts of life satisfaction and happiness regarding this study, we check whether the two are perceived differently by the respondents in our sample. We measure happiness by the question: "To what extent do you consider yourself a happy person?" The answer possibilities are "Very happy", "Happy", "Nor happy nor unhappy", "Quite unhappy" and "Very unhappy". Although this question certainly measures happiness, it may not truly be a measure of affect. Happiness in the sense of affect is really focused on the current moment in time, whereas this question entails a little more. Therefore, we consider the question for measuring happiness just as our question of life satisfaction as being a multi-interpretable one.

Graph 5 and Graph 6 below present the percentages of respondents for every answer score for both life satisfaction and happiness. Both variables are measured on a five-point scale where a higher score coincides with a higher level of well-being and happiness.





As the graphs show, the respondents are distributed differently over the answer categories for life satisfaction and happiness. By just looking at the patterns, the respondents in our sample seem to rate their selves as being more happy than satisfied with their lives. However, the graphs cannot really be compared, as the answer scales are different for the two variables. In order to gain a bit more insight in this distribution, we repeat the exact questions used for measuring life satisfaction and happiness. Life satisfaction is measured by the question: "To what extent are you satisfied with the life you live at this moment?" Answers are measured by means of an ordinal scale: "Dissatisfied", "Pretty Satisfied", "Satisfied", "Very satisfied" and "Exceptionally satisfied". Happiness is measured by the question: "To what extent do you consider yourself a happy person?" The answer possibilities are "Very unhappy", "Quite unhappy", "Nor happy nor unhappy", "Happy" and "Very happy", Comparing the answer categories of the two dependent variables reveals some inconsistency: a negative assessment of life

satisfaction is captured in one out of five answer categories (answer scores 1) whereas a negative assessment of happiness is captured in two out of five answer categories (answer scores 1 and 2). Adding up percentages reveals that 14.54% of the respondents consider themselves dissatisfied with their lives and 16.07% consider themselves (very) unhappy. A positive assessment of life satisfaction is captured by four out of five answer categories (answer scores 2-4) whereas a positive assessment of happiness is captured by only two out of four answer categories. Adding up percentages again reveals that 85.45% of the respondents regard their life satisfaction positive and only 58.70% of the respondents positively assess their happiness. These numbers seem to indicate that the respondents in our sample actually consider themselves more satisfied with their lives than being happy. So, exploring the data more thoroughly reveals that the relationship between happiness and life satisfaction scores is opposite to what we saw by just looking at the distribution of respondents over the answer categories. Analyzing the data a bit further provides additional information. Answer score 3 ("Satisfied") is most often chosen for *LIFESATISFACTION* (41.96%). *HAPPINESS* is most often (51.54%) evaluated by answer score 4 ("Happy"). This shows that the largest percentage of respondents consider themselves just a bit more happy than unhappy and just a bit more satisfied with their lives than unsatisfied, indicating similarity between the concepts happiness and life satisfaction.

As life satisfaction and happiness appear to be somewhat differently perceived by the respondents in our sample, we choose to investigate a second model (model 2), with happiness as the dependent variable. Only the dependent variable in model 2 is different from model 1, we use exactly the same explanatory variables. We aim at comparing the regression results from model 1 with the regression results from model 2. However, as the scaling of the two dependent variables is different and we have assumed ordinal answer scales, a comparison between the regressions with *LIFESATISFACTION* as the dependent variable and the regression with *HAPPINESS* as the dependent variable may result in a bias (Chapter 7). According to Ferrer-i-Carbonell and Frijters (2004), assuming ordinality or cardinality of happiness scales (and life satisfaction scales) makes little difference for the results. The study by Ferrer-i-Carbonell and Frijters (2004) is quite convincing, so we do not expect the difference in measurement scales to make a large difference for our results. However, they assume life satisfaction, happiness and subjective well-being all to be equal to the general satisfaction scale. Therefore, their findings may not hold for our somewhat distinctive concepts. To be sure of the influence of the different measurement scales, we conduct ordered probit regressions for the two models as a robustness check (Chapter 8).

Our second empirical model is specified as:

$$H_i = \alpha_0 + Q_i'\beta + X_i'\gamma + \varepsilon_i \qquad \text{(Model 2)}$$

where H_i is the level of happiness for resident i. Similar to model 1, the vectors Q_i' contain quality measures and the vectors X_i' contain control variables, both vectors contain exactly the same variables as in model 1.

Now, we have explained all dependent as well as independent variables we use for our empirical analysis. An overview and description of all the variables we use are listed in Table A.2.3, which can be found in the appendix.

4.6 Procedure

The dataset used for this analysis is quite extensive. It contains many measures on many different topics. Before arriving at our final model specification, we have tried other specifications. In this section we explain the most important categories of variables that we have tried in our specifications. Moreover, we explain the reasons for leaving them out. We summarize additional information regarding the dataset in the next chapter.

4.6.1 Self-care capacity

We tried to include measures of self-care capacity in performing different activities in the models. Examples of self-care capacity measures regard questions on personal care (eating, getting out of bed, changing clothes, bathing) and housekeeping activities (grocery shopping, cooking, doing laundry, cleaning, paying bills). Each question measures to what extent the respondent is able to perform it independently. Moreover, if the respondent indicates not being able to perform those without help, additional questions follow. The subsequent questions regard the extent to which the person receives help from nurses, other staff members and family members. We consider these questions interesting as we expect the degree of self-care capacity to be related to life satisfaction, based on the study by Borg et al. (2006). However, including self-care capacity measures in our models leads to many missing values. The reason is that people who have indicated to be highly immobile in the sense that they are almost always attached to their (wheel) chairs or beds are excluded from answering these questions. We would have to give up many observations, implicating a strong reduction of our sample. That is why we decided not to include self-care capacity measures.

4.6.2 Economic factors

Economic measures are also available in the dataset. These contain, among others, variables indicating monthly income. Moreover, respondents were asked whether they feel they are left with enough money to buy clothes, gifts, make trips and make phone calls after having paid their institutional contribution. In our view, including financial information would be relevant for this study. However, many respondents have not answered income related questions. The nonresponse for the questions measuring the money amount of income was a bit expected. However, the unwillingness of respondents to answer the questions regarding being able to pay for clothes, trips, phone-calls and gifts was a bit unexpected. Intuitively we expect the high nonresponse to be originating from the somewhat secretive nature of Dutch elderly. On the basis of personal experience, we regard Dutch elderly quite reluctant in sharing information about their financial status, as they do not consider it appropriate. Although including economic measures would lead to so many more missing values, first we decided to include them in a separate model to see whether this would provide us interesting insights. However, none of the financial variables provided significant results. Moreover, many were of opposite sign to what we were expecting. Analyzing the data shows that the financial measures show low variability as a result of the substantial non-response. Since adding financial measures does not provide us new insights and including them would imply loosing much information with respect to the other variables in our models, we decided to exclude financial variables.

4.6.3. Health variables

Finally, the dataset contains much more information regarding health status than just the measures included in our models. Respondents were asked to indicate for an extensive list of diseases whether they were suffering from it. We have included the different diseases in our model, but none of them appeared to be significantly related to our dependent variables. Exploring the data shows the low variability in the answers on these questions. For almost every disease, most elderly indicated not suffering from it. Therefore, we tried to include diseases by creating categories to increase the variability a bit. However, still no significant results appeared. Disease-specific measures are highly correlated with the other health variables in our models (*HEALTHSTATUS, dHEALTHIMP and dHEALTHDECL).* To avoid multi-collinearity problems, either the disease-specific variables or the other health variables should be included. Adding the disease-specific variables did not result in any significant results. However, we would have to sacrifice the other health variables. As *HEALTHSTATUS, dHEALTHIMP and dHEALTHDECL* appear to be significantly related to life satisfaction, this seems not to be such a good idea. As a result, we decided to leave the disease-specific variables out of our models.

Chapter 5 Data description

This chapter provides insight in the dataset used for our analysis and in the construction of our sample. Moreover, we show what the final sample looks like by summarizing descriptive statistics. We depict descriptive statistics for the entire sample as well as for the nursing home subsample and the residential home subsample.

5.1 Sample construction

In this paper, we use the cross-section dataset 'Ouderen in Instellingen 2008' (OII2008) from the Netherlands Institute for Social Research (SCP). GfK Panel Services Benelux (GfK) collected the data and composed the dataset for the SCP. The data were originally used for providing more insight in the living conditions of the elderly in Dutch institutions. The dataset contains information on 1,561 different respondents for the year 2008; 800 of them lived in a residential home and 761 lived in a nursing home. Of the nursing home residents, 393 people resided in a somatic nursing home ward and the other 368 lived in a psychogeriatric nursing home ward. In some cases, a clear distinction exists between somatic nursing homes and psychogeriatric nursing homes. In other cases, nursing homes host both somatic elderly and psychogeriatric elderly, who are resided in different wards within the same nursing home. For that reason, we talk about residential homes and somatic and psychogeriatric wards. The dataset contains 288 different institutions; 134 residential homes and 154 nursing homes.

In collecting data, GfK aimed at obtaining a representative sample, both in terms of institutions and respondents. First, the institutions were selected. All institutions have been categorized according to their geographic region. The Netherlands was divided in five different regions, these are: '4 big cities' (the cities Amsterdam, Rotterdam, Utrecht and Den Haag), 'Rest West' (the western region of the Netherlands with exclusion of the four big cities), 'North', 'East' and 'South'. Next, the sampling fraction was determined. For every region, the total capacity was calculated for every type of institution (residential homes, somatic nursing homes and psychogeriatric nursing homes). The total number of

beds measured capacity. For every type of institution, the relative fraction in each region was calculated. This fraction is used for determining how many institutions of each type had to be selected for every region. By means of randomization, the specific institutions making up the final sample were selected then. As a result, institutions with a higher capacity were more likely to be part of the sample. However, none of the institutions was so big that it resulted in self-selection.

After the selection of the institutions, the respondents were selected. For every elderly institution in the sample, respondents were selected randomly. For every residential home, 6 residents were selected and for every nursing home, 5 residents were selected. If the selected resident could not answer the questionnaire him- or herself, the spouse or a family member was asked to answer the questions on behalf of the respondents. In our opinion, family members and spouses may be able to answer questions about demographics, but determining the degree of life satisfaction, which is our main variable of interest, is in our view difficult to proxy as it is a subjective concept. Moreover, it is questionable to what extent proxy respondents are able to truly estimating health status and questions regarding social aspects. If others would estimate residents' life satisfaction, it may not reflect the true experienced status of well-being for the respondent of interest. The OECD (2013) provides a clear intuition on treating proxies: "Only the person under investigation can provide information on their evaluations, emotions and psychological functioning – it is people's own views that are the subject of interest". Wolff (2013) chose to use both answers provided by residents as well as by proxy respondents. He investigated the possible measurement errors resulting from this and concluded that substantial differences between respondents' answers and proxies exist indeed. Residents' self-reports are considered to be the "gold standard" in this type of research (Leedahl, 2013; Kane et al., 2003). As it seems intuitively logical and because other studies are pretty clear on this, we chose to drop all proxy observations for our analysis. This procedure leads to a big drop in respondents for our sample; we lost 535 out of 1,561 respondents. As a result, we are left with a sample containing 1,026 respondents. 704 of them lived in residential homes and 322 of them lived in nursing homes. For the psychogeriatric nursing homes, none of the respondents answered the questionnaires themselves; this is most likely due to the nature of their (mental) limitations. As a result, all information about psychogeriatric nursing wards has disappeared from our analysis and we are left with information about elderly living in residential homes and in somatic wards of nursing homes. Next, we dropped all respondents from the dataset who have not answered every question needed for measuring our variables of interest. As a result, we are left with a final sample of 905 respondents. 655 of them lived in a residential home and 253 lived in the somatic ward of a nursing home.

5.2 Descriptive statistics for the entire sample

In this section we summarize descriptive statistics of all variables we use in our empirical analysis. The correlations between all variables can be found in Table A.2.4 in the Appendix.

Table 1 below lists all variables used in our analysis, together with the corresponding descriptive statistics. For each variable, the number of observations, the mean, standard deviation, the minimum and the maximum are given.

Table 1 Descriptive Statistics

This table lists all variables included in our empirical models and provides corresponding descriptive statistics for our sample (n = 908).

Variable name	Mean	Standard Deviation	Minimum	Maximum
Dependent variables				
LIFESATISFACTION	2.778	1.028	1	5
HAPPINESS	3.460	0.932	1	5
Quality indicators				
PAINLIM	2.130	1.236	1	5
dANTIDEPRHYPN	0.430	0.495	0	1
dNOTREATMENT	0.250	0.433	0	1
dHEALTHIMP	0.102	0.303	0	1
dHEALTHEQUAL	0.526	0.500	0	1
dHEALTHDECL	0.372	0.484	0	1
dSAFETY	0.872	0.334	0	1
dPRIVACY	0.906	0.291	0	1
dINDIVCARE	0.763	0.425	0	1
Control variables				
HEALTHSTATUS	3.372	0.808	1	5
MOBILITY	3.117	0.930	1	4
dOTHERMEDIC	0.524	0.500	0	1
dSRMENTALPRBLMS	0.251	0.434	0	1
dLRMENTALPRBLMS	0.109	0.312	0	1
dMALE	0.267	0.444	0	1
dAGE55to65	0.034	0.182	0	1
dAGE65to75	0.081	0.274	0	1
dAGE75to85	0.368	0.482	0	1
dAGE85to95	0.462	0.499	0	1
dAGE95to105	0.055	0.228	0	1
dPARTNER	0.136	0.344	0	1
dWIDOW	0.691	0.463	0	1
dSINGLE	0.173	0.378	0	1
dCNTCTCLOSEREL	0.683	0.466	0	1
dCNTCTOTHERFAMILY	0.459	0.499	0	1
dCNTCTFRIENDS	0.380	0.486	0	1
dLONELY	0.213	0.409	0	1
dHIGHEDUC	0.057	0.232	0	1
dNURSINGHOME	0.279	0.449	0	1

In the methodology section we already discussed the descriptive statistics with respect to life satisfaction and happiness. From Table 1 we see that the average score for *PAINLIM* is 2.130 and that the variation is not very high as is clear from the standard deviation of 1.236 and the minimum of 1 and maximum of 5. Moreover, we see that almost half of the respondent uses antidepressants or hypnotics and more than half of the respondents use any medication other than antidepressants or hypnotics. 25% of the respondents suffer from mental problems without obtaining any treatment. The mean score for the variable *HEALTHSTATUS* is 3.372, so on average, the respondents rate their health status as being slightly above moderate. The variation around the mean score for the health status variable is quite low, the standard deviation equals 0.808. The majority of the respondents assessed their health status as remaining constant from the moment of admission (52.6%). 37.2% of the respondents experienced a decline in health status and 10.2% perceived their health as having improved from the moment of admission. The average score for *MOBILITY* is 3.117. This means that most respondents in our sample

are attached to a (wheel) chair or bed only every now and then or even never. The variation is not very high, as the standard deviation (0.930) together with the minimum 1 and maximum 4 indicates. Most of the respondents consider the environment in which they live as being safe (87.2%) and as providing them with enough privacy (90.6%) as well as individualized care (76.3%). The mean age of the sample in this study was 83.6 years with standard deviation 7.947. The largest proportion of the sample is aged between 75 and 85 years (46.1%) followed by a large group of respondents in the category 65 to 75 years. The smallest proportion of residents is aged below 65 (3.4%). The majority of the sample contains female respondents (73.3%). Only 13.7% of the respondents had a partner, whereas 69.1% of the respondents in the sample were widowed and 17.3% of the sample respondents were single. The largest proportion of the residents (68.3%) has regular contact with children or grandchildren. Almost half (45.9%) has contact with family members other than (grand) children at least once in every two weeks. The minority of elderly (38.0%) has regular contact with friends. Of the elderly in our sample, 21.3% indicated experiencing loneliness. Only 5.7% was highly educated. 27.3% of the sample lived in nursing homes and the other 72.7% lived in residential homes.

5.3 Descriptive statistics by subsample

Now that we have analyzed descriptive statistics for the entire sample, we can explore descriptive statistics for the subsamples. The main aim is to compare statistics of the nursing home subsample with those of the residential home subsample.

5.3.1 Demographic variables

In Table 2, presented below, we provide an overview of the descriptive statistics regarding the demographic variables in our models. We distinguish between the nursing home subsample and the residential home subsample. We list percentages of respondents for each variable for the nursing home subsample and the residential home subsample. By means of a Chi-square test we examine whether the differences in percentages between the nursing home subsample and the residential home subsample are statistically significant.

As the table shows, the distribution of the respondents in the nursing home subsample is significantly different from the distribution of the respondents in the residential home subsample. Having a look at the percentages of people in each age category in the two subsamples shows that for the 'younger' age categories (age 55-65, age 65-75 and age 75-85), the percentages of people are much higher in the nursing home subsample than in the residential home subsample. Moreover the percentages of people in the 'older' age categories are much larger in the residential home subsample than in the nursing home subsample. This indicates that people in residential homes were significantly older than people in the nursing homes. The average age of nursing home residents was 79.4 years whereas the average age of elderly in the residential homes was 85.2; this also confirms the difference in age distribution between the subsamples. This difference in age distribution between the two subsamples is intuitive: nursing homes take care of the relatively unhealthy whereas residential homes take care of the relatively healthy. Those who are relatively healthy can postpone moving to an institution quite long in general. If they get somewhat restricted in their self-capacity, there are smaller steps to take first (domestic help, for example), before moving to an elderly home.

Table 2 Descriptive statistics demographic variables, subsample breakdown

This table provides a description of the demographics for the entire sample and a breakdown for the subsamples with nursing home residents as well as elderly living in residential homes. A Chi-square test is performed to investigate whether the differences between the two subsamples is significantly different, the resulting p-values are reported in the last column.

	Nursing home subsample (n=253) (%)	Residential home subsample (n=655) (%)	P-value
Age categories			0.000***
Age 55-65	8.30	1.53	
Age 65-75	17.79	4.43	
Age 75-85	40.71	35.27	
Age 85-95	30.04	52.37	
Age 95-105	3.16	6.41	
Marital Status			0.000***
Partner	22.13	10.38	
Widow	56.92	73.74	
Single	20.95	15.88	
Gender			0.197
Male	30.04	25.80	
Female	69.96	74.20	
Education			0.876
Higher education	5.53	5.80	
Medium/lower education	94.47	94.20	

*Note: P-values marked with *** denote significance at the 1% significance level*

Aiming at visualizing the differences in the age distribution between the subsample, we depicted the age distribution in Graph A.1.2, which can be found in the appendix.

The differences in marital status between the two subsamples are also significant; the percentage of widowed elderly in residential homes is much higher than the percentage of widowed elderly in nursing homes. Most likely, this difference is related to the fact that elderly in residential homes are older on average. No significant differences between gender and education level exist between the two subsamples.

5.3.2 Dependent variables and quality indicators

Now that we have gained an insight in the distribution of our sample with respect to demographic variables, the next step is to examine the dependent variables and the quality indicators. In what follows, we provide descriptive statistics by subsample for the main variables of interest. Again, we perform Chi-square tests to examine whether differences between the two subsamples are significant. Descriptive statistics for the dependent variables can be found in Table 3 below:

Table 3 Mean scores dependent variables, subsample breakdown

This table depicts the mean scores for the dependent variables *LIFESATISFACTION* and *HAPPINESS* for the entire sample as well as for the nursing home subsample and the residential home subsample. A Chi-square test is performed to investigate whether the differences between the two subsamples is significantly different.

	Nursing home subsample (n=253) (%)	Residential home subsample (n=655) (%)	P-value
LIFESATISFACTION	2.364	2.940	0.000***
HAPPINESS	3.194	3.562	0.000***

*Note: P-values marked with *** denote significance at the 1% significance level*

Table 3 shows that within our sample, elderly living in residential homes experience significantly higher life satisfaction and happiness than elderly living in nursing homes. Table 4 below depicts the descriptive statistics for the quality indicators:

Table 4 Mean scores quality indicators, subsample breakdown

This table lists the mean scores for the quality indicators *PAINLIM, dANTIDEPRHYPN, dNOTREATMENT, dHEALTHIMP, dHEALTHDECL, dSAFETY, dPRIVACY, dINDIVCARE*. A Chi-square test is performed to investigate whether the differences between the two subsamples is significantly different.

	Nursing home subsample (n=253) (%)	Residential home subsample (n=655) (%)	P-value
PAINLIM	2.280	2.073	0.131
dANTIDEPRHYPN	0.478	0.411	0.065*
dNOTREATMENT	0.285	0.237	0.135
dHEALTHIMP	0.142	0.087	0.014**
dHEALTHDECL	0.375	0.371	0.900
dSAFETY	0.890	0.870	0.461
dPRIVACY	0.751	0.970	0.000***
dINDIVCARE	0.490	0.870	0.000***

*Note: P-values marked with */**/*** denote significance respectively at the 10%, 5% and 1% significance levels*

Table 4 shows that for our sample, elderly in residential homes use on average less antidepressants and hypnotics than elderly in nursing homes. The proportion of people that evaluate their health as being improved from the moment of admission to the institution is significantly higher within nursing homes than within residential homes. This seems to be related to the nature of the type of elderly institution. Nursing homes especially provide medical care, whereas residential homes focus on nursing care. Moreover, evaluations of privacy and individualized care differ much between nursing home residents and elderly in residential homes. Privacy and individualized care are significantly higher evaluated for residential homes than for nursing homes. On the basis of the information in Table 3 and Table 4, life in residential homes seems to be more pleasant than life in nursing homes.

Chapter 6 Results

Now that we have decided on all variables to include in the models, having explained how they are measured and having composed our sample, we can finally estimate the models. We start by estimating Model 1 by means of ordinary least squares regression (OLS). We run the model for the entire sample, the nursing home subsample and the residential home subsample. Next, we estimate Model 2 by means of OLS as well, in order to make a comparison between the results for life satisfaction and happiness.

6.1 Model 1: Life satisfaction

Table 5 below presents the results for our first model. We estimate it by means of linear regression. The aim of performing a regression of the dependent variable *LIFESATISFACTION* on all quality indicators and control variables is to find out which factors are important determinants of life satisfaction in institutionalized elderly. We estimate Model 1 three times: for the entire sample, the nursing home subsample and the residential home subsample. We conduct a Chow test to investigate whether the regression results for the two subsamples are significantly different. The results are presented in Table 5 below:

Table 5 Results Model 1: Life satisfaction

This table shows OLS estimation results for Model 1 by subsample. The dependent variable *LIFESATISFACTION* is regressed on the quality indicators and the control variables. Behind the regression coefficients, the corresponding standard errors appear between parentheses.

LIFE SATISFACTION	***Total sample (N = 908)***	***Nursing homes (N = 253)***	***Residential homes (N = 655)***
PAINLIM	- 0.046* (0.03)	- 0.032 (0.04)	-0.060* (0.03)
dANTIDEPRHYPN	- 0.075 (0.15)	- 0.018 (0.37)	-0.102 (0.17)
dNOTREATMENT	0.098 (0.11)	0.497** (0.19)	-0.012 (0.14)
dHEALTHIMP	0.190* (0.10)	0.005 (0.17)	0.264** (0.13)
dHEALTHDECL	- 0.131* (0.07)	- 0.265** (0.13)	-0.101 (0.08)
dSAFETY	0.123 (0.09)	- 0.226 (0.18)	0.259** (0.11)
dPRIVACY	0.546*** (0.11)	0.538*** (0.13)	0.416** (0.20)
dINDIVCARE	0.102 (0.08)	0.134 (0.11)	0.127 (0.11)
HEALTHSTATUS	0.194*** (0.04)	0.218** (0.07)	0.170*** (0.05)
MOBILITY	0.063 (0.04)	0.074 (0.08)	0.022 (0.05)
dOTHERMEDIC	- 0.071 (0.15)	- 0.169 (0.36)	-0.039 (0.16)
dSRMNTLPRBLMS	- 0.347** (0.11)	- 0.492** (0.20)	-0.334** (0.14)
dLRMNTLPRBLMS	- 0.619*** (0.13)	- 0.470** (0.22)	-0.717*** (0.15)
dMALE	- 0.058 (0.07)	- 0.193 (0.13)	-0.015 (0.09)
dAge55to65	0.321 (0.20)	0.102 (0.25)	0.521 (0.34)
dAge75to85	0.199* (0.12)	0.175 (0.16)	0.177 (0.18)
dAge85to95	0.260** (0.12)	0.185 (0.18)	0.238 (0.18)
dAge95to105	0.212 (0.17)	0.109 (0.36)	0.230 (0.23)
dPARTNER	- 0.012 (0.12)	- 0.173 (0.18)	0.068 (0.16)
dWIDOW	0.056 (0.09)	- 0.056 (0.18)	0.130 (0.11)
dCNTCTCLOSEREL	- 0.022 (0.07)	- 0.200 (0.13)	0.056 (0.09)
dCNTCTOTHERFAM	0.116* (0.06)	- 0.026 (0.12)	0.171** (0.07)
dCNTCTFRIENDS	0.015 (0.06)	- 0.162 (0.13)	0.074 (0.07)
dLONELY	- 0.433*** (0.07)	- 0.468*** (0.13)	-0.428*** (0.09)
dHIGHEDUC	- 0.274** (0.13)	-0.412* (0.25)	-0.296* (0.16)
dNURSINGHOME	- 0.228** (0.09)		
CONSTANT	1.464 (0.32)	1.85 (0.57)	1.546 (0.42)
Adjusted $\mathbf{R^2}$	0.2554	0.2244	0.2469
Chow test: P = 0.0142			

*Note: P-values marked with */**/*** denote significance respectively at the 10%, 5% and 1% significance levels*

We start by interpreting the regression results for the total sample. Thereafter, we examine the subsample results. Obviously, regarding all interpretations of regression coefficients, the *ceteris paribus* condition holds. If we state, for example, that by increasing variable A, variable B decreases, we actually mean that by increasing variable A and holding variables C-Z constant, variable B decreases.

6.1.1 Total sample

In this section, we discuss regression results for the entire sample consisting of both residential home inhabitants and nursing home residents. We start by evaluating the regression results for quality variables and proceed by examining the relationship between the control variables and life satisfaction.

Quality indicators

Our main variables of interest are the quality indicators. As the result table shows, *PAINLIM, dHEALTHIMP, dHEALTHDECL* and *dPRIVACY* are significantly related to *LIFESATISFACTION*. We consider these quality indicators now one for one. The limitation in ADL as a result of pain is negatively related to life satisfaction. However, this relationship is quite weak. By increasing the score for *PAINLIM* by 1 point, the score for life satisfaction decreases by 0.046 points where life satisfaction is measured on a five-point scale. This negative relationship, although not being so strong, confirms our first hypothesis. The coefficient for *dHEALTHIMP* is positive. Elderly having experienced an improvement in their health status since their admission to the institution rate their life satisfaction 0.190 points higher than elderly who noticed no change. The coefficient for *dHEALTHDECL* is negative. Elderly having experienced a decline in their health status rate their life satisfaction 0.131 points lower than those who did not experience any change. The results regarding health improvement and health decline confirm our fourth and fifth hypothesis. The regression results show that by keeping all other variables constant, a decline in health status is less important in relation to life satisfaction than an improvement in health status. Finally, the relationship between *PRIVACY* and *LIFESATISFACTION* is significant and strongly positive. Institutionalized elderly who perceive the degree of privacy in the institution they live in as being sufficient, score their satisfaction with life on average 0.546 points higher than those who do not experience enough privacy in their living environment. This result strongly confirms our seventh hypothesis.

The other hypotheses cannot be confirmed in the total sample. We find no evidence for the importance of use of antidepressants and hypnotics in determining life satisfaction. Moreover, we cannot confirm the relationship between the prevalence of mental problems without treatment and life satisfaction. However, examining the data provides a bit more insight in the possible reason for the last mentioned, somewhat unexpected result. Table 6 below shows the magnitude of prevalence of mental problems without treatment. The table summarizes the percentages of elderly in our entire sample suffering from mental problems, of those with short-term mental problems and of the group suffering from long-term mental problems:

Table 6 Mental problems without treatment

This table gives an insight in the prevalence of mental problems without treatment. We distinguish between mental problems in general, short-term mental problems and long-term mental problems.

	Mental problems (N = 327)	Short-term mental problems (N = 228)	Long-term mental problems (N = 99)
Treatment	30.6%	24.6%	44.0%
No treatment	69.4%	75.4%	56.0%

Table 6 shows that among people suffering from mental problems, 69.4% receives no treatment. Among the people with short-term mental problems, this percentage is even higher (75.4%). However, prevalence of long-term mental problems without treatment is lower (56.0%). As the table indicates, mental problems (either long-term or short-term) are more often untreated than treated. The variable *dNOTREATMENT* is highly associated with *dSRMNTLPRBLMS* and *dLRMNTLPRBLMS.* This can be seen from the correlation table (Table A.2.4 in the appendix) as well; the correlation between short-term

mental problems and obtaining no treatment is high (ρ = 0.67), the correlation between long-term mental problems and receiving no treatment is lower bur substantial as well (ρ = 0.25). As the results table shows (Table 5 above), both *dSRMNTLPRBLMS* and *dLRMNTLPRBLMS* appear to be significant in explaining life satisfaction. Prevalence of no treatment could therefore be captured in the coefficients for the mental problem dummies, resulting in the insignificance of the variable coefficient.

The regression results do not provide confirmation for the existence of a relationship between *dSAFETY* and *dINDIVCARE* with *LIFESATISFACTION* either. Having a further look at the data reveals low variability in the safety dummy: 792 out of 908 respondents feel save in their living environment. This low variability may cause the insignificance of the coefficient.

Control variables

In this section, we interpret the significant regression coefficients for the control variables. Several control variables appear to be highly significant. Three of them regard health status. Overall health status is strongly associated with life satisfaction. By increasing the score for *HEALTHSTATUS* with 1 point, *LIFESATISFACTION* increases by 0.194 points. The importance of health status in determining life satisfaction is confirmed in existing literature. Angelini et al. (2012) find a strong negative relationship between the existence of health problems and life satisfaction. Tse et al. (2013) find a strong positive association between health status and life satisfaction. According to Snider (1980), self-reported health status is the most important determinant of life satisfaction. He states that subjective health, meaning how people perceive their health to be, is much more important in determining life satisfaction than objective health and mobility.

Mental health problems, especially on the long run, are highly important in explaining life satisfaction. Elderly suffering from short-run mental problems rate their life satisfaction on average 0.347 points lower than those without short-run mental problems. The group with long-run mental problems rate their life satisfaction even 0.619 points lower than the group without mental problems in the long-run. Interestingly, short-term mental problems are highly associated with life satisfaction, although conceptually, life satisfaction is a measure regarding ones entire life. As explained earlier, our measure for life satisfaction regards 'current life' and we consider it multi-interpretable. The questionnaire did not state the timespan for mental problems being either on the short-run or the long-run. However, we think that most respondents regard 'current life' as covering a longer period than only 'the short-run'. The peak-end rule (Kahneman & Krueger, 2006) that we explained in the conceptual framework section, may play an important role here. Although short-term mental problems regard only a short period in life, they may influence overall life satisfaction substantially because people tend to let recent experiences be of high influence in the evaluation of their overall lives.

Next to health-related control variables, other factors play an important role in explaining life satisfaction as well. Loneliness is strongly related to life satisfaction: elderly feeling lonely rate their life satisfaction on average 0.433 points lower than their counterparts not living in loneliness. *dHIGHEDUC* is highly significant as well, although this variable does not show much variability. On average, the higher educated elderly experience lower levels of life satisfaction than the lower educated in our sample. The low variability in the variable could be the explanation for this relationship. Highly educated elderly live

in institutions with little highly educated company. They could feel barely connected to their inmates as they may not share the same interests and have therefore not much to talk about. As a result, they possibly make fewer friends in the institution than the lower educated elderly who form the majority within the institutions. As Wolff (2013) proofs, making friends within the institution is highly important in determining life satisfaction.

Moreover, significant coefficients for *dage75to85, dage85to95, dCNTCTOTHERFAMILY* and *dNURSINGHOME* are found. Elderly aged between 75 years and 95 years, experience significantly higher satisfaction with life than elderly in the control group, who are aged between 65 and 75 years. Probably, younger institutionalized elderly feel too young to live in an elderly home. Many elderly between 65 - 75 years still live in the community. This could make these relatively young elderly in institutions feel very bad about not being able to take care of their selves anymore. Moreover, moving to an elderly institution may feel like heading towards the end of one's life. For many, the elderly house is the place to spend their final time on earth. Elderly aged 75 and above may suffer less from certain feelings. They may not feel too young for living in an elderly home and may be satisfied with having reached a substantial age. Moreover, elderly aged between 75 and 95 are more likely to have lived in the elderly home for a longer period of time already than those between 65 and 75, just because they are older. The older old may be more used to their 'new' living environment than their younger counterparts. The coefficient for *dage55to65* is not significant, so we do not find evidence for elderly in this age category to experience different levels of life satisfaction than those between 65 and 75 years of age. Having a look at the data shows that the youngest age group only contains 31 respondents. This low number of respondents may well be the reason for the related coefficient not being significant. However, these younger elderly may rate life satisfaction similarly to the age group 65 - 75 as well. We do not find a significant difference between life satisfaction of the oldest old and of the elderly between age 65 and 75. Our sample consists of only 50 elderly aged 95 or above, so again, this could be the reason for not showing significant results.

Living in a nursing home is significantly negative associated with life satisfaction. Elderly in residential homes are on average more satisfied with their lives, even after controlling for health status, degree of privacy and other factors. Maybe, because of elderly in residential homes are in better health in general, the overall mood of residential home inhabitants is better than the mood of nursing homes residents. Spending time together with people with a more positive, happy appearance may influence one's own state of mind in a positive way. Moreover, it may be that elderly in nursing homes mentally feel less pleasant because they live together with so many people suffering from diseases and are confronted with people in pain all the time. For these reasons, elderly in residential homes may experience the ambiance of their living environment more positive than elderly in nursing homes.

Although a bit unexpected, we did not find evidence for association between marital status and life satisfaction in institutionalized elderly. However, although being widowed should intuitively be related to lower levels of life satisfaction, not finding a certain relationship can be explained as well. *dWIDOW* examines the relationship between being widowed and life satisfaction by comparing it to the group of singles. This control group is composed both of elderly never having had a partner and elderly who had a partner in the past but now not anymore. It may well be that widows experience more satisfaction with

overall life than those who have never had a partner or have divorced. Widows may be satisfied with having had a (long) good life together with a beloved spouse and cherish their memories.

We did not find much evidence for the relationship between the contact variables and life satisfaction. Only the dummy indicating whether the person has contact with family members other than (grand)children is significantly positive associated with life satisfaction. This is a bit contradictory to our expectations: we expected contact with close relatives and friends to be of higher importance. However, our results show evidence for the importance of social aspects in determining life satisfaction through loneliness.

6.1.2 Subsamples: nursing homes and residential homes

We performed a Chow-test to check whether the relationship between the explanatory variables and life satisfaction is significantly different between the nursing home subsample and the residential home subsample. The resulting P-value (P = 0.0142) shows that, by assuming a 5% significance level, the results are significantly different between the two samples.

For the subsamples, we find significant relationships between the explanatory variables and the dependent variables, although there are a bit less significant results than for the entire sample. Especially for the nursing home subsample that consists of only 253 respondents we do not find much evidence for the relationships between explanatory variables and life satisfaction. Variables with relatively low variability in the total sample may have even lower variability in the subsamples as a result of loss of respondents. This could be the source of not being able to confirm significant relationships within the subsamples. Again, we start by examining the regression results for the coefficients of the quality variables. Thereafter, we discuss significant relationships between control variables and life satisfaction for the subsamples.

Quality indicators

We find evidence for the existence of a strong positive relationship between *dPRIVACY* and *LIFESATISFACTION* in all three samples. *dSAFETY* is not significant in the total sample and the nursing home sample. However, this dummy is significantly related to life satisfaction in elderly living in residential homes. Residential home inhabitants who experience safety in their living environment rate their life satisfaction on average 0.26 points higher than their inmates who feel unsafe.

The variable *dNOTREATMENT* is only significant in the nursing home subsample. However, the coefficient is not of the expected sign. Having mental problems without obtaining treatment should, according to this result, be related to higher levels of life satisfaction. This seems to be counterintuitive. Probably, the small sample size of nursing home residents plays a role here. The use of antidepressants or hypnotics is significant in neither of the samples. We find no evidence for the association between obtaining individualized care and life satisfaction as well.

Although the variables measuring a change in health status are significantly related to life satisfaction for the total sample, they are not always in the subsamples. In the nursing home subsample, only a decline in health is significantly associated with life satisfaction. In the residential home subsample, on

the other hand, only health improvement is significantly related to satisfaction with overall life. Probably, this difference between samples has to do with the nature of the institution type. Nursing homes take care of the relatively unhealthy elderly, whereas residential homes take care of relatively healthy old people. For elderly in a relatively bad health, a further decline in health status may feel much worse than for those who are relatively healthy. Moreover, elderly moving to a nursing home know these types of elderly institutions provide extensive medical care; therefore, these elderly may have expectations in terms of health improvement. Elderly moving to residential homes on the other hand, are in general quite old. Because of their age, they may expect health declines, as it is common to obtain health issues when getting older. If they, unexpectedly, experience health improvements, they may feel very satisfied about this 'sudden windfall'. Further examining the data give more strength to these arguments. Among nursing home residents, 14.23% of the respondents experience health improvements, as opposed to only 8.7% in the residential home subsample. These numbers show that it would be logical for nursing home residents to form other expectations about their change in health than for elderly in residential homes. Although it is a bit tempting to conclude that health declines are more important for nursing home residents than health improvements and that health declines are less important for residential home inhabitants than health improvements, we need to be careful here. These results could very well be affected by the small sample size(s). Especially for the nursing home residents, the results may be a bit distorted by the small number of respondents.

Control variables

Overall health status is strongly associated with life satisfaction in the entire sample as well as in the subsamples. It appears to be slightly more important for nursing home residents' life satisfaction than for life satisfaction in residential home inhabitants, considering the magnitude. Moreover, the dummy variables measuring the prevalence of mental problems (both long-term and short-term) are strongly related to life satisfaction in all three samples. The relationship between mental problems and life satisfaction in the residential home sample is very similar to the relationship in the entire sample. For the total sample and the subsample, long-term mental problems are much stronger associated with life satisfaction than short-term mental problems. For nursing home residents, the coefficients of either classification of mental problems are of the same magnitude. The importance of loneliness is consistent among the samples as well in terms of significance, sign and magnitude. For all three samples considered, loneliness is strongly negative associated with life satisfaction. Education level shows consistency between the three different samples as well. For the residential home subsample, the relationship between having contact with family members other than (grand) children regularly and satisfaction with life is significant, as in the entire sample. It is not significantly related to life satisfaction for our nursing home sample. As in the entire sample, we do not find evidence in the subsamples for *dCNTCTCLOSEREL* to be related to life satisfaction.

6.2 Model 2: Happiness

Table 7 below presents the results for our second model. In this model, happiness is regressed on all quality indicators and control variables. For comparison, we repeat the results of Model 1 in the table. At first, we discuss the variables that are significantly related to *HAPPINESS*. At second, we compare the regression outcomes for the two models. Our main aim is to investigate whether our sample can provide

evidence for the difference between the concepts *LIFESATISFACTION* and *HAPPINESS*.

Table 7 Results Model 2: happiness

This table lists the OLS results of both Model 1 and Model 2. Model 1 regresses *LIFESATISFACTION* on all quality indicators and control variables. In Model 2, we changed the dependent variable by investigating *HAPPINESS* now. The quality indicators and control variables are exactly the same in both models. Behind the regression coefficients, the corresponding standard errors appear between parentheses.

LIFE SATISFACTION ***HAPPINESS***	***Model 1 (N = 908)***	***Model 2 (N = 908)***
PAINLIM	- 0.046* (0.03)	- 0.053** (0.03)
dANTIDEPRHYPN	- 0.075 (0.15)	- 0.039 (0.14)
dNOTREATMENT	0.098 (0.11)	0.065 (0.10)
dHEALTHIMP	0.190* (0.10)	0.309*** (0.10)
dHEALTHDECL	- 0.131* (0.07)	- 0.070 (0.06)
dSAFETY	0.123 (0.09)	0.104 (0.08)
dPRIVACY	0.546*** (0.11)	0.240** (0.10)
dINDIVCARE	0.102 (0.08)	- 0.083 (0.07)
HEALTHSTATUS	0.194*** (0.04)	0.159*** (0.04)
MOBILITY	0.063 (0.04)	0.055 (0.04)
dOTHERMEDIC	- 0.071 (0.15)	- 0.013 (0.13)
dSRMNTLPRBLMS	- 0.347** (0.11)	- 0.381*** (0.10)
dLRMNTLPRBLMS	- 0.619*** (0.13)	- 0.633*** (0.12)
dMALE	- 0.058 (0.07)	- 0.075 (0.07)
dAge55to65	0.321 (0.20)	0.343* (0.18)
dAge75to85	0.199* (0.12)	0.239** (0.11)
dAge85to95	0.260** (0.12)	0.307*** (0.11)
dAge95to105	0.212 (0.17)	0.361** (0.16)
dPARTNER	- 0.012 (0.12)	0.177 (0.11)
dWIDOW	0.056 (0.09)	0.092 (0.09)
dCNTCTCLOSEREL	- 0.022 (0.07)	- 0.002 (0.07)
dCNTCTOTHERFAM	0.116* (0.06)	0.134** (0.06)
dCNTCTFRIENDS	0.015 (0.06)	0.167*** (0.06)
dLONELY	- 0.433*** (0.07)	- 0.371*** (0.07)
dHIGHEDUC	- 0.274** (0.13)	- 0.056 (0.12)
dNURSINGHOME	- 0.228** (0.09)	- 0.173** (0.08)
CONSTANT	1.464 (0.32)	2.465 (0.30)
Adjusted R^2	0.2554	0.2286

*Note: P-values marked with */**/*** denote significance respectively at the 10%, 5% and 1% significance levels*

6.2.1 Interpreting the results of Model 2

Again, we start by examining the relationship between the quality indicators and the dependent variable, in this case *HAPPINESS.* We proceed by exploring the relationship between the control variables and happiness.

Quality indicators

PAINLIM, dHEALTHIMP, and *dPRIVACY* show a significant relationship with *HAPPINESS.* The extent to which the respondent is limited in performing activities of daily living is significantly negative related with happiness. However, the magnitude of the relationship is small. By increasing the score on *PAINLIM*

by 1 point, *HAPPINESS* decreases by 0.05 points. *dHEALTHIMP* and *dPRIVACY* are both significantly positive related to happiness. Elderly having experienced an improvement in their health status rate their happiness on average by 0.31 points higher than elderly who have noticed no change. The elderly in our sample who experience enough privacy in their living environment perceive their happiness as being 0.24 points higher than the elderly who indicate a lack of privacy.

Control variables

HEALTHSTATUS, dage55to65, dage75to85, dage85to95, dage95to105, dCNTCTOTHERFAMILY and *dCNTCTFRIENDS* are all positively related to *HAPPINESS*. By increasing overall health status with 1 point, happiness increases with 0.16 points. Contact with family members other than close relatives and contact with friends are pretty strong related to happiness as well. Moreover, age appears to be related to happiness. Elderly aged 55 - 65 are on average 0.34 points happier (on a five-point scale) than those in the reference group with age 65 - 75. Similarly, elderly aged 75 - 85 are on average 0.24 points happier than those in age group 65 - 75. Elderly aged between 85 and 95 are on average 0.31 points happier than those with an age between 65 and 75. Finally, the oldest old in our sample (between age 95 and age 105) are on average even 0.36 points happier than the elderly between 65 and 75 years of age.

The variables *dSRMENTALPRBLMS, dLRMENTALPRBLMS, dLONELY* and *dNURSINGHOME* are significantly negative related to *HAPPINESS.* The relationship between either classification of mental problems and happiness is strong, although long-run mental problems are stronger related with lower levels of happiness than short-run mental problems. Elderly suffering from loneliness assess their happiness by 0.37 points lower than elderly not feeling lonely. Our sample's respondents who live in a nursing home evaluate their degree of happiness on average with 0.17 points lower than those living on residential homes.

6.2.2. A comparison: life satisfaction and happiness

As the regression results in Table 7 reveal, life satisfaction and happiness are to some extent considered to be different concepts in the context of our sample. Although the two dependent variables show similarities regarding some variables, substantial differences exist as well.

The quality indicators that show significant relationships with life satisfaction are significantly related to happiness as well, except for *dHEALTHDECL.* A decline in health status is related to a decrease in life satisfaction, but we do not find evidence for a relationship with happiness. Health improvements are, on the contrary, stronger associated with happiness than with life satisfaction. Although privacy is significantly positive related to both life satisfaction and happiness, it is more important in determining life satisfaction. Limitations in ADL caused by pain appear to be of similar importance for life satisfaction and happiness.

Regarding the control variables, some differences are found as well. Age seems to be of higher importance in explaining happiness than in explaining life satisfaction. Not only the age categories 75 - 85 and 85 - 95 are important in determining happiness, the age categories 55 - 65 and 95 -105 show a significant positive relationship with happiness as well. Actually, people in all categories are happier than

those in the category 65 to 75. Having regular contact with friends has a significant positive influence on happiness but not on life satisfaction. Education level is not significantly related to happiness although it is strongly negatively related to life satisfaction.
Health status, the presence of mental problems, regularity of having contact with family members other than (grand) children, loneliness and the type of institutions are of similar importance in relation with life satisfaction as in relation to happiness.

The comparison of Model 1 and Model 2 shows that life satisfaction and happiness are, at least to some extent, conceptually different. The determinants for satisfaction with current life are partially different from the determinants for happiness. As explained earlier, our measure for life satisfaction does not fully coincide with life evaluation; we regard is as being oriented somewhere between being a measure of life evaluation and a measure of affect. Similarly, our measure for happiness does not fully coincide with affect; it may be a bit more directed towards life evaluation. However, we do regard our measure of life satisfaction to cover a longer time period than our measure of happiness. In our view, our measures for life satisfaction and happiness both belong somewhere between life evaluation and affect as regarded from a timeframe view, where life satisfaction is placed more towards life evaluation and happiness more towards affect.

We expected to obtain results that would reflect this time difference in our dependent variables. However, this appears not really to be the case. To start with, satisfaction with privacy in the elderly institution is much stronger related to life satisfaction than to happiness. After having found a strong positive relationship between privacy and life satisfaction, we expected to find a relationship between privacy and happiness of at least the same magnitude, as in our view; the happiness measure is more oriented towards the current phase in life. The findings with respect to education level are somewhat contradictory to our expectations as well. The results of our first model show that higher educated people are on average less satisfied with their current lives. We thought that this may be because highly educated elderly are in the minority within elderly institutions. As a result, they may have less to talk about with their inmates than the lower educated who are in the majority. However, if that would be the reason, a similar result should hold with respect to happiness as well. Of course, other underlying reasons for the significant negative relationship between education and life satisfaction may exist. To continue, a decrease in health is significantly related to current life satisfaction, whereas it is not to happiness. An improvement in health status however, is important both for life satisfaction and happiness. Improvements in health are even much stronger related to happiness than to life satisfaction.

Especially the findings for the health change variables and privacy are somewhat puzzling. Current life satisfaction and happiness appear to be regarded very different by the respondents in our sample with respect to these measures. However, the findings do not reflect a true difference in the timeframe of the two variables.

Chapter 7 Robustness Checks

To repeat, we measure life satisfaction by the question: "To what extent are you satisfied with the life you live at this moment?" Answers are measured by means of an ordinal scale: "Exceptionally satisfied", "Very satisfied", "Satisfied", "Pretty Satisfied" and "Dissatisfied". This five-point scale seems somewhat skewed towards positive evaluations of satisfaction. The first four answer possibilities evaluate positive satisfaction, only the last answer possibility measures negative satisfaction. Usually, five-point scales are symmetric in the sense that two answer possibilities measure a positive evaluation, the median answer possibility can be regarded as a neutral evaluation and two answer possibilities measure negative evaluation, similar to the five-point scale for life satisfaction used by Angelini et al. (2012). Our measure for happiness is answered on a symmetric five-point scale.

As the scaling of the two dependent variables in our study is different, a comparison between the two can give problems. Our linear regression results in the previous section are possibly biased. By means of OLS, the assumption is made that the distance between the answer possibilities is exactly the same for each pair. This is not necessarily the case and is even unlikely especially for the *LIFESATISFACTION* answer scale. Therefore, we conduct ordered probit regressions as a robustness check. The underlying assumption is that a latent continuous measure exists, underlying the ordinal scale.

Again, we perform regressions for both Model 1 and Model 2. Table 8 below displays the ordered probit results.

Table 8 Results ordered probit models

This table lists the ordered probit regression results of both Model 1 and Model 2. In Model 1, *LIFESATISFACTION* is regressed on all quality indicators and control variables. In Model 2 *HAPPINESS* is regressed on all quality indicators and control variables.

LIFE SATISFACTION / ***HAPPINESS***	***Model 1 (N = 908)***	***Model 2 (N = 908)***
PAINLIM	- 0.56 * (0.03)	- 0.068 ** (0.03)
dANTIDEPRHYPN	- 0.087 (0.18)	- 0.103 (0.19)
dNOTREATMENT	0.137 (0.14)	0.027 (0.14)
dHEALTHIMP	0.234 * (0.13)	0.442 *** (0.13)
dHEALTHDECL	- 0.159 * (0.08)	- 0.076 (0.09)
dSAFETY	0.149 (0.11)	0.144 (0.11)
dPRIVACY	0.658 *** (0.14)	0.287 ** (0.13)
dINDIVCARE	0.122 (0.10)	- 0.119 (0.10)
HEALTHSTATUS	0.247 *** (0.05)	0.227 *** (0.05)
MOBILITY	0.083 * (0.05)	0.068 (0.05)
dOTHERMEDIC	- 0.082 (0.18)	- 0.059 (0.19)
dSRMNTLPRBLMS	- 0.442 *** (0.14)	- 0.467 *** (0.14)
dLRMNTLPRBLMS	-0.774 *** (0.16)	- 0.764 *** (0.15)
dMALE	- 0.068 (0.09)	- 0.114 (0.09)
dAge55to65	0.413 * (0.24)	0.430 * (0.24)
dAge75to85	0.248 * (0.15)	0.262 * (0.15)
dAge85to95	0.317 ** (0.15)	0.355 ** (0.15)
dAge95to105	0.290 (0.21)	0.427 ** (0.21)
dPARTNER	- 0.007 (0.14)	0.289 ** (0.15)

dWIDOW	0.068 (0.11)	0.139 (0.12)
dCNTCTCLOSEREL	- 0.016 (0.09)	0.008 (0.09)
dCNTCTOTHERFAM	0.141 * (0.07)	0.177 ** (0.08)
dCNTCTFRIENDS	0.018 (0.08)	0.223 *** (0.08)
dLONELY	- 0.522 *** (0.09)	- 0.475 *** (0.09)
dHIGHEDUC	- 0.317 ** (0.16)	- 0.059 (0.16)
dNURSINGHOME	- 0.289 *** (0.11)	- 0.273 ** (0.11)
CONSTANT		
Log-likelihood	- 1122.017	- 1019.366

*Note: P-values marked with */**/*** denote significance respectively at the 10%, 5% and 1% significance levels*

The ordered probit results show many similarities with the OLS results for both Model 1 and Model 2. Except for *dage55to65* in Model 1 and *dPARTNER* and *dCNTCTCLOSEREL* in Model 2, the results are similar in terms of signs and significance. Both *dage55to65* and *dPARTNER* were not significantly related to life satisfaction in the linear regression model but by performing an ordered probit model, the results are significant.

As almost all results are similar in terms of sign and significance between the OLS results and the ordered probit results, we consider the OLS results as being quite robust. The ordered probit results seem to confirm our linear regression results, adding strength to our OLS results.

Chapter 8 Discussion

This concluding chapter starts with an overview of the most important findings of this study and a discussion regarding the findings. Related to these findings, we suggest some focus areas for policy makers and nursing staff. Finally, we discuss the limitations of this study and provide suggestions for further research.

8.1 Summary of main findings and discussion

In this section, we start with providing an overview of our results of main interest: the relationship between the quality of Dutch elderly institutions and their residents' subjective well-being. Thereafter, we shortly discuss the other determinants of life satisfaction found in this study. Moreover, we discuss the relationship between life satisfaction and happiness.

The importance of institutional quality

The regression results provide evidence that Dutch elderly institutions can indeed contribute to their residents' subjective well-being. Several quality indicators show a significant relationship with life satisfaction, our measure for subjective well-being.

The extent of experienced privacy seems to be the most important determinant of subjective well-being among the quality indicators considered in our study. Elderly in Dutch institutions who are satisfied with the privacy in their living environment rate their life satisfaction (measured on a five-points scale) 0.55 points higher than their inmates who wish for more privacy. We consider this result quite interesting, as

the living environment seems to be more important for institutionalized elderly than the quality of care. However, we find proof for the importance of quality of medical care or nursing care for subjective well-being as well. Adequate pain management by the staff of elderly institutions significantly contributes to their residents' well-being. As our results show, elderly suffering from pain with limitations in their activities of daily living as a result, rate their life satisfaction significantly lower than elderly with fewer limitations from pain. However, the difference in average rating of life satisfaction is quite small. Changes in self-assessed health status are important in relationship to life satisfaction as well. As expected, health improvements contribute in a positive direction to life satisfaction and health declines are negatively related to life satisfaction. For the entire sample, health improvements are more important in determining life satisfaction than health declines. Interestingly, for the nursing home sample we only find evidence for the negative relationship between health declines and life satisfaction, whereas for the residential home sample, we can only proof the importance of health improvements.

Although we do not find evidence for the relationship between experiencing safety within the living environment and subjective well-being in the total sample, safety seems to be important for the residential home subsample. Moreover, our regression results do not proof the importance of prevalence of mental problems without treatment for subjective well-being. However, exploring the data a bit further shows that the insignificance of this variable may be due to the high association with the variables measuring long-term and short-term mental problems. The significant regression coefficients for the mental problem variables may capture the importance of receiving treatment. Actually, the majority of elderly suffering from mental problems, either long-term or short-term, does not obtain any treatment, which is a quite alarming result.

Other determinants of subjective well-being

Next to the degree of institutional quality, there are other factors that significantly contribute to subjective well-being in institutionalized elderly. Especially health aspects are of great importance for life satisfaction in institutionalized elderly. This is fully in line with the findings in other studies mentioned earlier. Both physical as well as mental health problems are strongly related to satisfaction with overall life. We find a strong significant positive relationship between overall self-rated health status and life satisfaction. Whether or not one experiences long-term mental problems has the highest explanatory power for life satisfaction among all independent variables in our models. Prevalence of short-term mental problems is significantly related to lower levels of life satisfaction too.

Loneliness is very important for the degree of life satisfaction as well. Lonely institutionalized elderly rate their life satisfaction 0.43 points lower than their inmates not suffering from loneliness. Moreover, we also find a significant relationship between elderly subjective well-being and the type of elderly institution they live in as well as their education level and age. Nursing home residents rate their satisfaction with life significantly lower than elderly in residential homes. Elderly between 75 and 95 years of age are on average more satisfied with their lives than their elderly aged between 65 and 75 years. High-educated elderly are in a large minority in institutions, they rate their well-being significantly lower than the lower educated.

Life satisfaction and happiness

Although subjective well-being as measured by life satisfaction and on the other hand happiness are used interchangeably in the literature, they are conceptually different. Our study shows that for our sample, differences in the determinants for the two dependent variables exist. To some extent, satisfaction with current life and happiness are influenced by the same factors. Especially mental health status, overall health status, limitation in ADL as a result of pain, loneliness and the type of elderly institution influence both current life satisfaction and happiness in the same direction and by more or less the same magnitude. Major differences exist as well. A decline in health status, for example, has an important negative influence on life satisfaction but it is not significantly related to happiness. An increase in health status is significantly related to both life satisfaction and happiness but it is less important in explaining life satisfaction than in explaining happiness. Satisfaction with privacy in the living environment is significantly positive related to both life satisfaction and happiness, but it is of much higher importance in explaining life satisfaction than in explaining happiness. This research shows therefore that although subjective well-being as measured by current life satisfaction and happiness are related, they do not measure exactly the same. However, in the light of the conceptual definitions, we expected measures related especially to the present to be important for happiness and measures more related to life as a whole to be related to life satisfaction. With respect to this, our results are somewhat counterintuitive. For example, privacy within the current living environment should, conform our expectations based on the conceptual definitions, be stronger related to happiness than to life satisfaction.

This contradiction between the conceptual definitions and our findings may well be originating from the multi-interpretable backgrounds in our measures. As explained earlier, the questions used for our analysis do not clearly provide a timeframe specification; they regard the timeframe the respondents consider it to entail. Although in our view, satisfaction with current life entails a longer period of time than happiness, the respondents in our sample may have different perceptions on this. Some respondents may interpret the questions as being more towards a measure of life evaluation whereas other respondents may interpret the questions as being more oriented towards a measure of affect.

Current life satisfaction as a measure of subjective well-being

In this study, we use current life satisfaction as a measure of subjective well-being. As explained earlier, we view current life satisfaction as being a measure somewhere in between being a measure of life evaluation and being a measure of affect. In interpreting our determinants of current life satisfaction as being determinants of subjective well-being, we should keep in mind that other components of subjective well-being not taken into account in this study may be important as well. There are more important measures underlying affect and we may by means of the used question for life satisfaction not evaluate life as a whole always. Our measure may contain some elements of life evaluation and affect, but is does certainly not contain aspects of eudaimonia. However, on could argue that the eudaimonia dimension may not be a relevant distinctive dimension in the case of elderly. In our view, having a sense of meaning and purposes in life is especially an important aspect of consideration for younger people. Often, people start making plans at earlier ages with respect to goals they want to achieve and ways to attach meaning to one's life. In that way, they can evaluate their lives every now

and then as the ageing process continues. This enables people to adjust goals or start living differently in order to reach their goals in case they are not progressing towards it. Once having obtained old age, it is in general less easy to start working on attaining goals and experience a sense of purposefulness of one's own life, just because most likely not much time is left, there are limitations coming from health and mobility problems and in case one has no feelings of having attained meaning in life at that age, it is most likely a bit difficult to reach is, as the largest part of one's life could in that case be seen as being wasted. So in our view, for elderly aspects of eudaimonia are included in life satisfaction (are you satisfied with, among other aspects, the extent to which personal goals have been reached and meaning has been found in life) as opposed to younger people who are still working on creating and achieving goals and attaching meaning to their time on earth.

8.2 Policy Recommendations

Elderly institutions seem to be able to improve their quality of care especially by reducing under diagnosing of both mental problems and pain. Moreover, attention should be focused to the design and layout of elderly institutions when (re) building new homes, as our study proofs the desire for more privacy in institutionalized elderly. We will elaborate a bit further on the different potential sources of low quality just mentioned.

Although we did not find statistical evidence for the relationship between sufferings from mental problems without obtaining treatment and subjective well-being, exploring the data provides concerning insights. The majority of institutionalized elderly who suffer from mental problems do not obtain any treatment. 56.0% of the elderly in our sample who suffer from long-term mental problems do not obtain treatment. Even three out of four elderly suffering from short-term mental problems do not receive help. In improving quality of care regarding providing help to residents with mental problems, an important role exists for nursing staff. Gueldner et al. (2001) already emphasized the importance of untreated mental problems. As they state, depression goes often undiagnosed. On top of that, elderly diagnosed with depression often do not receive active treatment after all. They recommend the routine-based assessment of nursing home residents. This seems to be a good idea for Dutch elderly institutions as well. More than half of the elderly in our sample suffering from long-term mental problems do not obtain treatment. This is problematic; we found evidence that elderly suffering from long-term mental problems on average rate their life satisfaction by 0.62 points lower than their counterparts without long-term mental problems. Adequate signaling of mental problems as well as actively responding afterwards could substantially improve well-being of institutionalized elderly.

As our regression results show, a significant negative relationship exists between the extent of limitation in activities in daily living and well-being. Although the difference in life satisfaction rates is not large between elderly with limitations in ADL as a result of pain and the control group, the significant relationship does show the importance of pain management by staff in the elderly institutions. By applying effective pain therapy, residents' overall well-being could be improved. Although nursing home staff should be able to judge on the need to provide pain therapy and should react adequately on pain signals found in their residents, part of the problem could also be traced back to the elderly themselves (Tse et al. 2013). In providing this argument, Tse et al. (2013) refer to Schofield (2006), who states that among older people, there are many who do not take actions when experiencing pain. As a result of

negligence in indicating the presence of pain to nursing staff, the pain intensity could increase. Possible reasons for this passive behavior are the following: elderly may be reluctant in asking for help, consider and accept pain as part of the ageing process or are afraid of getting pain medication prescribed. Moreover, as Tse et al. (2013) continue, Higgins et al. (2004), Murphy (2007) and Schofield (2006) provide two additional arguments for elderly to behave passive in creating awareness of their pain by nursing staff. Firstly, elderly may have low expectations about the willingness or ability of staff members in providing them pain therapy. Secondly, elderly may not always be very aware of available pain therapies. Tse et al. (2013) provide some useful recommendations for nursing home staff. First of all, under-recognized pain in elderly can be reduced by introducing regular pain assessment by nursing staff at patients and by letting patients keep track of pain diaries to be able to follow changes in pain intensity. These recommendations are useful for Dutch nursing homes as well. By creating more awareness at nursing staff about unrecognized pain in elderly patients, they can focus more on detecting pain and providing pain therapy. This is a pretty simple way of contributing to the overall well-being of Dutch institutionalized elderly that can be easily implemented.

Our study proofs the importance of privacy for subjective well-being in Dutch institutionalized elderly. Elderly indicating to be satisfied with the extent of privacy, rate their life satisfaction much higher than those who experience a lack in privacy. Our data shows that dissatisfaction with privacy is more common in nursing homes than in residential homes. Almost everyone (96.6%) of elderly in residential homes is satisfied with the level of privacy. However, only 75.1% of nursing homes residents is satisfied with the level of privacy provided. As a result of the process of extramuralisation, the relative number of residential homes will decrease as opposed to the number of nursing homes. Moreover, because of the large ageing of the Dutch population, the number of elderly in nursing homes is expected to rise in the future. In our opinion, attention should be focused on the layout and design in (re) building nursing homes with respect to privacy. If possible, the houses should be designed in such a way that elderly do not have to share rooms or, in case of this being too costly (building more walls is more costly), the rooms should be designed in such a way that all patients have their own space in their shared room and that they are able to separate their part of the room a bit of their roommates.

8.3 Study Limitations and suggestions for further research

Although the dataset used for our analysis contains many variables measuring many different aspects of subjective well-being, we could for several reasons not include measures regarding all possible important aspects. The individual quality indicators do not provide a very good insight in the overall quality of the institution. As explained in the literature section, one can think of many quality indicators who all together form a measure of overall quality of care. In this paper, we only examine a couple of indicators. We can draw conclusions about the influence of these specific quality indicators on elderly well-being, but several other, possibly important, measures are omitted. Including more quality indicators may influence the strength of the relationship between the quality indicators used in this paper and well-being. In fact, the influence of the quality measures used in this paper may be overestimated as a result. With respect to the control variables, our regression lacks the incorporation of economic variables. Moreover, we do not have any information about the extent to which residents obtain pain medication and non-drug pain therapy. We know to what extent our sample's residents are

limited in their ADL and we know about the use of medication in general, but we lack data on pain treatment.

The most important limitation in this study is the measurement of subjective well-being. We measure subjective well-being by means of a question regarding life satisfaction. Using life satisfaction as a measure of subjective well-being is common and conceptually correct, however, our life satisfaction question regards current life satisfaction instead of life as a whole. 'Current' life is not further specified; it is up to the respondent how to assess it. Likewise, the question used for measuring happiness does not specify the timeframe either. The dependent variables are not the only unclear specified variables in our models with respect to the time frame. No time specification of long-term mental problems is provided in the questionnaire. The questionnaire contains the question 'Do you suffer from long term mental problems?' without specifying the threshold for mental problems being short term or long term. With respect to further research in general, we suggest the more precise formulation of questions in questionnaires. If a question about life satisfaction were used, for example, it would be helpful if questionnaire designers should precisely define the timeframe. Moreover, the answer possibilities used in the questionnaire are not always consistent. The questions about current life satisfaction and happiness are asked sequentially but the answer possibilities are quite different. Moreover, the change in health status measure may suffer from subjectivity bias. Some residents live for already a long time in the elderly home whereas other respondents may have just moved there recently. Especially people with a very high age, who receive inpatient care for already a long time, may not be able to reflect on their change in health status properly.

Finally, institutionalized elderly not being able to answer the questionnaire them selves are excluded from this study. The dataset contains the answers of proxy-respondents in this case, but we chose not to use these, as the answers may not truly reflect the opinion of the relevant person. Often, respondents not being able to participate in the questionnaire themselves are those who are cognitively affected. Actually, this group of people can be regarded as being the frailest group within the population of elderly in institutions. Not much is known about institutionalized elderly and we pointed out the importance of obtaining more knowledge about the determinants of life satisfaction for this frail part of society. With this study, we added some knowledge but we are still in the dark about determinants of life satisfaction in cognitively impaired institutionalized elderly. It would be interesting if further research could be conducted specifically towards life satisfaction of this frail group.

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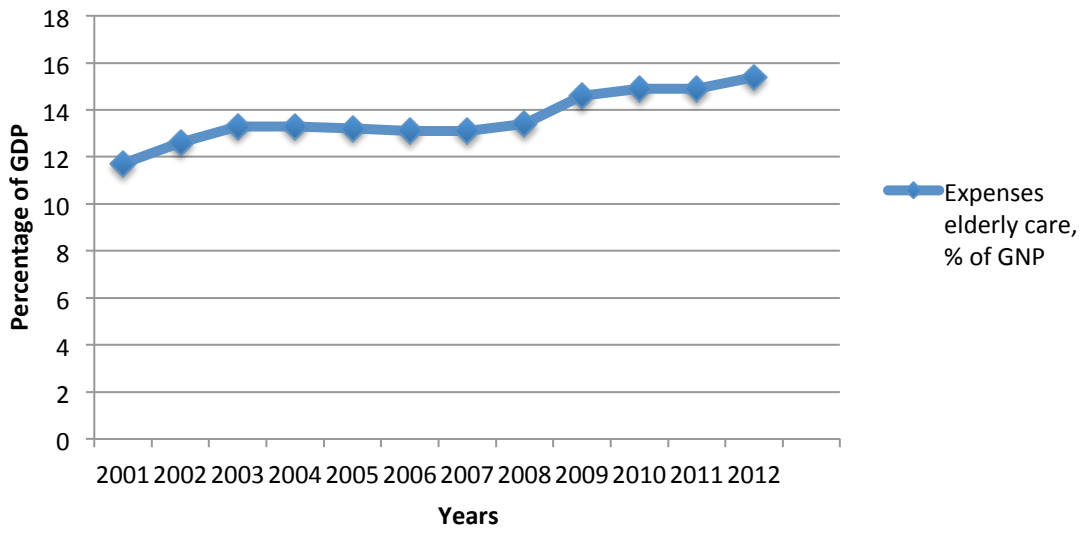
Dataset

The Netherlands Institute for Social Research (SCP)
'Ouderen in Instellingen 2008' (OII2008), created in 2009
Available at Dans Archiving Networked Services – DANS
Persistent Identifier: (http://www.persistent-identifier.nl/?identifier=urn:nbn:nl:ui:13-8b3o-xz)

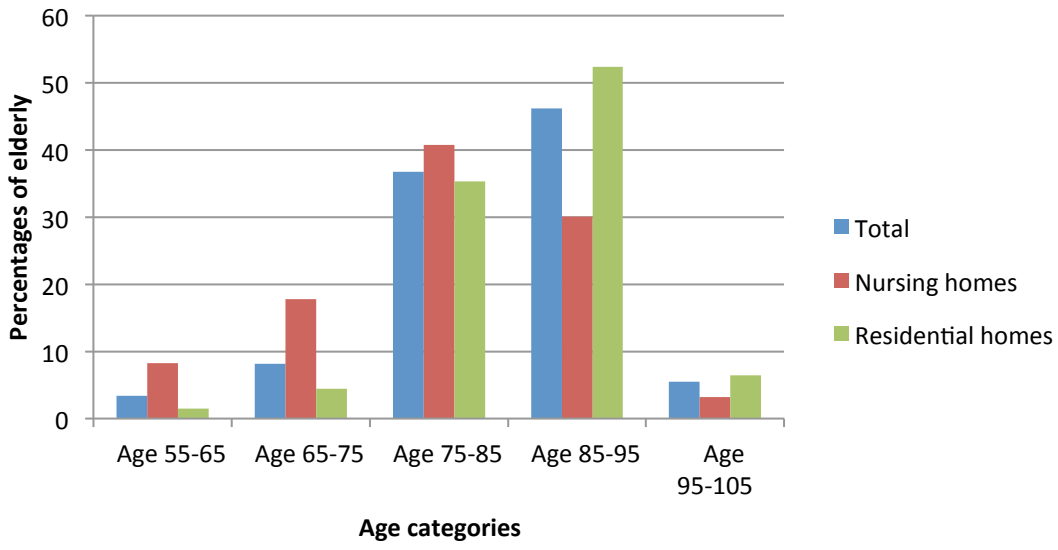
Appendix

A.1. Graphs

Graph A.1.1
Expenses elderly care 2001-2012; % of Dutch GNP
This graph shows the increase in Dutch elderly care expenses as a percentage of total Gross National Product for the years 2001 up until 2012.
(Source: CBS Statline)



Graph A.1.2
Percentage of elderly in each age group
This graph displays the percentages of people in each age category, both for the total sample as well as for the nursing home subsample and the residential home subsample.



A.2 Tables

Table A.2.1 Variable overview: subjective well-being and quality measures

This table lists measures used in existing literature on individual subjective well-being and institutional quality in the health sector. These variables are matched with variables in our dataset that we use for measuring subjective well-being and quality.

Literature		*Dataset*	
Variable name	**Measurement scale**	**Variable name**	**Measurement scale**
Dependent variable: overall wellbeing			
How satisfied are you with your life in general?[2]	Ordinal scale: "Very dissatisfied", "Dissatisfied", "Neither satisfied nor dissatisfied", "Satisfied", "Very Satisfied".	MA2 To what extent are you satisfied with the life you live at this moment?	Ordinal scale: (exceptionally satisfied, very satisfied, satisfied, pretty satisfied, dissatisfied)
Quality measures:			
Pain quality measure[3]	Binary nominal scale (yes if patient has at least experienced moderate pain daily or excruciating pain at any time in the last seven days, no otherwise)	GE2 To what extent has pain limited your ADL in the past four weeks	Ordinal scale (not at all, a little, quite, much, very much)
Prevalence of weekly use of depressants and hypnotics[4]	Continuous (%) outcome measure (higher percentage indicates poorer quality)	ME1 Do you use medication? ME2 Do these include antidepressants? ME3 Do these include hypnotics?	Binary nominal scale (yes, no)
Prevalence of depression with no treatment[4]	Continuous (%) outcome measure (higher percentage indicates poorer quality)	GE7 Given the patient has indicated presence of having been overstrung, anxious or depressed; did the patient obtain treatment in the past 12 months (at general practitioner, specialist, psychologist)?	Binary nominal scale (yes, no)
Change in own patients' assessment of overall health status: difference between overall health status before and after surgery[5]	Interval scale (scale from 0 to 100, where 0 is the worst possible overall health status)	GE11 Did your overall health improve, remained the same or worsened from the moment you moved to the nursing home?	GE11 Nominal scale (improved, remained the same, worsened)
		GE1 How would you rate your overall health status?	GE1 Ordinal scale (very good, good, moderate, bad, very bad)
Safety[6]		KW012 To what extent do you feel unsafe?	Ordinal scale (safe, sometimes unsafe, often unsafe)

[2] V. Angelini, D. Cavapozzi, L. Corazzini and O. Paccagnella, 2012. Age, Health and Life Satisfaction among older Europeans. Soc. Indic. Res 105:293-308

[3] J. Bowblis and H. McHone, 2013. An instrumental variables approach to post-acute care in nursing home quality: Is there a dime's worth of evidence that continuing care retirement communities provide higher quality? Journal of Health Economics 32:980-996

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Privacy[6]	KW002 Do you experience having enough privacy?	Binary nominal scale (yes, no)
Individualized care[6]	KW001 Can you decide for yourself when you wake up? KW007 Can you decide for yourself when you go to the toilet?	KW001 Binary nominal scale (yes, no) KW007 Binary nominal scale (yes, no)

Table A.2.2 Age dummies

This table lists the different age dummies used in this study and depicts the minimum as well as maximum ages for each category.

Age dummy	Minimum age	Maximum age
dage55to65	55	64
dage65to75	65	74
dage75to85	75	84
dage85to95	85	94
dage95to105	95	102

Table A.2.3 Model Summary

This table lists and describes all variables used in the two models, explaining wellbeing and happiness from the quality indicators and control variables

Variable name	Description
Dependent variables	
LIFESATISFACTION	Respondents' current life satisfaction, measured on a ordinal five point scale (1 = not satisfied, 2 = a bit satisfied, 3 = satisfied, 4 = very satisfied, 5 = exceptionally satisfied).
HAPPINESS	Respondents' current overall happiness measured on a ordinal five point scale (1 = unhappy, 2 = not very happy, 3 = moderately happy, 4 = happy, 5 = very happy).
Quality indicators	
PAINLIM	Degree of experienced limitation in activities of daily living caused by pain, measured on a five point ordinal scale (1 = not limitated at all, 2 = a bit limited, 3 = rather limited, 4 = quite limited, 5 = very limited).
dANTIDEPRHYPN	Dummy variable indicating the use of antidepressants and hypnotics. dANTIDEPRHYPN equals one if the respondent uses either antidepressants, hypnotics or both and the dummy equals zero if he or she uses neither of them.
dNOTREATMENT	Dummy indicating the prevalence of mental problems without obtaining any treatment in the former 12 months (at general practitioner, specialist, psychologist). dNOTREATMENT equals one if the person has experienced mental problems without receiving any treatment. The dummy equals zero if the person has either not experienced mental problems at all or if the person has experienced mental problems but got treatment for it.
dHEALTHIMP	Dummy indicating whether the respondent has experienced an improvement in his or her overall health status from the moment of admission to the elderly home. dHEALTHIMP equals one if the respondent has experienced a health improvement and zero if he or she has experienced a decline or no change in the health status.
dHEALTHDECL	Dummy indicating whether the respondent has experienced a decline in his or her overall health status from the moment of admission to the elderly home. dHEALTHDECL equals one if the respondent has experienced a decline and zero if he or she has experienced no change or an improvement.

dSAFETY	Dummy variable equaling one if the respondent feels safe in the elderly home and zero if he or she feels often or sometimes unsafe.
dPRIVACY	Dummy variable equaling one if the respondent experiences enough privacy and zero otherwise.
dINDIVCARE	Dummy variable indicating whether the respondent regards the care he or she receives as being individualized. If the person can decide for him or herself when to wake up and when to go to the toilet, dINDIVCARE equals one, if the person is not free to decide when to wake up and / or when to go to the toilet, it equals zero.
Control variables	
HEALTHSTATUS	Assessment of respondents' overall health status, measured on a five point ordinal scale (1 = very bad, 2 = bad, 3 = moderate, 4 = good, 5 = very good).
MOBILITY	Degree of mobility, measured by the regularity of being attached to bed or chair all day on a four point ordinal scale (1 = fully attached to bed, 2 = mainly attached to chair, 3 = attached to chair every now and then, 4 = (almost) never attached to chair or bed).
dOTHERMEDIC	Dummy indicating the use of medication other than antidepressants and hypnotics. dOTHERMEDIC equals one if the respondent indicated using medication but not using antidepressants and hypnotics. The dummy equals zero if the respondent either uses no medication at all or uses medication including antidepressants and / or hypnotics.
dSRMENTALPRBLMS	Dummy indicating the presence of short term mental problems. dSRMENTALPRBLMS equals one if the person has been anxious, concerned, dejected or depressed in the previous twelve weeks and equals zero otherwise.
dLRMENTALPRBLMS	Dummy variable equaling one if the respondent has indicated suffering from long run mental problems and zero otherwise.
dMALE	Dummy indicating gender, it equals one for males and zero for females.
dAge55to65	Dummy equaling one if the respondents' age is between 55 and 65 and zero otherwise.
dAge65to75	Dummy equaling one if the respondents' age is between 65 and 75 and zero otherwise.
dAge75to85	Dummy equaling one if the respondents' age is between 75 and 85 and zero otherwise.
dAge85to95	Dummy equaling one if the respondents' age is between 85 and 95 and zero otherwise.
dAge95to105	Dummy equaling one if the respondents' age is between 95 and 105 and zero otherwise.
dPARTNER	Dummy indicating whether the respondent has a partner or not. It equals one if the person has a partner (either married or in a relationship) and zero if the person is widowed or single.
dWIDOW	Dummy indicating whether the respondent is widowed or not. It equals one if the person is a widow and zero if the person has a partner or if the person is single.
dCNTCTCLOSEREL	Dummy measuring the extent to which the respondent has contact with close relatives, being either children or grandchildren. The variable equals one if the respondent has contact with close relatives at least once a week and zero otherwise.
dCNTCTOTHERFAMILY	Dummy measuring the extent to which the respondent has contact with family members other than (grand) children. The variable equals one if the respondent has contact with other family members at least every two weeks and zero otherwise.
dCNTCTFRIENDS	Dummy measuring the extent to which the respondent has contact with friends. The variable equals one if the respondent has contact with friends at least every two weeks and zero otherwise.
dLONELY	Dummy indicating whether the person feels lonely or not. It equals one if the respondent indicates having the desire to have more social contact than he / she currently has and zero if he or she experiences having enough or too much social contact.
dHIGHEDUC	Dummy indicating whether or not the respondent is highly educated. dHIGHEDUC equals one if the respondent finished higher education and zero otherwise.
dNURSINGHOME	Dummy equaling one if the respondent lives in a nursing home and zero if the respondent lives in a residential home.

Table A.2.4 Correlation Matrix

This table shows the correlation coefficients between the dependent variables, quality indicators and control variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.*LIFESATISFACTION*	1.00														
2.*HAPPINESS*	0.67	1.00													
3.*PAINLIM*	-0.20	-0.20	1.00												
4.*dANTIDEPRHYPN*	-0.14	-0.15	0.17	1.00											
5.*dNOTREATMENT*	-0.18	-0.20	0.14	0.09	1.00										
6.*dHEALTHIMP*	0.04	0.08	-0.06	0.07	0.03	1.00									
7.*dHEALTHDECL*	-0.20	-0.18	0.23	0.16	0.11	-0.26	1.00								
8.*dSAFETY*	0.09	0.09	-0.07	-0.10	-0.02	0.04	-0.10	1.00							
9.*dPRIVACY*	0.24	0.14	-0.02	-0.04	-0.07	-0.05	-0.07	0.11	1.00						
10.*dINDIVCARE*	0.19	0.09	-0.10	-0.07	-0.05	-0.03	-0.04	0.00	0.19	1.00					
11.*HEALTHSTATUS*	0.29	0.28	-0.38	-0.22	-0.18	0.05	-0.33	0.05	0.06	0.08	1.00				
12.*MOBILITY*	0.23	0.17	-0.26	-0.06	-0.03	0.01	-0.09	-0.03	0.13	0.41	0.19	1.00			
13.*dOTHERMEDIC*	0.10	0.12	-0.14	-0.91	-0.07	-0.05	-0.12	0.09	0.03	0.03	0.16	0.02	1.00		
14.*dSRMNTLPRBLMS*	-0.17	-0.19	0.15	0.11	0.67	-0.00	0.11	-0.04	-0.06	-0.05	-0.19	-0.03	-0.08	1.00	
15.*dLRMNTLPRBLMS*	-0.21	-0.22	0.08	0.26	0.25	0.14	0.07	-0.06	-0.05	-0.05	-0.13	0.00	-0.23	-0.20	1.00
16. *dMALE*	-0.04	-0.04	-0.06	-0.09	0.02	0.00	-0.01	0.14	-0.02	0.04	-0.03	0.01	0.10	0.00	0.03
17. *dAge55to65*	-0.05	-0.05	-0.01	0.07	0.05	0.08	0.01	-0.04	-0.06	-0.01	-0.09	-0.03	-0.06	-0.01	0.13
18. *dAge65to75*	-0.13	-0.13	0.01	0.00	0.06	0.09	-0.04	0.04	-0.03	-0.11	-0.05	-0.19	0.00	0.06	0.08
19. *dAge75to85*	-0.05	-0.03	0.10	-0.01	0.00	0.07	0.07	0.02	-0.03	-0.03	-0.05	-0.05	0.03	-0.01	0.06
20. *dAge85to95*	0.12	0.10	-0.08	-0.01	-0.04	-0.12	0.06	0.00	0.07	0.08	0.07	0.17	0.01	-0.00	-0.13
21. *dAge95to105*	0.02	0.04	-0.04	-0.02	-0.03	-0.05	0.04	-0.07	-0.01	0.03	0.07	0.00	-0.03	-0.04	-0.02
22.*dPARTNER*	-0.07	0.00	0.07	-0.07	0.05	-0.01	-0.05	0.10	-0.08	-0.07	-0.05	-0.08	0.09	0.07	-0.03
23.*dWIDOW*	0.08	0.06	-0.02	0.05	-0.01	-0.03	0.06	-0.06	0.05	0.06	0.04	0.10	-0.06	-0.01	-0.03
24.*dCNTCTCLOSEREL*	0.04	0.05	0.00	0.05	-0.01	0.02	0.01	0.07	0.02	0.02	-0.04	0.05	-0.02	0.02	-0.03
25.*dCNTCTOTHERFAM*	0.07	0.09	0.03	0.01	0.00	0.01	-0.01	0.03	0.02	0.04	-0.06	0.00	0.00	0.00	-0.04
26. *dCNTCTFRIENDS*	0.03	0.11	0.06	-0.02	0.08	0.10	-0.03	0.05	-0.01	0.06	0.00	0.03	0.02	0.08	-0.03
27.*dLONELY*	-0.25	-0.25	0.06	0.08	0.08	-0.01	0.09	-0.04	-0.03	-0.07	-0.08	-0.05	-0.07	0.12	0.09
28.*dHIGHEDUC*	-0.05	0.00	-0.04	-0.05	0.00	0.01	0.00	-0.01	0.01	0.01	0.01	-0.05	0.06	-0.02	-0.03
29.*dNURSINGHOME*	-0.25	-0.18	0.07	0.06	0.05	0.08	0.00	0.02	-0.33	-0.51	-0.06	-0.51	-0.03	0.07	0.03

	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.
16. *dMALE*	1.00													
17. *dAge55to65*	0.15	1.00												
18. *dAge65to75*	0.05	-0.06	1.00											
19. *dAge75to85*	0.06	-0.14	-0.23	1.00										
20. *dAge85to95*	-0.09	-0.17	-0.28	-0.71	1.00									
21. *dAge95to105*	-0.09	-0.05	-0.07	-0.18	-0.22	1.00								
22.*dPARTNER*	0.29	-0.01	0.13	0.08	-0.10	-0.10	1.00							
23.*dWIDOW*	-0.30	-0.24	-0.18	-0.07	0.21	0.10	-0.59	1.00						
24.*dCNTCTCLOSEREL*	-0.08	-0.15	-0.07	0.06	0.03	0.00	0.06	0.31	1.00					
25.*dCNTCTOTHERFAM*	-0.01	0.08	0.02	0.00	-0.02	-0.05	0.01	-0.08	0.02	1.00				
26. *dCNTCTFRIENDS*	0.01	0.00	0.06	0.08	-0.07	-0.07	0.05	-0.01	0.03	0.18	1.00			
27.*dLONELY*	-0.01	0.02	0.02	-0.01	-0.01	0.00	-0.07	0.02	-0.07	-0.07	-0.09	1.00		
28.*dHIGHEDUC*	0.11	0.01	0.00	0.06	-0.05	-0.02	0.00	-0.12	-0.11	0.00	0.06	-0.01	1.00	
29.*dNURSINGHOME*	0.04	0.17	0.22	0.05	-0.20	-0.06	0.15	-0.16	-0.11	0.00	-0.02	0.07	-0.01	1.00