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The perceptions of Dutch elderly on their remaining length of life and social well-being

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Abstract

Objective The aim of this study is to describe and understand the relation between perceptions of Dutch elderly on their remaining length of life and social well-being. In the Netherlands, no studies have been conducted before on this relation between social well-being and perceptions on remaining length of life. **Methods** The secondary data used for this quantitative study is obtained from the Longitudinal Aging Study Amsterdam data collection. Both multinomial and binary logistic regression was applied to measure the relationship between perceptions on remaining length of life and social well-being. **Results** A large part of the respondents reported to have positive perceptions on their remaining length of life. It resulted that Dutch elderly who are not lonely are less likely as elderly who are severe lonely to have positive perceptions on remaining length of life. There was no direct relationship between perceptions of Dutch elderly on their remaining length of life and social well-being. Controlled for the background characteristics of sex, age and education it turned out that there was a relationship between perceptions on remaining length of life and social well-being of Dutch elderly. **Conclusion** Severe lonely elderly tend to have the most positive perceptions on remaining length of life. We tend to explain this by theories on coping. Elderly can tackle their feelings of loneliness by the use of several types of coping behavior or coping strategies. The elderly who do feel severe lonely change their coping strategy in reporting they think they have a long time left in life. In this way, they stay involved in life.

Keywords: Dutch elderly, perceptions on remaining length of life, social well-being, loneliness, Longitudinal Aging Study Amsterdam, coping, quantitative research

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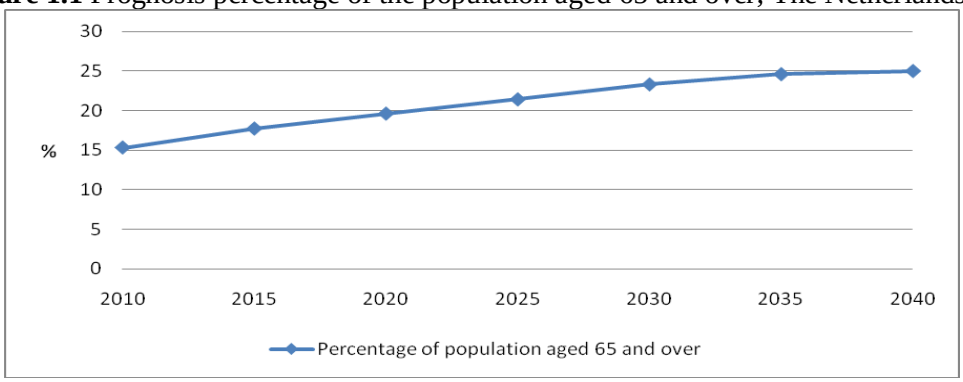
1 Introduction

1.1 Background

The population in the Netherlands is aging. Life expectancy is still increasing and people are still getting older (Statistics Netherlands, 2008). On 1 January 2008 more than 2.4 million persons were older than 65 years in the Netherlands. They cover a percentage of 14.8 percent of the Dutch population. It is suggested that in 2035 approximately 4 million people will be aged over 65 years. By that time the share of elderly people will be 24 percent of the total Dutch population (de Boer, 2006; Isken, 2005). Statistics Netherlands (2009) gives slightly different percentages, but the main perspective is the same. Figure 1.1 gives a clear overview of these developments. Among the people aged 65+ in 2008 25 percent is aged 80 years or older (de Beer and Verweij, 2007).

Figure 1.1 Prognosis percentage of the population aged 65 and over, The Netherlands, 2010-2040



Source: Statistics Netherlands, 2009

According to de Beer and Verweij (2007) the most important causes of the population aging are the growth of the whole population (in which the absolute number of older people increased), the decline in fertility and the increase in life expectancy. They also forecast a strong increase the next decennia for the percentage aged 65+. Main reason is the aging of the 'babyboom generation'. Therefore from 2011 onwards the percentage of elderly people will even increase more.

The changes in demography not only affect individuals, but also families, communities and societies (Antonucci et al., 2002). According to the United Nations (2007) 'Demographic aging affects the size and proportion of the various cohorts, changing young and old dependency ratios and the size of the working population. As a consequence, employment, social security, social welfare, education and health care, as well as investment, consumption and savings patterns, need adjustment'. Policy makers are challenged to put effort in dealing with the consequences of aging populations. Research programs and conferences deal with the subject of successful aging, and policies regarding elderly are adapted (von Faber et al., 2001). In the Netherlands, the Longitudinal Aging Study Amsterdam (LASA) is one of the institutions that have been engaged in the study of aging. The Longitudinal Aging Study Amsterdam is carried out by the Department of Policies for the Aging, Ministry of Health, Welfare, and Sports and the VU University of Amsterdam (LASA, 2009a). The objective of the LASA is: 'by using longitudinal data, policy relevant aspects of aging can be identified and new policy aims can be developed'. Recently many reports have been published on the topic of aging in the Netherlands. The Dutch government published in 2005 the 'Policy for the Elderly' ('Nota Ouderenbeleid'), which was actualized in 2007 (Ministry of Health,

Welfare and Sport, 2009). The reports and papers focus on the investment of Dutch society in the wishes and the potential of Dutch elderly. Highlighted is that differentiation must be made in specific age groups. In debates held with elderly on the future, it turned out that elderly attached importance to keep participating in society; even if their health and mobility declined. To make this possible, attention has to be paid to adjustment in physical infrastructure, e.g. in increasing mobility, as well as in the social infrastructure; in attention for well-being, social integration, maintenance of neighborhood networks and encountering between generations and cultures (SCP, 2008; Ministry of Health, Welfare and Sport, 2009; NIZW, 2004). Joining the LASA objective, this thesis also tends to provide recommendations for policy makers, which can be adapted in formulating new policies. The societal relevance of this paper is in contributing to the existing policies.

The secondary data used for this quantitative study is obtained from the Longitudinal Aging Study Amsterdam data collection. Using the LASA data collection, insight will be gained on age identities of Dutch elderly. The concept of subjective age comes in when the scope is on an individual's aging process. However, research that has been accomplished on subjective age was merely conducted on how old people feel and into which age group a person categorized himself or herself (Kleinspehn-Ammerlahn et al., 2008; Steverink et al., 2001). In this thesis, something different is examined. The main focus is on how long elderly think they have left in life. The research contributes to the existing literature in focusing on perceptions on remaining length of life. This measure was, as far as we know, never used before. Hence, scientific relevance is also gained in adding results to the already existing study among elderly people conducted by the LASA.

Another main concept in this study is social well-being. One of the main predictors of social well-being is loneliness (De Jong Gierveld and van Tilburg, 2006). It is considered as a risk factor for reduced well-being (Holmen and Furukawa, 2002; Jylhä, 2004). Loneliness increases with old age. Increasing life expectancy and becoming older creates more loneliness in society. Elderly people will get more and more involved in stressful situations (Holmen and Furukawa, 2002). In old age, loneliness is often related to the loss of a partner. The loss of a spouse is a major risk factor for loneliness among older people (Dykstra et al., 2005). Next to that the loss of relatives and friends and decreasing health are situations occurring more often than for younger people (Holmen and Furukawa, 2002). In 1999, it was estimated that about 32 percent of the people aged 55 and over conceive feelings of loneliness in the Netherlands (De Jong Gierveld, 1999). Almost fifty percent of the population in the European Union sees loneliness as the main problem for older adults. Therefore the study of loneliness in old age is of main importance in society. It has its consequences for the use of health services, institutionalization and it gives an increasing risk of mortality (Savikko et al., 2005).

It seems interesting in an aging society to focus on Dutch elderly, their perceptions on their remaining length of life and their social well-being. This study examines the relation on the perceptions which elderly have themselves on their aging process and the way this is influenced by their social well-being and their background. In the Netherlands, no studies have been conducted before on this relation between social well-being and perceptions on remaining length of life. This research will try to describe and understand this relation, by taking into analysis background characteristics (selected possible confounders) which tend to explain the relation between perceptions on remaining length of life and social well-being. This brings us to the following objective and research questions.

1.2 Objective and research questions

In this research the objective is to describe and understand the relation between perceptions of Dutch elderly on their remaining length of life and social well-being. This leads to the following main research question:

- What is the relation between perceptions of remaining length of life and social well-being of Dutch elderly and how can this relation be understood?

To answer the main question four sub questions have been formulated:

- What is the difference between subjective remaining length of life and chronological remaining length of life of Dutch elderly by background characteristics?
- What is the relation between perceived remaining length of life and social well-being of Dutch elderly?
- How can the difference between subjective remaining length of life and chronological remaining length of life of Dutch elderly be explained?
- What is the effect of selected possible confounding variables on the relationship between perceived remaining length of life and social well-being of Dutch elderly?

1.3 Structure

This thesis is built up of six chapters. The second chapter discusses the main theories on the topics of subjective age and social well-being. In this chapter, furthermore a literature review is provided, which considers previous research conducted on subjective length of life and social well-being. Resulting from the theory and literature review is the conceptual model of this research. Chapter three deals with the data and methods used in this study. The used data is obtained from the Longitudinal Aging Study Amsterdam data collection and an overview of this data collection is provided. The main concepts from the conceptual model are discussed and their operationalisation is provided. Elaborated is on the techniques used for analyzing the relationships between perceptions on length of life and social well-being. The fourth and fifth section are the results chapters, providing the main outcomes of this study. These chapters cover the relationship between perceptions on remaining length of life and social well-being of Dutch elderly analyzed by means of multinomial and binomial logistic regression. Then, the final chapter includes the conclusion, in which the main conclusions are summarized. The discussion gives a review on the most important results. A reflection on the used data and methods and recommendations for further research and policy making are also provided.

2 Theoretical framework

For this study several theories will be applied to design a strong theoretical framework. From this onset the research will be conducted, in order to answer the research questions. First, an overview of the most important and useful theories on subjective age and social well-being is provided. Additional, a literature review on studies conducted before on the topics of subjective age and social well-being is provided. The last section of this chapter covers the conceptual model; which results from the research questions and theoretical framework. It shows the relation between the different concepts of interest in this study.

2.1 Theory

In this section several theories on the main concept of study are discussed. First light is shed on the framework on subjective age. Then some of the existing theories on well-being are considered. Most of the attention is paid to the form of social well-being.

2.1.1 A framework on subjective age

One of the main concepts of this study is subjective age. Subjective age is described as 'a multidimensional construct that indicates how old a person feels and into which age group a person categorized himself or herself' (Kleinspehn-Ammerlahn et al., 2008; Steverink et al., 2001). In order to integrate empirical perspectives on research on subjective age, Montepare (2009) initiated a lifespan framework for the concept of subjective age. The framework offers an explanation of why individuals experience their age the way they do. Underlying basis of the framework is that subjective age derives from 'a process of anchoring and adjusting one's age relation to distal and proximal reference point of age' (Galambos et al., 2005; Montepare, 2009). Distal reference points are subscribed as 'relatively stable personal models of development consisting of a unified set of past, present and future markers against which individuals evaluate themselves and their age' (Montepare 2009: p.43). 'These distal models are presumed most often to take on a curvilinear shape with gains anticipated in the future.' Personal models include midpoints which reflect optimal stages of self-perceived prime or desired development in their way of functioning. People most often adopt older age identities during early years in the life course, whereas becoming older gives them a younger subjective age, given the desirability of achieving and maintaining ideal functioning. Changes across the lifespan in subjective age and its referents can be expected. Galambos et al. (2005) and Montepare (2009) suggested the existence of another reference mechanism next to a distal reference point. Shifting from one age category to another, individuals experience 'a bottom dog phenomenon in which they have moved from comparing themselves with same aged and younger people to a reference group of older individuals' (Montepare, 2009: p.43). A younger subjective age may occur in referencing to an older group. Proximal reference points or age markers are described as 'variable age markers consisting of historic, physical, normative and interpersonal events that make age salient' (Montepare, 2009: p.44). Researchers emphasize on the role of proximal events in influencing the difference between one's subjective and chronological age. Four types of proximal events are defined: historic, physical, normative and interpersonal events. Historic events are celebrated events as birthdays, weddings, anniversaries, memorials and reunions. Researchers have found that older adults the nearer their birthday experienced age identities closer to their real age. The other way around, they perceive themselves younger if their birthday is more distant. Physical events are health-related events associated with age like heart attacks, strokes, memory loss, but also reproductive-related events such as the birth of a (grand) child or death related events such as the dying of the spouse or a friend. Normative events are age-related events that come from socialization or cultural customs like having a first date, being allowed to drink alcohol, getting married or getting retired. Interpersonal events include social interactions with other

people who have a different age or hold expectations about behavior related to age (Montepare et al., 2009).

2.1.2 Well-being

Now the concept of subjective age is discussed, the next main topic of study is considered. In this study the concept of subjective age is related to social well-being of Dutch elderly. We know that there are many theories on well-being. This section gives in short an overview of some main existing ideas of the concept of overall and social well-being and will then narrow down to the used indicator of social well-being in this study, which is loneliness.

2.1.3 Social well-being

Well-being is a concept that has been studied extensively. A well known theory on well-being is the basic needs theory of Maslow. Maslow introduced his theory of basic needs in 1970. He identified five basic needs; physiological, safety, love and belongingness, esteem and self-actualization needs. These five basic needs are arranged in an order that the one on top only becomes prominent if the lower ones are fulfilled in a sufficient degree. In other words: the higher needs in this pyramid only come into sight when the lower needs in the pyramid are satisfied (de Bruijn, 1999). 'The fulfillment of hierarchical needs described by Maslow (1971) can be used to measure human and social well-being' (Clarke, 2006: p.154). 'Within this approach, well-being is defined as the fulfillment of these hierarchical needs'. The theory was initially not meant for measuring social well-being, but the hierarchical structure of basic needs is often used and 'provides useful information about the quality of social well-being in a society' (Clarke, 2006: p. 155). Theories in the same category as Maslow's theory of basic needs are those of Lindenbergh (1989), and later on Lindenbergh in cooperation with Ormel (1999) and Steverink (2006). They developed new theories based on Maslow's insights. Lindenbergh (1989) suggests two universal goals: physical well-being and social esteem (in the way of social approval, social status and affection). In addition to his theory, Lindenbergh in cooperation with Ormel (1999), introduced a theory known as the Social Production Functioning (SPF) theory. The main content of SPF theory is that people tend 'to improve their situation in life by the optimization of two universal goals; psychical and social well-being' (Nieboer, 2005: p.315). According to Steverink and Lindenbergh (2006: p.282) needs in SPF theory refer to 'a restricted set of basic physical and social needs that must be at least minimally fulfilled for a person to experience overall well-being'. Subjective well-being is then seen as 'the extent to which people's goals or needs are obtained' (Nieboer, 2005: p.314). Social well-being is seen as three forms of social approval; the needs of *affection* (feeling loved), *behavioral confirmation* (belonging, doing things right) and *status* (skills, education, wealth).

2.1.4 Social Production Functioning-Successful Aging (SPF-SA) theory

Till so far, the effect of age was not implemented in the SPF theory. Therefore, Steverink and Lindenbergh (2006) developed the Social Production Functioning-Successful Aging (SPF-SA) theory. The SPF-SA theory is an extension of the SPF theory and focuses on age-related changes in needs and possibilities for needs satisfaction and the realization of well-being. Age will influence the demand of all the five needs. For example, status is a need which is more difficult to fulfill on a higher age, because it is mainly dependent of having a paid job or being recognized for having certain skills. For elderly people who are already retired it becomes more difficult to obtain satisfaction in this need. On the contrary, affection is not that much tied to age, it is still good possible to fulfill the need of affection on a higher age (Steverink and Lindenbergh, 2006). In this study most emphasis is on the need of affection as a part of social well-being. Affection is defined as having intimate ties, offering emotional support.

2.1.5 Autonomy and well-being in the aging population

Another framework on well-being is provided by Deeg and colleagues (1998). Their framework on well-being was purposed by a database in which hypotheses can be tested. This database is known as the Longitudinal Aging Study Amsterdam (LASA). Well-being is defined as the evaluation by older persons of their functioning. Deeg et al. (1998) consider four components of functioning of elderly: physical, cognitive, emotional and social functioning. The four components have different contributions to autonomy and well-being of elderly. This differentiation does not exclude any interrelation between the four components. 'The study focuses mainly on predictors of change in these components of functioning, on trajectories of functioning, and on consequences of change in functioning' (LASA, 2009a). Change in social involvement is the main focus of the LASA scenario on social functioning of elderly (Knipscheer et al., 1998). Three main areas are indicated: social network characteristics, social participation and loneliness (LASA, 2009d). It was decided to focus on the concept of loneliness. The choice for this concept is elaborated on in section 2.2.4. There are several underlying theories to understand the changes in social functioning, depending on the topic of research.

2.1.6 Selective optimization and compensation model and theory of mental incongruity

The selective optimization and compensation model by Baltes and Carstensen (1996; cited by Knipscheer et al., 1998) focuses on 'successful adaptation of aging by taking into account gains and losses, paying attention to great heterogeneity in aging and views successful mastery of losses more occurring in old age'. The model of selection, optimization and compensation (SOC) gains betters understanding how people develop successfully and avoid negative outcomes. The theory of SOC can be embedded in the different domains of functioning. According to Ouwehand et al. (2007), the model is directed to how people react to losses and how coping behavior can be a valuable strategy. Coping is an important factor in successful aging and optimization and compensating becoming older.
The theory of mental incongruity is considered as 'a basis for hypotheses that proposes a lack of well-being to be the result of how elderly think a situation should be (the standard) and how they experience the actual situation or their own behavior' (Knipscheer et al., 2003). The theory of mental incongruity focuses on the mental system. It is known as a cognitive motivational theory (Dykstra, 1995). 'The behavioral disposition of an individual is formed by interrelations between desires and actual experiences' (van Baarsen, 2002: p.33). Incongruity directs to an imbalance in the mental system and will be greater when conditions for change (such as income, support) are less sufficient. 'Relationships with others may be a source of incongruity when expectations of support fall short of the actual support received and changes in functioning may occur' (van Baarsen, 2002: p.33).

2.1.7 Loneliness

One of the most common definitions of loneliness is given by Peplau and Perlman (1982) and de Jong Gierveld (1987: p.120): 'Loneliness is the unpleasant experience that occurs when a person's network of relationships is deficient in some important way'. It is 'a discrepancy between the relationships one has and the relationships one desires' (Perlman, 2004: p.184). Loneliness has three main characteristics: loneliness is compulsory, it is a subjective experience of an individual and thereby difficult to detect from outside and it is situated in a lack of meaningful personal relationships (van Tilburg and de Jong Gierveld, 2007). Weiss (1973) was the first to bring differentiation in types of loneliness. He made a distinction between emotional and social loneliness. Emotional loneliness represents 'the subjective response to the absence not so much of a particular other but rather of a generalized attachment figure, it is a state that is probably not experienced until adolescence.' It is the lack

of an intimate relationship, an emotional strong tie with a partner or close friend. Only entering a new emotional strong relationship can stop this form of loneliness (van Tilburg and de Jong Gierveld, 2007). The other form of loneliness, social loneliness, is related to the subjective experience of missing a wider social network of friends, colleagues, neighbors, people with the same interest or people to share some kind of interest with (van Tilburg and de Jong Gierveld, 2007; Weiss, 1973). In this form of loneliness, there is a lack of a broader surrounding network which cannot be undone by an intimate partner relationship. Social loneliness can occur e.g. by residence in an unaccepted community, or moving to a new community (Weiss, 1973).

2.1.8 Cognitive discrepancy theory

Another important feature of loneliness is that it is more connected with the qualitative aspects than with quantitative characteristics of a relationship (Perlman, 2004). As mentioned before, loneliness is a subjective experience and cannot only be predicted by objective indicators (de Jong Gierveld and Havens, 2004; Perlman, 2004). Loneliness is a subjective concept in the way that a person can perceive feelings of loneliness and may be surrounded by many people. An individual can have a large social network but may still feel lonely (Perlman, 2004; Savikko et al., 2005).

The aspects mentioned above are integrated in the cognitive discrepancy theory of Perlman and Peplau (1997). The cognitive discrepancy model stresses the perceived discrepancy between actual and desired levels of contact. It goes thereby beyond theories of social needs and the theory of mental incongruity in focusing on relations rather than situations or behavior. Actual levels of contact are only important if they tend to differ from desired levels (Archibald et al., 1995). The model furthermore incorporates how intensely people react to their lack of social contact and support. One's reaction is influenced by the degree to which they are involved in 'cognitive processes such as causal attributions, social comparisons, or perceiving they have control over events in life'. The model also helps in explaining why an individual can be alone for a longer time without feeling lonely and why others do feel lonely being surrounded by other people. It focuses on the desired levels of social contacts. For example, isolated individuals can avoid feelings of loneliness if 'their desired levels of social contacts are low, if they have decided for themselves to be solitary, and/or if they attribute their isolation to external forces beyond their own control' (Peplau and Perlman, 1997; cited by Perlman, 2004: p.184).

2.2 A literature review

As we know several theories on subjective age and social well-being, a main focus in this research is on previous research on these topics. This section covers an overview of the studies conducted before on subjective age, social well-being and loneliness. First it is made clear what is meant by the different concepts. Then light is shed on the relation between the different topics of study.

2.2.1 Subjective age

As mentioned earlier, subjective age is described as 'a multidimensional construct that indicates how old a person feels and into which age group a person categorized himself or herself' (Kleinspehn-Ammerlahn et al., 2008; Steverink et al., 2001). Chronological (real) age is the length of time that has elapsed since one's birth (Henderson, 1995). Different researchers suggested that subjective age was incorporated systematic and in distinct patterns across the lifespan (Montepare, 2009; Galambos et al., 2005; Montepare and Lachman; 1989). Where younger individuals perceive themselves as slightly older than their actual age, older

people perceive themselves as being younger than their actual age (Montepare and Lachman, 1989; Hubley and Russel, 2009). Differences between real and subjective age became more pronounced becoming older (Rubin and Berntsen, 2006; Galambos et al., 2005; Hubley and Russel, 2009). On average older people feel ten to twenty years younger than actual ages (Hubley and Russel, 2009; Montepare and Lachman, 1989). Cross-cultural studies on subjective age showed similar outcomes in reporting subjective ages of older adults that were younger than their real ages (Montepare, 2009; Rubin and Berntsen, 2006). This discrepancy in old age between one's chronological and subjective age is in general regarded as a denial of aging. 'A youthful subjective age is considered as an indicator of successful aging' (Rubin and Berntsen, 2006). Montepare and Lachman (1989) stated that: 'Theorists in the aging field have suggested that the tendency of aging adults to maintain younger subjective age identities is a form of defensive denial by which they can dissociate themselves from the stigma attached to growing old'. Because of its multidimensional view, subjective age is a more meaningful concept than chronological age in predicting psychological and physical functioning in old age (Barak and Stern, 1986; Markides and Boldt, 1983; Rubin and Berntsen, 2006). Many older adults reject the label ''elderly'' and tend to have youthful self perceptions (Westerhof and Barret, 2005). 'Under this age-denial view, there is no reason to suspect a discrepancy between subjective and chronological age in childhood and early adulthood, but the discrepancy should accelerate with older ages' (Rubin and Berntsen, 2006).

Research on subjective age among older adults started in the 1950's (Hubley and Russell, 2009). Researchers became more and more interested in the attitudes of adults towards aging. Since then, 'the empirical investigation of the personal experience of aging has been approached almost exclusively from the perspective of subjective age identification or age identity' (Steverink et al., 2001). Early research suggested that subjective age reflected 'different 'ages of me', or how old individuals perceived themselves to feel, look, act and desired to be'. Later on researchers tended to explain subjective age by manifesting systematic and distinct patterns across the lifespan (Goldsmith and Heiens, 1992; Montepare, 1996; Lachman, 1989, cited by Montepare, 2009).

2.2.2 Determinants of subjective age

In many disciplines researchers tended to explain why an individual perceives his or her subjective age as 'x' years. Studies have been conducted on the association and strength between variables and subjective age. According to Hubley and Russell (2009), researchers focused on socio-demographic, health variables and socio-psychological in explaining discrepancies between subjective and chronological age. A same kind of division of correlates has been made by Barak and Stern (1986) in their *Research Note on Subjective Age*. In this research note light was shed on previous studies in which subjective age was the dependent variable. They distinguished four groups of variables which correlate with subjective age:

1.) Biological and physiological
2.) Demographic
3.) Psychographic and social psychological
4.) Behavioral

Biological and Physiological Correlates

Different studies have shown that self-rated good health is correlated to subjective age. The better a person perceives his or her physical health, the younger one considers his or herself to be (Barak and Stern, 1986; Markides and Boldt, 1983, Hubley and Russel, 2009). According to Hubley and Russel (2009) health variables even explain the greatest variance between subjective and chronological age. Mainly the predictors of physical functioning, general

health, vitality and health satisfaction contributed to a lower subjective age. Of these main contributors to subjective age, self reported health (health satisfaction) explained the greatest proportion of the variability in subjective age (Hubley and Russel, 2009). Moreover, longitudinal research showed that negative changes in health status brought a change in subjective age (Markides and Boldt, 1983; cited by Barak and Stern, 1986).

Demographic correlates

Barak and Stern (1986) make a division in chronological age, gender, race, marital status, educational status, employment status, retirement status, income, socio-economic status, family demographics and group membership for demographic correlates. As described in the former section, chronological age is the most clearly related to subjective age. Most older adults report subjective ages that were younger than their real ages (Montepare, 2009; Rubin and Berntsen, 2006). The discrepancy between subjective age and chronological age should accelerate with older age (Rubin and Berntsen, 2006). Gender is a variable on which discussion is whether interaction exists between this variable and subjective age. Outcome of the study of Hubley and Russel (2009) was that there were no sex differences between subjective age relating to chronological age. Still other studies reported positive relationships between the discrepancy of subjective and real age and sex. Women show greater age discrepancies than men in some studies (Montepare and Lachman, 1989). No interaction was found on the relationship between race and subjective age (Linn and Hunter, 1979; Markides and Boldt, 1983; cited by Barak and Stern, 1986). Connidis (1989; cited by Steverink et al., 2001) recognized marital status in explaining perceptions of age. Barak and Stern (1986) found unmarried women to perceive themselves younger than real age, but no relation was shown for widowhood. Education status is considered as one of the most important subjective age correlates. People with a higher education level perceived themselves as younger (Barak, 1979; Bultena and Powers, 1978; cited by Barak and Stern, 1986). Employment status is also considered as a determinant of subjective age, together with retirement status. People who are fully employed perceive themselves being younger than real age (Barak and Stern, 1986). For income an inverse association is seen; a higher income gives lower perceptions of subjective age. For social economic status the same relation has been found. Family demographics are considered as age of the offspring and number of offspring. Negative views of aging were held by people with fewer children according to Connidis (1989; cited by Steverink et al., 2001) but Barak and Stern (1986) stress that the more (grand) children one has, the elder an individual will perceive him or herself. Also on group membership conflicting results are found on the association with subjective age (Barak and Stern, 1986).

Psychographic and social psychological correlates

Psychographic research is being described by Barak and Stern (1986) as life-style research. This type of research originated in consumer behavior discipline. It combined social, psychological, and behavioral aspects to gain more insight than demographic characteristics on its own would provide. Factor analysis or likert scale measurements were introduced to obtain these insights. Life satisfaction inventories are well known in gerontologist research. Life satisfaction being measured as subjective well-being was incorporated in many studies, and results showed that a greater proportion of life satisfaction resulted in a lower subjective age compared to people's real age. Life satisfactory inventories (LSI) were also considered as having an inverse effect on subjective age. Studies merely conducted (with a focus) on life satisfaction found that many variables have correlations for as well life satisfaction as subjective age; e.g. self-perceived health, education and income. Barak and Stern (1986) stress in their research note that further research is needed on these assumptions.

Behavior correlates

According to Barak and Stern (1986) there is also a lack of investigation on behavioral variables as media behavior as television viewing, radio listening and reading in relation to subjective age. Inverse relationships that have been found between behavior correlates and subjective age are: shampoo frequency, shampoo brand switching, telephoning, dining out, exercising and playing computer games (Barak and Stern, 1986).

2.2.3 Social well-being of elderly

Social well-being is understood in many different ways. In the Netherlands, the concept of loneliness is considered as one of the main indicators of social well-being. The choice for this concept is explained in the next sections.

2.2.4 Loneliness as indicator of social well-being

In the Netherlands, loneliness is understood as one of the main indicators of social well-being (De Jong Gierveld and van Tilburg, 2006). There are many definitions for the concept of loneliness. Loneliness is determined as 'the subjective experience of an unpleasant or improper lack of (the quality of) certain social relationships (Fokkema and van Tilburg, 2005). Mentioned before, one of the most common definitions is given by Peplau and Perlman (1982) and de Jong Gierveld (1987): 'Loneliness is the unpleasant experience that occurs when a person's network of relationships is deficient in some important way'. Loneliness incorporates an 'unwanted discrepancy between the relationships one has and the ones one would like to have' (Perlman and Peplau, 1982; Perlman, 2004).

Especially when people become older, loneliness is more occurring (Holmen and Furukawa, 2002; Jylhä 2004). Loneliness is an important indicator of well-being among elderly (Holmen and Furukawa, 2002). It is considered as a risk factor for reduced well-being. Several researchers found that loneliness is a complex concept and closely connected to age, gender, marital status, social contacts, living arrangements, housing conditions, interests, friendship, health and cognitions (Holmen and Furukawa, 2002; de Jong Gierveld, 1987; Dykstra et al., 2005; Jylhä, 2004; Tijhuis et al., 1999; Savikko et al., 2005). In old age, loneliness is often related to the loss of a partner (Holmen and Furukawa, 2002). Jylhä (2004) found that women were more likely to describe themselves as "lonely" than men. Living with a partner gives less often feelings of loneliness than living alone (de Jong Gierveld, 1987). Elderly people will get more and more involved in stressful situations. Loss of relatives and friends and decreasing health are situations occurring more often than for younger people (Holmen and Furukawa, 2002). However, noted is that there can also be relationship gains in later life, for example new partnerships after widowhood and divorce or new commitments after retirement, which tend to a decrease in loneliness (Dykstra et al., 2005).

2.2.5 The study of loneliness in society

The study of loneliness in old age is of main importance in society. It has its consequences for the use of health services, institutionalization and it gives an increasing risk of mortality (Savikko et al., 2005). In a study of Walker (1993), cited by de Jong Gierveld and Havens (2004: p. 109) it occurred that more than 40 percent of the population of the European Union feel that loneliness is one of the two main problems among older people. Even more a share of 44 percent of the European population aged 65 and over see loneliness as the main problem for older adults. Studies in different countries showed that loneliness is most occurring among the very old (Tijhuis et al., 1999; Jylhä, 2004; Pinquart and Sörensen, 2001). Among middle-age and younger respondent, a share of 20 to 30 percent of the respondents perceived moderate or serious loneliness. With an increasing age, the prevalence of loneliness also

increases. For people aged 80 and over, moderate or severe loneliness was even reported by 40 percent to 50 percent. In the Netherlands, it was estimated that about 32 percent of the people aged 55 and over conceive feelings of loneliness in 1999. This means that more than 1.3 million people in the Netherlands deal in some degree with feelings of loneliness. Of this group is 28 percent regarded as moderate lonely, 3 percent as severe lonely and 1 percent as being very severe lonely (De Jong Gierveld, 1999).

2.2.6. Loneliness in relation to health

Several researchers emphasized on the relationship between loneliness and health (Dykstra et al. 2005; de Jong Gierveld, 1998; Jylhä, 2004). These studies tend to show a negative association between health and loneliness. Next, the concept of subjective health status was often found to be related to loneliness (Holmen and Furukawa, 2002; Tijhuis et al., 1999). Loneliness influences mental and physical health. Furthermore, diseases seem to have an effect on the level of loneliness. Increasing age gives an increasing risk of stress for diseases. For example, dementia is one of the most common diseases occurring in old age. Elderly suffering from dementia found it harder to face new situations and compensate the decreasing ability to perform everyday tasks. These problems may lead to a lack of social contacts, withdrawal from society and this can lead to feelings of loneliness. Social contacts are considered as an important aspect of healthy aging. It is suggested that loneliness is related to the satisfaction with these social contacts (Holmen and Furukawa, 2002).

Savikko et al. (2005) conducted their research on self-reported loneliness and health status among Finnish older population. They stated that loneliness in old age is ‘a significant challenge for gerontological research and practice’. Savikko et al. (2005) show also certain clear links between loneliness and old age, widowhood and living alone. However, gender differences seem to be disputable. Furthermore, they stress the relation between low levels of education and poor levels of income. Fokkema and van Tilburg (2005) point out the consequences of loneliness on health status. Loneliness can reduce one’s health status in many respects; both mentally and physical. Lonely people tend to have more often a reduced self-respect, a pessimistic future perspective, depression complaints and fear impairments. A research conducted in the Netherlands by Penninx et al. (1997) has shown that a lower level of loneliness, more emotional support and less practical assistance gives a lower mortality rate among elderly.

2.2.7 Subjective age related to well-being and health

Now both the concepts of subjective age and social well-being are discussed, the relation between the two variables is dealt with. As we can notice in the former sections, several variables such as sex, age, marital status, education level and health status tend to influence both subjective age and loneliness. Previous research on the relationship between subjective age and well-being was conducted by Barak and Stern (1986); Kleinspehn Ammerlahm et al. (2008); Steverink et al. (2001); Uotininen (2005); Westerhof and Barrett (2005).

Studies about successful aging find that a young subjective age is associated with good health and higher levels of well-being (Levy et al., 2002; Westerhof and Barrett, 2005). ‘This pattern has been shown by multivariate studies in which potential confounders have been controlled for’ (Barak and Rahtz, 1999, Barak and Stern, 1986; Logan and al., 1992; cited by Uotinen, 2005). Levy et al. (2002) stated that high satisfaction with aging is associated with good health. They found that people with more positive self-perceptions of aging report better functional health than those with more negative self-perceptions of aging, after controlling for several baseline measures of functional health, such as age, gender, self-rated health,

loneliness, race, and socioeconomic status (Levy et al., 2002).

Most of the studies conducted on the relation between perceptions of aging and well-being focused on the form of overall well-being. Westerhof and Barret (2005) conducted a study on subjective well-being and age identity among elderly in the United States and Germany. Subjective well-being was operationalised as satisfaction with life. Compared with Germans, Americans tend to have more youthful age identities and higher levels of life satisfaction. They controlled the relation between age identity and subjective well-being for age, gender, socioeconomic status, marital and employment status and health. Outcomes were that a more youthful identity (a larger difference between subjective and real age) is related to higher levels of subjective well-being, even when controlling for chronological age, gender, socioeconomic status, marital and employment status, and objective and subjective health. Steverink et al. (2001) investigated the personal experience of aging, the resources relevant to it, and its relation to subjective well-being. They also studied the concept of life satisfaction, a five-item likert scale variable. They found that how satisfied people feel was associated with perceptions of aging. The resources of subjective health, income, education and hope were found to influence the aging experience and its relation with life satisfaction. Their aim was to contribute to the knowledge of the personal experience of aging and to help identify those people at risk for developing a somehow negative view of the aging process. 'Such information can also be used to develop interventions aimed at a more positive aging experience and greater subjective well-being in later life' (Steverink et al., 2001: p. 372).

2.2.8 Coping strategies

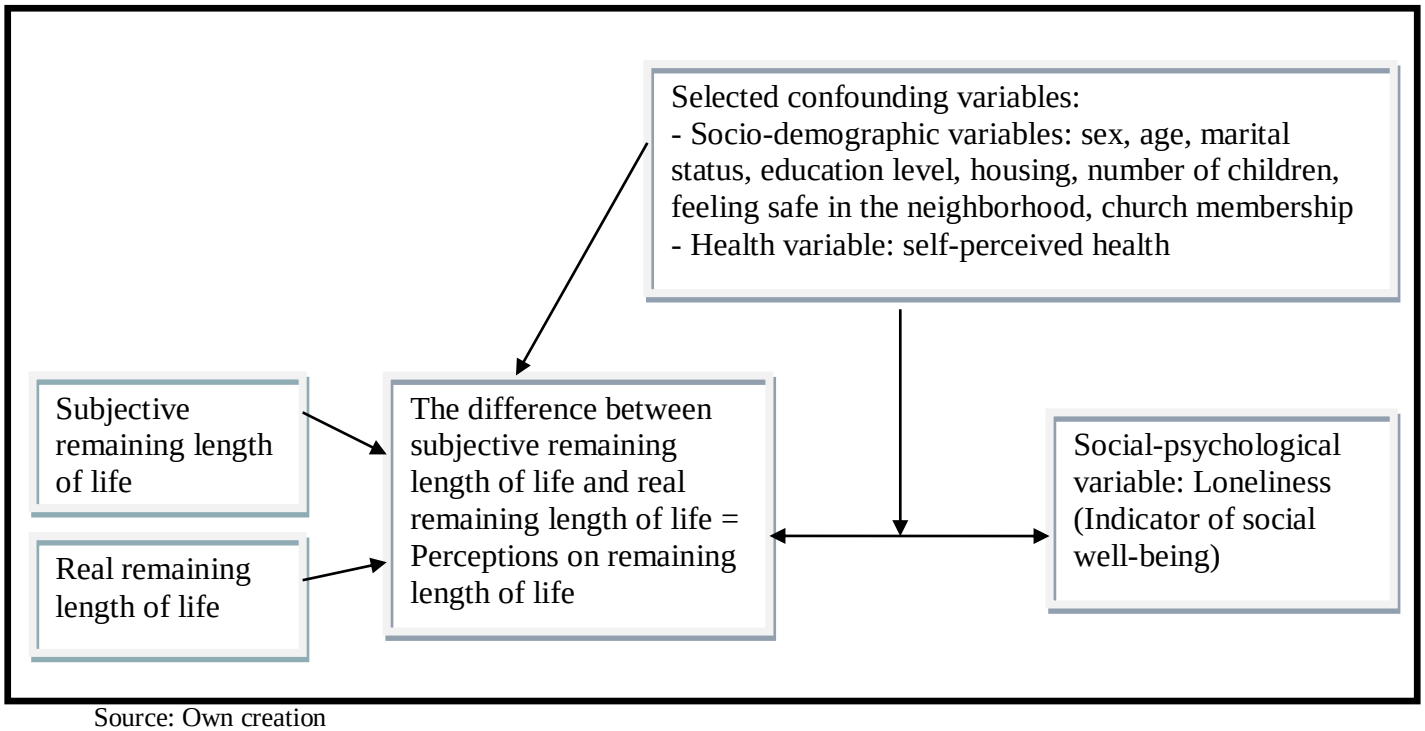
In trying to understand how the relationship between subjective age and loneliness can be explained, and how elderly people tend to adjust to loneliness and aging, coping strategies can be useful. Elderly can tackle their feelings of loneliness by the use of several types of coping behavior or coping strategies. A coping strategy is 'a general tendency to use a special method to deal with a stressful occurrence' (Horchner et al., 2002, cited by van Baarsen, 2002). Coping strategies are under divided as problem directed or action-directed/emotional oriented coping. People may actively deal with problems or may try to control the emotions they have. Elderly tend to enhance self-protecting coping strategies, for example, by 'dampening' negative experiences (Lawton, 1996, cited by van Baarsen, 2002). As their sources of stress change (for instance health problems), they may change their coping strategies to stay involved in life. Another coping strategy is self-esteem. Self-esteem has its effect on loss. Low self-esteem gives little confidence, motivation and skill to change certain circumstances. For example, widowhood can change conceptions of the self and can lead to impairment in one's identity (van Baarsen, 2002). High self-esteem gives more opportunities to change situations of loneliness (Dykstra, 1995). It functions as a buffer against emotional effects of stress. People having more self-esteem feel more in control in interacting with others and tend to have more often an adequate network for support (Dykstra, 1995). Another form of coping related to aging can be found in previous research conducted on subjective age. According to Ouwehand et al. (2007), coping is an important factor in successful aging and optimization and compensating becoming older. Several researchers stressed that the increasing discrepancy between subjective age and real age is generally regarded as an age-denial view that becomes most pronounced in old age (Barak, Mathur, Lee and Zhang, 2001; Peters, 1971; Ward, 1977; cited by Rubin and Berntsen, 2006). In this way elderly adjust to growing older, in rejecting the label 'elderly' and reporting a younger subjective age than actual age which accelerates with becoming older. Both strategies on coping are kept in mind when doing analysis. In this study coping behavior of elderly might give an explanation why elderly perceive their perceptions on remaining length of life and loneliness in the way they do.

2.3 The conceptual model

Many studies were conducted on either loneliness or subjective age. We study the relationship between both concepts. No previous research was found on the relationship between self perceptions of aging and loneliness as main indicator of social well-being. To our knowledge, the relation between these variables was never studied before in the Netherlands. From the literature review it became clear that there are several variables that tend to both influence subjective age and loneliness. This leads to the following conceptual model (figure 2.1). The conceptual model shows the relationships between the main concepts of interest of this study.

From literature, we know that the discrepancy between subjective age and real age can be influenced by many different variables; e.g. socio-demographic, health and social-psychological variables. The discrepancy between subjective age and real age is therefore the dependent variable of study. However, in this study is focused on a somewhat different measure: perceptions on remaining length of life. The concept of perceptions on remaining length of life is deducted from the difference between subjective remaining length of life and real remaining length of life. Although we know the used measure of difference between subjective remaining length of life and real remaining length of life is a different measure we still expect to be the variables in explaining the difference between subjective and real age will be the same as for our measure.

Figure 2.1 The conceptual model



Source: Own creation

An analysis will be conducted on the relation between the difference between subjective remaining length of life and real remaining length of life and social well-being of Dutch elderly. In studies conducted before, social-psychological variables as life satisfaction measuring well-being were incorporated, and results showed that a greater proportion of life satisfaction resulted in a lower subjective age compared to people's real age (Barak and Stern, 1986). In this study, loneliness is included as social-psychological variable measuring well-being and influencing perceptions on remaining length of life of Dutch elderly. Loneliness is seen as one of the main indicators of social well-being of elderly (De Jong Gierveld and van

Tilburg, 2006).

From theory and the literature review it is expected that there might be other variables having a positive or negative effect on perceptions of remaining length of life and on its relationship with social well-being. Several selected socio-demographic variables are taken along into analysis, next to a health variable which tends to explain perceptions on remaining length of life as well as the relation between perceptions on remaining length of life and social well-being of Dutch elderly. Opinions among researchers differ on the interaction of socio-demographic variables on subjective age (Barak and Stern, 1986; Hubley and Russel, 2009; Montepare, 2009; Rubin and Berntsen, 2006). Chronological age is clearly related to subjective age. Marital status and education level also have its effect on subjective age of people. Differences in results in former studies on subjective age were shown for the factors of sex, number of children, living arrangements and church membership. Studies conducted before on the indicator of social well-being -loneliness- showed that loneliness is influenced by age, sex, marital status, education level, housing (Holmen and Furukawa, 2002; de Jong Gierveld, 1987; de Jong Gierveld, 1998; Jylhä, 2004; Tijhuis et al., 1999; Savikko et al., 2005). Subjective health tends to have both its effect on subjective age and loneliness (Hubley and Russel, 2009; Holmen and Furukawa, 2002, Tijhuis et al., 1999). The variables of sex, age, marital status, education level, housing, feeling safe in the neighborhood, number of children, and church membership will be taken along in the analysis. Feeling safe in the neighborhood is considered as a housing variable.

Furthermore, results from the analysis on the relationship between perceptions on remaining length of life and loneliness are tried to understand by several coping strategies which Dutch elderly might adapt in adjustment to loneliness or their perceptions on aging.

2.3.1 Hypotheses

Based on the existing literature, the following hypothesis has been formed:

- There is a relationship between perceived remaining length of life and loneliness. The more lonely people are the more negative perceptions on remaining length of life they will have.

Based on studies conducted before on the discrepancy between subjective age and real age, we expect that:

- There are no differences for males and females in the way they perceive their remaining length of life.
- The older a person is, the more positive remaining length of life is experienced. Perceived remaining length of life increases with a higher age.
- Unmarried people consider to have the most positive perceptions on remaining length of life, compared to widowers, married and divorced elderly.
- Elderly with a higher education level obtained have more positive perceptions on remaining length of life than those with lower education.
- The number of children has a positive effect on the difference between subjective remaining age and real remaining age. The more children people have, the more positive they experience their perceived remaining length of life.
- There is no difference in perceptions on remaining length of life between Dutch elderly living independent and those living in a residential home or other type of housing.
- There are no differences in perceptions on remaining length of life for the different categories of church membership.

- Feeling safe or not in the neighborhood has no effect on the difference between subjective remaining length of life and real remaining length of life.
- The better elderly perceive their health, the more positive perceptions on remaining length of life older people have.

From studies conducted before on either subjective age and loneliness, we know that the variables age, marital status, education level and subjective health proved to have effect on as well subjective age as loneliness.

- Therefore we expect age, marital status, education level and subjective health to have effect on the relationship between perceptions on remaining length of life and loneliness.

3 Data and methods

In order to describe and understand the relation between perceptions of Dutch elderly on their remaining length of life and social well-being, a data set and several methods for analysis of this data set are used. This chapter discusses the data and methods used in this study. First, a description is provided of the LASA data collection. The study design and the area of study is being described. Insight is gained in the used variables of the data collection. The concepts from the conceptual model are defined and operationalised. A description of the used dependent, independent and confounding variables is provided. Reflected is upon the data quality. Then, the methodology section takes into account the types of analytical techniques used in this study. Several ethical aspects which have to be regarded in conducting a research are also discussed in this chapter.

3.1 The LASA data collection

3.1.1 Study design

This research will be a quantitative research with the use of secondary data. It will be both descriptive and explanatory, in describing the relationship between perceptions on remaining length of life and social well-being of Dutch elderly and in understanding the way this relation is influenced by several background characteristics of Dutch elderly. The secondary data used for this quantitative study is provided by the Longitudinal Aging Study Amsterdam (LASA). The objective of the LASA is: 'by using longitudinal data, policy relevant aspects of aging can be identified and new policy aims can be developed. Moreover, assumptions from which policy measures are developed can be tested, and effects of policy changes can be assessed prospectively' (LASA, 2009a).

The LASA data collection exists of individual data of Dutch elderly in the age-categories 55-59, 60-64, 65-69, 70-74, 75-79, and 80-85 years. These people were born in different birth categories, also known as cohorts. People from different birth categories/cohorts were interviewed and identical follow-up data collections were conducted in following waves among the same people (LASA, 2009b). The study is longitudinal in a way that there is an observation of the individual through time (LASA, 2009a). Every three years the same people were interviewed. There were realized six waves in gathering the data. Wave A covers the year 1992 and the most recent wave (Wave F) descends from the years 2005-2006. (LASA, 2009b) However, the first wave was carried out by the Living arrangements and social networks of older adults (LSN) study. This LSN data was considered as baseline for the LASA study in 1992 (LASA, 2009b). The respondents were visited at home by trained interviewers using a lap top computer for data entry. Interview and tests take one and a half hours approximately. People who moved between the different waves were traced and re-interviewed (LASA, 2009c). An overview of the sample regarding year of birth and year of data collection is provided in table 3.1. As shown in table 3.1, in the first sample 4494 people were interviewed. This declined per year to the latest wave (F), in which 1257 interviews were held.

3.1.2 Study area

The LASA data covers three culturally and geographically defined areas in the Netherlands; the South, the West and the North-East (LASA, 2009b). Each area included one large or middle sized city and two or more rural municipalities which are located near this city. The sample frame was provided by eleven municipality registries. Data from all the three defined areas is used in this study.

Table 3.1 Composition of the realized sample in numbers (respondents) regarding to year of birth of the respondent, LASA data collection

Year of birth	Wave A (LSN) 1992	Wave B (LASA) 1992-1993	Wave C (LASA) 1995-1996	Wave D (LASA) 1998-1999	Wave E (LASA) 2001-2002	Wave F (LASA) 2005-2006
1903-1907	689	-	-	-	-	
1908-1912	774	580	384	233	133	42
1913-1917	712	575	431	318	215	109
1918-1922	589	472	384	313	242	160
1923-1927	593	492	441	386	335	278
1928-1932	580	512	463	416	385	330
1933-1937	557	476	442	410	381	338
Total	4494	3107	2545	2076	1691	1257

Source: LASA, 2009b

3.1.3 Used data

For this study, LASA data is obtained from Wave D (1998-1999). More insight in the sample is provided in table 3.2, which provides information on the respondents by different background characteristics. After merging the files for all the used variables (discussed in the next section) 1714 respondents were left. Of these respondents, 794 (46.3%) were male, and 920 (53.7%) were female. The mean age of the respondents was 73.8 years. Most respondents were married (57.1%), next to that widowed elderly were largely represented in the sample (32.1%).

Table 3.2 Descriptive characteristics of the sample, LASA data collection, Wave D
N=1714

Characteristic	N	%
Sex		
Male	794	46.3
Female	920	53.7
Age*		
60-64	277	16.2
65-69	382	22.3
70-74	346	20.2
75-79	272	15.9
80-84	249	14.5
85 and higher	188	11.0
Marital status		
Never married	90	5.3
Married	979	57.1
Divorced	95	5.5
Widowed	550	32.1

Notes: *Mean age= 73.79

The LASA data collection consists of many more characteristics, subdivided in three main categories. In the database are dependent variables, independent variables and intermediary variables. Intermediary variables are not taken into account in this study and therefore not mentioned in this chapter. In the next section, the variables used in this study will be clarified.

3.2 Definitions and operationalisation of the concepts

Below a description is provided of the concepts from the conceptual model (see section 2.3). As follows is their operationalisation in order to clarify the measurement of the concepts. The operationalisation is for the greater part deducted from the measurement of the variables in

the LASA data collection, of which a introduction was given in the former paragraph. This section makes clear how the dependent and independent variables of the LASA data collection are embedded in this study.

3.2.1 Dependent variable: Perceptions on remaining length of life

The used dependent variable in this study is 'subjective age'. This variable was added to data collection (wave) D in 1998-1999. The LASA works with a 'timescale' on which the subjective age of elderly is measured (Deeg, 2009). Next to the variable of subjective age, the real (chronological) age of the respondents is used. However, in this study is focused on the perceived remaining length of life of the Dutch elderly, which is the 'difference' between the years that elderly perceive to have left in life, and the real age elderly have left in life according to life tables of Statistics Netherlands.

Subjective remaining length of life: Deducted from the concept of subjective age. Subjective age is 'a multidimensional construct that indicates how old a person feels and into which age group a person categorized himself or herself' (Kleinspehn-Ammerlahn et al., 2008; Steverink et al., 2001).
Operationalisation:
Measured by a timescale which runs from zero to one, where respondents can tell where they think they stand in life, marking this line/scale with a cross. An example of this subjective age lifeline is provided in figure 3.2.

- Can you tell us by marking the line with a cross where you find yourself on your lifeline on this moment? (Deeg, 2009)

Subjective remaining length of life is measured by calculating for every respondent the perceived remaining length of life between this cross on the lifeline and the end of this lifeline.

Real remaining length of life: Real/chronological length of life is the length of time that has elapsed since one's birth (Henderson, 1995). Real remaining length of life is the real remaining life expectancy for the real age of the respondent. Real remaining length of life is obtained from a life table on remaining life expectancy from Statistics Netherlands for the year 1999, the year in which the data was collected. This number of years is different for men and women.
Operationalisation:

- Real age: What is your exact age (LASA, 2009d)?

For every respondent, the real remaining length of life is extracted from a life table on remaining life expectancy from Statistics Netherlands for the year 1999.

Perceptions on remaining length of life: The difference between subjective remaining length of life and real remaining length of life. In this thesis, the difference variable is also defined as perceptions on remaining length of life, in order to make readability better.
Operationalisation:
The variable *difference* in years between the variables subjective remaining length of life and real remaining length of life is created by subtracting real remaining length of life from subjective remaining length of life. Hence, this difference is categorized into three groups.

The operationalisation of these concepts is extensively elaborated on in section 3.4.

3.2.2 Independent variable: Social well-being

In the LASA database several variables are collected which measure well-being/quality of

life. Well-being is defined as the evaluation by older persons of their functioning. LASA (2009d) distinguishes four components of functioning; physical, cognitive, emotional and social.

In this study, the component of *social functioning* is used to measure well-being, accomplished from wave D (1998-1999). In the Netherlands, loneliness is considered as one of the main indicators of social well-being (see section 2.2.4). In the literature much attention has been paid to this social component of well-being as being an important factor for the well-being of elderly; as described in section 2.2.5. Where LASA considers the component of social functioning as dependent, in this study loneliness is seen as an independent variable, influencing the perceptions of remaining length of life of Dutch elderly.

Loneliness:
LASA (2009e) measures loneliness by applying the 'De Jong Gierveld loneliness scale'. This 11-itemed version was initialized in 1985 by De Jong Gierveld and Kamphuis. Originally, the multidimensional scale of loneliness existed of 34-items and was developed by De Jong Gierveld and Raadschelders in 1982 (De Jong Gierveld and van Tilburg, 1999). Since this 34-item scale was considered to primarily measure feelings of severe loneliness, the scale was changed. An 11-item unidimensional scale was developed based on 30 items. A self-administered questionnaire was handed to the respondents at the end of every face-to-face interview in order to collect the data (De Jong Gierveld and van Tilburg, 1999). In this study there will be made use of the 11-item loneliness scale in order to measure social functioning of Dutch elderly. An introduction of the used scale is given in section 2.2.4. The 'De Jong Gierveld loneliness scale' consists of the following items.

Loneliness (11 items). (De Jong Gierveld and van Tilburg, 1999)

1. There is always someone I can talk to about my day-to-day problems
2. I miss having a really close friend
3. I experience a general sense of emptiness
4. There are plenty of people I can lean on when I have problems
5. I miss the pleasure of the company of others
6. I find my circle of friends and acquaintances too limited
7. There are many people I can trust completely
8. There are enough people I feel close to
9. I miss having people around
10. I often feel rejected
11. I can call on my friends whenever I need them

(Possible answers are "yes", "more or less", "no")

'The scale is based on the so-called 'cognitive theoretical approach to loneliness' (De Jong Gierveld and van Tilburg, 1999). This approach to loneliness is described in the theory on loneliness in section 2.1.7. It is based on the emphasis on the discrepancy between the relationships one has and the relationships one desires (Dykstra and de Jong Gierveld, 1994). 'The greater the discrepancy, the greater the loneliness' (De Jong Gierveld and van Tilburg, 2006: p.595).

The scale exists of five positive and six negative items (De Jong Gierveld and van Tilburg, 1999). The positive items emphasize on feelings of belongingness, the negative items mention feelings of social loss or disappointment. The word loneliness itself is not mentioned (De Jong Gierveld, 1998). The scale ranges from '0' to '11', i.e. from not lonely to extreme lonely (De

Jong Gierveld and van Tilburg, 2006). In the used De Jong Gierveld loneliness scale, incorporated is the difference between emotional and social loneliness (Weiss, 1973; see section 2.1.3). The items on the emotional loneliness scale are all formulated negatively; the items on the social loneliness scale are all formulated positively (Perlman, 2004). Despite this differentiation between emotional and social loneliness in the scale, this study will focus on overall loneliness.

The 'de Jong-Gierveld scale' is known as a reliable and objective instrument to measure loneliness (Pinquart and Sörensen, 2001). The quality of the scale has been assessed - with one exception- as sufficient/good by the Committee Test Affairs of the Netherlands Institute of Psychologists in 2000. Hence, the loneliness scale was adopted by the Dutch GGD's (regional health services) as 'one of their standard assessments of social functioning of older adults' (de Jong Gierveld and van Tilburg, 1999).

Operationalisation:
A new variable is created (dlocat1) by the use of De Jong Gierveld and van Tilburg (1999) manual of loneliness scale. The scores for the loneliness variable are subdivided into three categories: not, moderate and severe lonely.
Not lonely includes the scores on the loneliness scale from 0 up until 2.
Moderate lonely includes the scores on the loneliness scale from 3 up until 8.
Severe lonely includes the scores on the loneliness scale from 9 up until 11.

3.2.3 Selected possible confounding variables

Next, insight will be gained in other independent variables influencing perceptions of remaining length of life and social well-being. The effect of socio-demographic variables and a health variable are also examined to influence the difference between subjective and real remaining length of life and social well-being of elderly. Sex, age, education, marital status, children, church membership, housing and feeling safe in the neighbourhood were shown to be associated with both perceptions on remaining length of life and/or social well-being; these variables were taken into analyses. Hence, the health variable of self-perceived health will be taken along in the analysis. In the literature on subjective age discussed in paragraph 2.2.2 of this study, health variables seem to have a great influence on the variance of subjective and chronological age. Also is emphasized on the relationship between loneliness and health (Dykstra et al. 1999; de Jong Gierveld and van Tilburg 1995; Tijhuis et al., 1999; Jylhä 2004). Examined is the influence of these selected possible confounders on perceived remaining length of life and social well-being of Dutch elderly.
Operationalisation:

Sex:

- Is the respondent a male or a female?
    - Male
    - Female

Age category:

- To what age category does the respondent belong?
    - 60-64 years
    - 65-69 years
    - 70-74 years
    - 75-79 years
    - 80-84 years
    - 85 and higher

Marital status:

- What is your official marital status?
    - Never married
    - Married
    - Divorced
    - Widowed

Children:

- How many children do you have?
    - None
    - One to three
    - Four or more

Education:

- What is the education level you attained?
    - No education
    - Primary education
    - Secondary or higher education

Membership of church:

- Are you member of a church?
    - No member
    - Protestant
    - Roman Catholic
    - Other

Housing and living arrangements:

- What is the type of housing you live in?
    - Independent housing
    - Residential home
    - Other type of housing

Fear of criminality:

- Do you feel save at night in the neighborhood?
    - No
    - Yes

Self-perceived health:

- How is your health in general?
    - Excellent
    - Good
    - Fair
    - Sometimes good/bad
    - Poor

3.3 Data quality

It is important to reflect upon the data quality. Secondary data is used for this study and therefore it is necessary to check upon the way of gathering the data, and by whom this was done. The Longitudinal Aging Study Amsterdam is carried out by the Department of Policies for the Ageing, Ministry of Health, Welfare, and Sports and the VU University of Amsterdam (LASA, 2009a). During data collection, several procedures and measures were used to obtain complete and accurate reporting of the data. Interviewers were evaluated regularly, as well during the interview period as when the training was over. At that time, a standard evaluation form was filled in, which had two purposes. At first, the evaluation process was structured by the form in providing uniform criteria for a quality check and giving feedback to the interviewers. Secondly, data was gathered for the explanation and correction of possible

effects if interviewing on data quality and non-response. (LASA, 2008) The LASA admits that since the evaluation was retrospective, many forms were filled in as global evaluations and the trainers and co-trainers often skipped more detailed evaluation questions. Therefore the evaluation of the interviewers contains quite some missing data. During the data gathering itself, regional supervisors filled in the evaluation forms. They evaluated interviewers by listening tape recorders of completed interviews, which were sent in by the interviewers themselves and they gave the interviewers feedback by telephone contact (LASA, 2008).

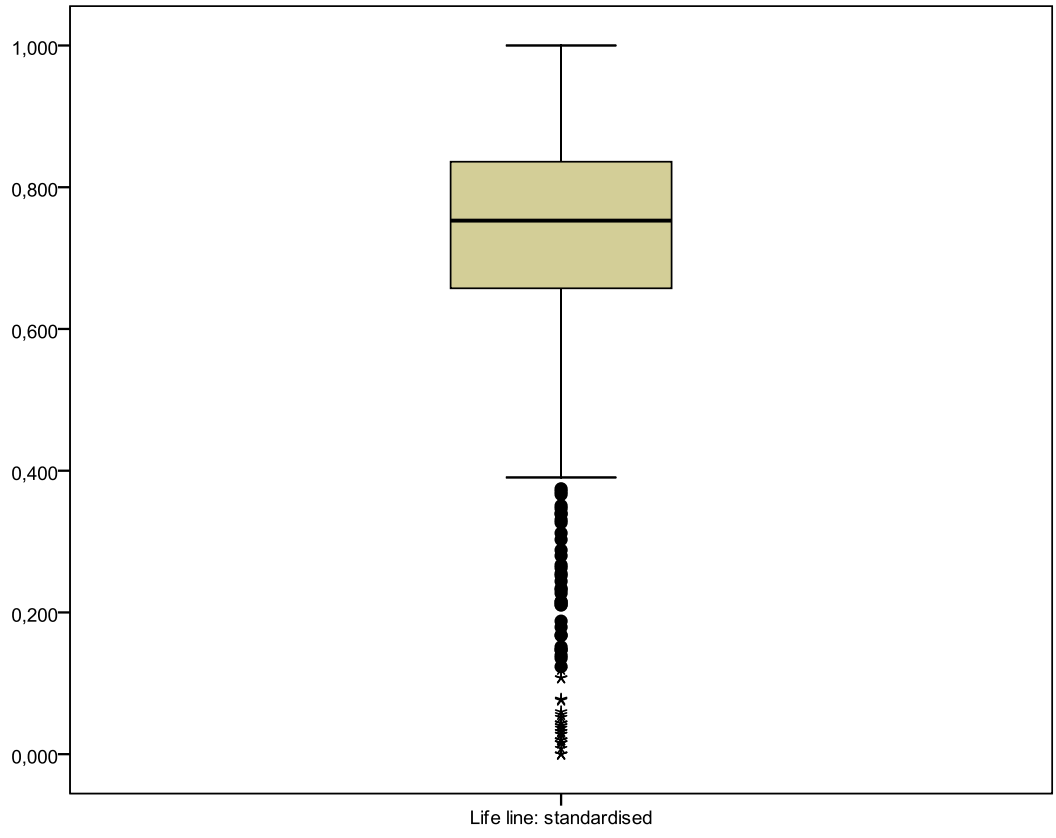
3.4 Data processing

In this section a broader explanation is given on the dependent variable of this study; the difference between subjective remaining length of life and real remaining length of life. The process of coming to this variable is explained. This section starts with discussing the subjective age life line variable which is obtained from the LASA data collection. Considered is the distribution of the difference between subjective remaining age and real remaining age.

3.4.1 The subjective age life line

Of main importance in this study is the value of the subjective age lifeline. Reflected is upon the degree of understanding this lifeline question. By calculating the subjective age lifeline into the total perceived remaining length of life, some of the respondents perceived themselves as having 5000 years left in life. Therefore it seemed reasonable to leave this certain values for the subjective age lifeline variable out of further analysis. A first assumption made here, was that it seems reasonable to believe that people perceive at being at ‘half time’ of their life. Subjective age lifelines values up until 0.5 therefore definitely had to remain included in the sample. A boxplot (figure 3.1) provides more information on the variable.

Figure 3.1 Boxplot of the subjective age lifeline of Dutch elderly



The boxplot in figure 3.1 shows the median, the interquartile range and the smallest and largest values for a group of a case. (Norusis, 2002). Then there are two lines represented above and underneath the box, these 'whiskers' "extend to the largest and smallest observed values within 1.5 box length" (Norusis, 2002). The lower whisker has a value of 0.4 for the subjective age lifeline variable. Beneath the line are outliers (designated with an O) and extreme values (designated by an *).

It was decided to delete the outliers and extreme values in the data sample, to make a more even distribution of the data. Since there is no further information on the degree of understanding the subjective age lifeline question, this seems to be a reasonable solution. A cut-off point was set and the values for dlifeline until 0.4 were left out of analysis. The assumption that people perceived themselves at being at the half length of their life (subjective age lifeline 0.5) was thereby not assaulted. These outliers and extreme values (the lifeline values until 0.4) represent 4% of the total number of cases. From the 1714 subjective age lifeline cases in the database there are now 1645 cases left which are taken into further analysis.

3.4.2 The difference between subjective and real remaining length of life

As mentioned in section 3.2.1, perceived remaining length of life is considered as the 'difference' between the subjective remaining length of life and the real remaining length of life of the respondents. In this section, a broader insight in the difference variable is provided.

Subjective age (the variable dlifeline) was measured by letting the respondents mark a cross on a 'lifeline', which runs from zero to one (see figure 3.2). This value is translated into perceived remaining length of life of Dutch elderly. A comparison is made between how many years the respondents really have left in life and how they perceive their remaining length of life, which is the part represented by the arrow. In other words, the perceived remaining length of life of the respondents is compared to the real remaining life expectancy, which is drawn from the life table of Statistics Netherlands for the year 1999. By subtracting this real remaining length of life from perceived remaining length of life, the variable 'difference' is created.

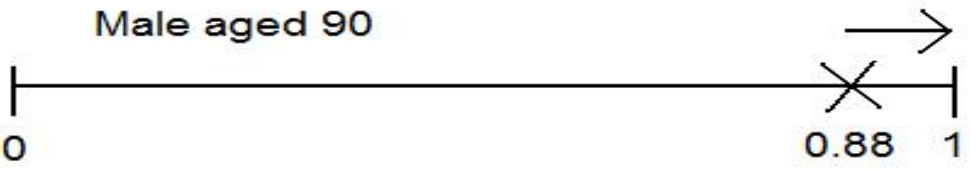
Table 3.3 Coming to the variable 'difference' between the subjective (remaining) age of the respondents and the real (remaining) age of the respondents

Respondent number	M/F	Subjective age	Real age	Rounded real age	Perceived total length of life	Perceived remaining length of life	Real remaining life expectancy	Difference
…….	**1**	**0.88**	**90.10**	**90**	**101.46**	**11.36**	**3.21**	**8.15**
…….	1	0.83	90.25	90	108.34	18.09	3.21	14.88
…….	1	0.77	90.22	90	116.71	26.49	3.21	23.28
…….	2	0.96	91.58	92	95.00	3.42	3.34	0.08
…….	2	0.78	90.22	90	116.26	26.04	3.91	22.13
…….	1	0.79	89.24	89	113.25	24.01	3.44	20.57
…….	1	0.88	89.46	89	101.66	12.20	3.44	8.76
…….	1	0.89	89.60	90	100.45	10.85	3.21	7.64
…….	1	0.88	89.15	89	101.31	12.16	3.44	8.72

Notes: M/F: Male/Female; the number 1 represents a male, the number 2 represents a female.

Table 3.3 shows a certain part of the respondents from the LASA data collection; their real age and subjective age life line value. To give an example, the first respondent in this table is a male with a real age of 90.10 years. This man has a subjective age value of 0.88; meaning he perceives being at point 0.88 of his total life (which would be point 1 on the lifeline). Figure 3.2 shows a graphical version of the subjective age lifeline for this respondent.

Figure 3.2 A subjective age lifeline for a male, aged 90, with a subjective age lifeline value of 0.88



Next, the perceived total length of life is calculated. If a person of 90.10 years perceives being at point 0.88 of his total length of life, his perceived total length of life would be 90.10/0.88= 101.46 years. His perceived remaining length of life is drawn by subtracting the real age of the respondent from the total perceived length of life: 101.46 – 90.10 = 11.36 years.

Table 3.4 Real remaining life expectancy in the Netherlands by age and sex, 1999

Sex	**Male**	**Female**
Age	**years**	**years**
88	3.71	4.59
89	3.44	4.24
90	3.21	3.91
91	3.00	3.61
92	2.82	3.34
93	2.66	3.09

Notes: Only ages 88-93 are displayed
Source: Statistics Netherlands, 2009

This perceived remaining length of life is compared to the real remaining length of life of the respondent. The real remaining life expectancy is extracted from the life table of Statistics Netherlands for 1999, the year in which the data on subjective age has been gathered. Table 3.4 shows real remaining life expectancy in 1999 for both men and women in the Netherlands. The last step in measuring the 'difference' between the subjective remaining age of the respondents and the real remaining age of the respondents, is subtracting the real remaining life expectancy of the respondent from the perceived remaining length of life. The life expectancy for men aged 90 was 3.21 years in 1999. This remaining life expectancy is being subtracted from his perceived remaining length of life. Now a new variable is created; the *difference* in years between the variables subjective remaining age and real remaining age. In this case, the difference between subjective remaining age and real remaining age is 11.36 – 3.21 = 8.15 years. This is also drawn in the last column of table 3.3.

3.4.3 Another distribution of the difference variable

In order to gain more insight in the difference variable, next to the mean and median values, a distinction is made of values of negative values, 'round zero' values and positive values of the variable difference. The difference between subjective remaining age and real remaining age of Dutch elderly was categorized in the groups lowest thru minus three (negative values), minus three thru three (round zero values) and three and higher (positive values). Positive perceptions include the elderly who perceive their subjective remaining length of life higher than their real remaining length of life. The people who perceive their subjective remaining length of life as about the same as their real remaining length of life, are categorized in the group round zero values. People with a negative perception on their remaining length of life, which incorporates a lower subjective remaining length of life as real remaining length of life, are in the negative perceptions group.

This specific distinction, and especially the formulation of the 'round zero' group (minus three thru three), is based on the fact that between the values minus three and four a gap is considered (see table 3.5). The categories minus four thru minus three and minus three thru minus two show a relatively large differentiation in size. For the positive values there is not such a clear distinction. Only the categories five thru six and six thru seven show a higher percentage as the other positive difference per one categories. Due the distribution of the negative values the decision is made to categorize the difference variable in this order.

Table 3.5 Distribution of the difference between subjective and real remaining length of life per one year, from minus ten years to plus ten years

		Frequency	Percent	Valid Percent	Cumulative Percent
	-6 thru -5	16	1.0	2.1	7.1
	-5 thru -4	23	1.4	2.9	10.0
	-4 thru -3	24	1.5	3.1	13.1
	-3 thru -2	46	2.8	5.9	19.0
	-2 thru -1	40	2.4	5.1	24.1
	-1 thru 0	39	2.4	5.0	29.1
	0 thru 1	38	2.3	4.9	34.0
	1 thru 2	53	3.2	6.8	40.8
	2 thru 3	55	3.3	7.1	47.8
	3 thru 4	51	3.1	6.5	54.4
	4 thru 5	53	3.2	6.8	61.2
	5 thru 6	69	4.2	8.8	70.0
	6 thru 7	67	4.1	8.6	78.6
	7 thru 8	55	3.3	7.1	85.6
	8 thru 9	52	3.2	6.7	92.3
	9 thru 10	60	3.6	7.7	100.0
	Total	780	47.4	100.0	
Missing	System	865	52.6		
Total		1645	100.0		

3.5 Methodology

In the methodology section, the types of analytical techniques used in this study are specified. First an overview is provided of the methodology process. Then the different of regression techniques that have been applied in this study are reflected upon. The selected technique, which is logistic regression, is elaborated on. The data is analyzed by the use of SPSS Statistics 17.0 and MS excel 2007.

3.5.1 Methods of analysis

The quantitative analysis of the data was divided into a bivariate and multivariate analysis. The bivariate analysis exists of cross tabulations and single logistic regression analysis to test the relation between two variables, the dependent and independent variable. Multivariate analysis was then applied in order to detect the influence of multiple factors and even combinations of two or more factors on the response variable.

In answering the first and second research question, descriptive analyses were conducted to

show the distribution of the difference variable with the socio-demographic variables, health variable and the socio-psychological variable (loneliness) in the study population. Cross tabulations of all these variables in the data file were made. The categories of perceptions on remaining length of life were compared with the chi-square test for categorical variables, to look for association between perceptions on remaining length of life and the independent variables (social well-being and the possible confounding variables). For the second research question also logistic regression analysis was used to gain more insight in the relationship between perceptions on remaining length of life and social well-being. Applying the logistic regression is becomes clear how the categories of loneliness influence perceptions on remaining length of life. Hence, in answering the third research question determined was which variables independently predict perceptions on remaining length of life. For instance, the single effect of the different education levels or age categories on perceptions on remaining length of life was tested. With this knowledge, there was tried to predict which variables might influence the relationship between perceptions on remaining length of life and social well-being.

In the multivariate analysis, perceptions on remaining length of life of Dutch elderly were controlled for all the selected confounding variables (the socio-demographic variables and health variable). This is compared to the bivariate results in answering the third research question. Furthermore there was searched for interaction effects between the confounding variables and social well-being in predicting perceptions on remaining length of life of Dutch elderly, in order to answer the fourth research question.

The decision to use these techniques is reflected upon many times. First a critical view on different techniques of analysis that could be used in order to analyze the relationship on perceptions on remaining length of life, loneliness and the selected possible confounders was accomplished. This next section discussed the choices made in the methodology process.

3.5.2 The process of methodology

At the beginning of the research process much attention was paid to the mean and median values of the dependent variable of study; the difference between subjective remaining length of life and real remaining length of life of Dutch elderly. The technique of general linear models (GLM) next to linear regression was applied, but the outcomes of these types of regression were difficult to interpret. This was caused by the fact that the dependent variable existed of a ‘difference’ between two measures (i.e. subjective and chronological remaining length of life). It seemed more clarifying to compare groups and preferred was to treat the dependent variable as categorical rather than continuous. Decided was to divide the difference between perceived remaining length of life and real remaining length of life variable into three categories; negative, equal and positive perceptions (see section 3.4.3). Now a different type of analysis had to be applied. In order to analyze the effect of the predictor variables on these three categories of perceptions on remaining length of life, multinomial logistic regression can be used. However, with this type of regression, it is only possible to make comparisons between two categories of the difference variable. A comparison between the category of negative perceptions to the category of equal perceptions is made, as well as a comparison between positive and equal perceptions on remaining length of life. Having conducted this analysis, it became clear that this was not yet sufficient. Therefore it was decided to gain more insight in the variables of study by applying binary logistic regression. Positive perceptions as well as negative perceptions of remaining length of life were considered as outcome variable. The background of these analytical techniques and the dependent variables taken into analysis will be elaborated on in the next sections.

3.5.3 Multinomial and binary logistic regression

Multinomial and binomial logistic regression both tend to support only a single dependent variable, which is never a continuous variable (Garson, 2009). For binary logistic regression, this response variable can have only two categories. Multinomial logistic regression exists to handle the case of a dependent variable with more classes than two (Norusis, 2005). Multinomial logistic regression compares each level of the dependent with the reference category, for each independent variable. It examines thereby the relation between the dependent variable and a set of predictor variables (Garson, 2009).

Having a response variable with two categories, the logistic equation looks as follows

$$\text{Log } \frac{P(\text{event})}{P(\text{noevent})} = b_0 + b_1X_1 + b_2X_2 + ... + b_pX_p$$

In the model, b0 is the intercept and X_1 to X_p are the independent variables, from which some of them may be interaction terms. The left side of the model is known as the logit, also called the natural log of the odds that the event occurs (Norusis, 2005). The 'b' terms are the logistic regression coefficients, also called parameter estimates (Garson, 2009).

In the multinomial logistic regression model, where the dependent variable tends to have more possible values, calculated is the log of the ratio of the probability of being in that group compared to being in the baseline group. This is called the baseline category logit. If that baseline category is *J,* for the *i*th category, the model looks like

$$\text{Log } \frac{P(\text{category}_i)}{P(\text{category}_j)} = b_{i0} + b_{i1}X_1 + b_{i2}X_2 + ... + b_{ip}X_p$$

Each coefficient in this equation has two subscripts, the first identifies the logit (i) and the second the variable (1). For the baseline category all the coefficients are 0. The other coefficients are non-zero and take into account the comparison of each group to the last group (Norusis, 2005).

In the multinomial model, the three categories for the difference between subjective remaining length of life and real remaining length of life include positive perceptions, equal perceptions and negative perceptions. Table 3.6 gives a clear overview of this distribution. Because of the division in three categories, the technique of multinomial logistic regression is applied. The reference category is the category of elderly with equal perceptions on remaining length of life; these people perceive their remaining length of life as about the same as their actual time left in life. Applying the multinomial logistic regression technique, the relation with loneliness and the selected possible confounders is examined. Univariate analyses examine the relation between the independent variables and the difference between subjective and real remaining length of life. Where association is found between the independent and the dependent variables, the significant independent variables are taken along in looking for interaction between the dependent, independent and confounding variables.

Binary logistic modeling is used to predict a dependent variable on the basis of categorical or continuous variables. This form of regression is used when a dependent variable is dichotomous. It can have only two values, 0 and 1. The "1" value is that of the dependent variable, using the "0" level as the reference value (Norusis, 2005). Logistic analyses for binary outcome variables tend to model the odds of an event's occurrence and to measure the

effect of the independent variables on these odds (O'Connell, 2006). The odds for an event compare the probability of an event occurring (referred to as 'success') to the probability of an event not occurring (referred to as failure). Having a probability of success greater than the probability of failure, the odds have a value of greater than 1. If the two outcomes are the same, the odds are 1. Having a smaller probability of success, the odds have a value of lower than one (Norusis, 2005).

$$odds = \frac{\Pr(success)}{\Pr(failure)} = \frac{\Pr(success)}{1-\Pr(success)} = \frac{\pi}{1-\pi}$$

3.5.4 Interpretation of the model

To measure the effect of the odds of an independent variable on the dependent variable, the odds ratio is constructed. The odds ratio compares the odds for the different values of the explanatory variables and is the exponential of the individual parameters. In the next formula, ExpB stands for the odds ratio, it gives the change in odds for a unit increase in the explanatory variable and is the most useful for the interpretation of the model.

$$\frac{\pi}{1-\pi} = \exp(\beta_0 + \beta_1 x) = \exp \beta_0 \times \exp \beta_1 x$$

In this study, a binary variable is created for both negative perceptions and positive perceptions on remaining length of life. Negative perceptions take into account a value for difference up until minus three. All other values in the database are then considered as being not negative values. The other way around, positive values are represented by every value for difference larger than three. Table 3.6 tends to clarify this division. First positive perceptions on remaining length of life are seen as an outcome variable, and in the second analysis negative perceptions on remaining length of life are seen as the outcome variable. The odds is the probability of having positive perceptions of remaining length of life compared to having not positive perceptions of remaining length of life (that is having negative or equal perceptions on the difference between subjective and real remaining length of life). When ExpB is higher than one, the more likely it is to have positive perceptions on remaining length of life, due to the effect of the change of an independent variable. If ExpB is less than one, it is less likely to have positive perceptions. When the odds ratio equals one, there is no change in the probability of having positive perceptions on remaining length of life by the influence of a unit increase in the explanatory variables (DeMaris, 2005; O'Connell, 2006).

The way of interpreting the outcomes is the same for the multinomial logistic regression; it only differs in the comparison made. Here both positive and negative perceptions are equated to equal perceptions on remaining length of life. For instance, if ExpB of having positive perceptions is less than one, it is less likely to have positive perceptions compared to equal perceptions on remaining length of life. If ExpB of having negative perceptions is less than one, it is less likely to have negative perceptions compared to equal perceptions on the difference between subjective and real remaining length of life.

The significance level measured on is 0.10 ($p<0.10$). Measurement is on a 90% confidence interval.

Table 3.6 The difference variable taken into analysis, both in the multinomial model and the binary logistic model

Model	Category	Value	Interpretation
Multinomial logistic model	Negative perceptions	Difference between subjective remaining l.o.l* and real remaining l.o.l. from lowest thru minus three years	Subjective remaining length of life < real remaining
	Equal perceptions	Difference between subjective remaining l.o.l and real remaining l.o.l. from minus three years thru three years (=reference category)	Subjective remaining length of life = real remaining length of life
	Positive perceptions	Difference between subjective remaining l.o.l and real remaining l.o.l from three years thru highest	Subjective remaining length of life > real remaining length of life
Binary logistic model type 1	Positive perceptions (value=1)	Difference between subjective remaining l.o.l and real remaining l.o.l from three years thru highest	Subjective remaining length of life > real remaining length of life
	Not positive perceptions (value=0)	Difference between subjective remaining l.o.l and real remaining l.o.l from lowest thru three years	Subjective remaining length of life <= real remaining length of life
Binary logistic model type 2	Negative perceptions (value=1)	Difference between subjective remaining l.o.l and real remaining l.o.l from lowest thru three years	Subjective remaining length of life <= real remaining length of life
	Not negative perceptions (value=0)	Difference between subjective remaining l.o.l and real remaining l.o.l from three years thru highest	Subjective remaining length of life > real remaining length of life

Notes: *l.o.l = length of life

3.5.5 Interaction effects

In this study, there is searched for interaction effects between the independent variables influencing the dependent variable. Interaction effects are measured for examining the effect of the selected possible confounding variables (sex, age, education, marital status, children, housing, church membership, feeling safe in the neighborhood and self-perceived health status) on the relationship between perceptions on remaining length of life and loneliness. Both in the multinomial and the binomial model testing for interaction effects is included.
A significant interaction shows that there is a different relationship between one independent variable and the dependent variable, depending on the level of another independent variable (Hosmer and Lemeshow, 2000). It is useful to specify the focal independent variable and the moderator variable (Jaccard, 2001). In this study, the focal independent variable is loneliness and the moderator variables are the selected possible confounding variables.

3.6 Ethical aspects

In doing research ethical aspects always have to be taken into account. In first place, the privacy of the respondents must be protected. Using the LASA database and doing a secondary data analyses, no specific information on respondents can be published. The LASA data can only be used for this research, may not be provided to third parties and has to be removed after use (Poppelaars, 2009). Shortcomings in the research have to be presented. There are always technical limitations and failures in research and there has to be honesty about this (Babbie, 2007). In the conclusion chapter, a section on evaluation of the data and methods is therefore included (section 6.3).

4 Results part I

This chapter provides the main results of the multinomial logistic regression analysis. Every research question reflects one section. The first paragraph gives more insight in the difference between subjective remaining length of life and chronological remaining length of life of Dutch elderly. The relationship between the difference between subjective and chronological remaining length of life and social well-being of Dutch elderly is discussed in the second section. Then is elaborated on how the difference between subjective and chronological remaining length of life can be explained. The final section describes the influence of selected background characteristics on the relation between perceived remaining length of life and social well-being of Dutch elderly.

4.1 Difference between subjective and chronological remaining length of life by background characteristics

The selected background characteristics have been related to the difference between subjective remaining length of life and real remaining length of life. Table 4.1 shows the negative (<-3), equal (0) and positive (>3) values for difference, as well as the mean and median difference and the total number of cases. Next to that, chi-square tests were conducted in order to analyze the relationship between the specific background characteristics and the three categories for difference (negative, equal and positive).

Table 4.1 shows that the total mean difference between subjective and real remaining length of life is 16 years. On average Dutch elderly perceive themselves as having 16 years more left in life than their real remaining life expectancy, deducted from the life tables of Statistics Netherlands for the year 1999. The total amount of negative perceptions is 7.1%, indicating that 7.1 % of the Dutch elderly perceive themselves as having a lower subjective remaining length of life than their real remaining length of life. These elderly perceive themselves having a shorter time left in life than they really have. A share of 16.5 % of the Dutch elderly perceives their subjective remaining length of life about the same as their real remaining length of life. The largest group can be found back in the group of Dutch elderly who perceive having a longer time left in life than they really have; the positive values of the difference variable count for 76.4%. These elderly perceive a higher subjective remaining length of life than their real remaining life expectancy, and they have positive perceptions on their remaining length of life.

Table 4.1 Distribution of the difference between subjective and real remaining length of life of the respondents by selected confounding variables in years, obtained from wave D (1998-1999)

Background characteristic	< -3 (%)	0 (%)	> 3 (%)	Mean difference	Median difference	N	N (%)	P value Chi square
Sex								
Male	6.4	14.7	78.9	14.91	10.56	767	46.6	P=
Female	7.7	18.0	74.3	16.98	10.55	878	53.4	0.088*
Age category								
60-64	9.5	20.5	70.0	12.82	10.04	263	16.0	
65-69	10.4	14.4	75.2	14.47	9.80	367	22.3	
70-74	5.7	15.6	78.7	15.62	10.23	334	20.3	P=
75-79	7.7	10.0	82.3	17.79	12.25	260	15.8	0.0001***

80-84	5.9	17.6	76.6	18.31	10.64	239	14.5	
85 and higher	0.5	24.2	75.3	18.88	10.44	182	11.1	
Marital status								
Never Married	3.4	17.0	79.5	15.68	11.95	88	5.3	
Married	8.1	15.5	76.4	14.85	9.84	939	57.1	P=
Divorced	4.5	21.3	74.2	18.76	12.13	89	5.4	0.390
Widowed	6.4	17.2	76.4	17.67	10.57	529	32.2	
Education								
No education	11.7	11.7	76.6	19.69	11.99	137	8.3	P=
Primary education	8.2	17.5	74.3	18.37	11.92	463	28.1	0.044**
Secondary or higher education	6.0	16.7	77.3	14.74	10.16	1045	63.5	
Number of children								
None	5.9	17.6	76.5	13.75	10.84	204	12.4	P=
1 to 3	7.4	16.9	75.7	15.47	10.12	922	56.0	0.833
4 or more	7.1	15.2	77.6	17.87	11.41	519	31.6	
Membership of church								
No member	6.3	17.6	76.0	15.23	9.80	601	36.5	
Protestant	7.0	15.7	77.2	17.05	10.59	540	32.8	P=
Roman Catholic	8.2	15.9	75.9	15.95	11.66	477	29.0	0.903
Other	7.4	14.8	77.8	13.77	8.81	27	1.6	
Housing								
Independent	7.1	16.5	76.4	15.80	10.47	1590	96.7	P=
Residential home or other	7.3	16.4	76.4	22.24	14.12	55	3.3	0.999
Feeling safe in neighbourhood								
No	5.7	18.8	75.5	19.18	10.55	314	19.2	P=
Yes	7.5	15.8	76.7	15.26	10.53	1322	80.8	0.284
Self perceived health								
Excellent	5.9	15.4	78.7	16.75	10.98	169	10.3	
Good	6.7	16.8	76.5	15.69	11.07	889	54.1	P=
Fair	7.1	18.2	74.7	16.13	10.16	411	25.0	0.324
Sometimes good/bad or poor	10.4	11.6	78.0	16.56	9.64	173	10.5	
Total	7.1	16.5	76.4	16.01	10.56	1645		

Notes: A positive value of difference means that subjective/perceived remaining length of life of the respondents is higher than their real remaining length of life. Respondents think they have longer left in life than they actually have (according to the life table (1999) obtained from Statistics Netherlands).

P values for the chi square test: *significant on the p<0.01 level
**significant on the p<0.05level
***significant on the p<0.10 level

From literature we expect that health variables tend to explain the greatest variance between subjective and chronological age (Barak and Stern, 1986; Hubley and Russel, 2009). In table 4.1 can be observed that self-perceived health shows this expected relation between the difference between subjective remaining length of life and real remaining length of life. The worse elderly perceive their health, the more negative perceptions on remaining length of life they have. However, this relationship is not significant (p=0.324). For the other background characteristics of Dutch elderly we see that women are more pessimistic than men concerning their perceived remaining length of life. Males tend to have more positive perceptions on remaining length of life than females. However, women have a higher mean difference between subjective real remaining length of life. The expectation that the older people are, the more positive values (>3) of difference is shown, can partly be found back in the table. It seems indeed that the older people are, the more positive they perceive their subjective remaining length of life compared to their real remaining length of life, with an exception for the oldest age categories. Elderly aged 80 and over tend to have relatively many equal perceptions. Dutch elderly who have never been married show the most positive values for difference, this was also expected from literature. It was hypothesized that the more education elderly have, the more positive perceptions on remaining length of life are reported. This can indeed be found back in table 4.1. No education gives even more the most negative perceptions. Having more children was expected to give higher perceptions of remaining length of life. Indeed, the category four or more children shows the highest mean difference and the most positive values for difference. Being a member of a church gives the most positive values of difference, except for the category roman catholic. However, the different categories of church membership do not tend to differ significantly in perceptions on remaining length of life. No difference in perceptions on remaining length of life can also been found back for the different categories of housing. Elderly who do not feel safe in the evening in their neighborhood, perceive a higher mean difference between their subjective remaining length of life and real remaining length of life than elderly who do feel safe. The elderly that do feel safe show more negative perceptions on remaining length of life, but also more positive perceptions.
Chi-square tests on the difference variable show that the difference between subjective and real remaining length of life is related to sex, age category and education level ($p<0,1$; measuring on a confidence interval of 90%).

4.2 Relation between difference and social well-being of Dutch elderly

In this study, the likert scale variable of loneliness is considered as social-psychological variable influencing perceptions of length of life (see section 2.3). In the Netherlands, loneliness is seen as one of the most important indicators of social well-being of elderly (de Jong Gierveld, 2001). Figure 4.1 shows a histogram of the distribution of Loneliness Scale scores measured in Wave D (1998-1999), based on the ‘de Jong Gierveld’ loneliness scale. From this distribution three categories for loneliness are made (see section 3.4.3). In table 4.2 more information on the loneliness variable is shown. Related to the difference between subjective remaining length of life and real remaining length of life, we do not see the expected relationship that the more lonely Dutch elderly are, the more negative perceptions on remaining length of life they will have. Elderly who feel severe lonely show compared to the other categories of loneliness the less negative perceptions for difference and even more the highest mean difference between subjective and real remaining length of life (21.87 years). The chi-square test shows that there is no relationship between loneliness and the difference between subjective and real remaining length of life, where p=0.363 (>0.1).

Figure 4.1 Distribution of the loneliness score of Dutch elderly on the 'de Jong Gierveld loneliness scale', obtained from Wave D (1998-1999) N= 1625

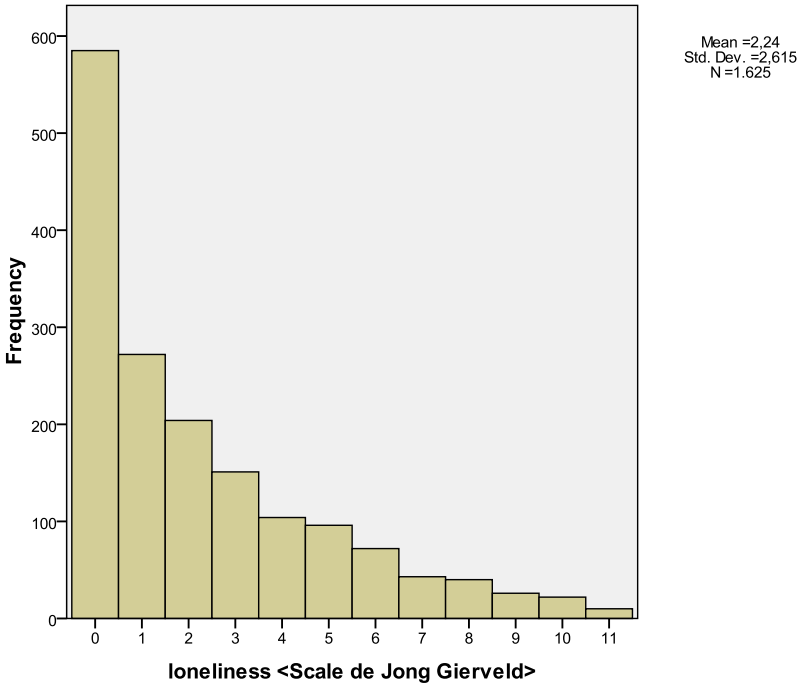


Table 4.2 Distribution of the difference between subjective and real remaining length of life of the respondents by the indicator of social well-being in years, obtained from wave D (1998-1999)

Perceptions on remaining length of life	< -3 (%)	0 (%)	>3 (%)	Mean difference	Median difference	N	N (%)	P value Chi square
Loneliness								
not (0-2)	7.7	17.0	75.3	15.70	10.04	1061	65.3	P=
moderate (3-8)	5.9	15.0	79.1	15.76	11.15	506	31.1	0.363
severe or very severe (9-11)	3.4	19.0	77.6	21.87	12.41	58	3.6	
						N=1625	100.0	

Notes: A positive value of difference means that subjective/perceived remaining age of the respondents is higher than their real remaining age. Respondents think they have longer left in life than they actually have (according to the life table (1999) obtained from Statistics Netherlands).

Table 4.3 Results of the relationship between perceptions of remaining length of life and loneliness

	Loneliness	**Exp (B)**	**Sig.**
Negative perceptions	Not lonely Moderate lonely Severe lonely	2.506 2.171	0.239 0.332
Equal perceptions			
Positive perceptions	Not lonely Moderate lonely Severe lonely	1.085 1.287	0.814 0.483

Multinomial logistic regression has been applied to analyze the relationship between perceptions on remaining length of life and the indicator for social well-being; loneliness. Derived from table 4.3 is that the odds ratio for loneliness is higher than 2 for Dutch elderly with negative perceptions. Dutch elderly who are not and moderate lonely are 2.1 and 2.5 times more likely to be in the category negative perceptions than people who are severe lonely, compared to elderly who have about the same perceptions on their subjective and real remaining length of life. But also do Dutch elderly have odds ratios that are slightly higher for

positive perceptions than equal perceptions on their difference between subjective remaining length of life and real remaining length of life. It seems that Dutch elderly who are not or moderate lonely have as well more negative as positive perceptions compared to equal perceptions than elderly who are severe lonely. Noted is that the odds ratios do not differ significantly. The level of loneliness of Dutch elderly is not significantly related to the separation of the negative perceptions and equal perceptions, neither to the separation of the positive perceptions and equal perceptions on remaining length of life.

4.3 Difference between subjective and real remaining length of life explained

For the selected background characteristics the relationship with perceived remaining length of life is measured by multinomial logistic regression analyses. First bivariate analysis was conducted, in entering single independent variables. The odds ratios shown indicate the association of each separate variable with perceptions on remaining length of life. This is compared to the outcomes of the multivariate analysis in which the response variable is controlled for the independent variables together. Only the variables which show an association with the dependent variable are displayed, which are sex, age, education level and self-perceived health. Different from the chi-square test, subjective health does show interaction with perceptions on remaining length of life in the logistic model.

If we include the same variables simultaneously and control them for each other, we see differences in odds ratios and significance level, but the main perspective is the same as in the bivariate analysis. There is only a change for the categories of good and fair health, these categories are now significantly associated with perceptions on remaining length of life. The multivariate analysis confirms to a large extent the results from the bivariate analysis.

Table 4.4 Logistic bivariate and multivariate analyses on perceptions of remaining length of life and background characteristics

		Bivariate analysis		**Multivariate analysis**	
	Determinants	**Exp (B)**	**Sig.**	**Exp (B)**	**Sig.**
Negative perceptions	**Sex**				
	Males	1.008	0.973	1.192	0.455
	Females				
	Age category				
	60-64 years	20.370	0.004	25.588	0.002
	65-69 years	31.547	0.001	40.461	0.000
	70-74 years	16.077	0.008	18.456	0.005
	75-79 years	33.846	0.001	40.557	0.000
	80-84 years	14.667	0.011	17.017	0.008
	85 and higher				
	Education level				
	No education	2.762	0.008	3.680	0.001
	Primary education	1.296	0.291	1.482	0.127
	Secondary or higher Education				
	Self-perceived health				
	Excellent	0.427	0.085	0.432	0.096
	Good	0.447	0.025	0.394	0.012
	Fair	0.430	0.031	0.388	0.018
	Sometimes good/bad or poor				
Equal perceptions					
Positive perceptions	**Sex**				
	Males	1.297	0.055	1.364	0.027
	Females				

	Age category				
	60-64 years	1.088	0.715	1.130	0.607
	65-69 years	1.679	0.024	1.819	0.011
	70-74 years	1.618	0.037	1.711	0.021
	75-79 years	2.656	0.000	2.874	0.000
	80-84 years	1.399	0.168	1.501	0.101
	85 and higher				
	Education level				
	No education	1.413	0.219	1.677	0.773
	Primary education	0.915	0.549	0.981	0.904
	Secondary or higher Education				
	Self-perceived health				
	Excellent	0.388	0.758	0.734	0.361
	Good	0.126	0.676	0.640	0.086
	Fair	0.066	0.606	0.569	0.040
	Sometimes good/bad or poor				

Notes: Total explained variance (R^2) of perceptions of remaining length of life with all determinants in the multivariate logistic regression model was 5.9 %.

Opinions among researchers differ whether there are sex differences in the discrepancy of subjective and real age and sex (Hubley and Russell, 2009; Montepare, 2009). Table 4.4 shows that males are 20% more likely than females in the category negative perceptions than in the category of equal perceptions. However, this relation is not significant. Males having positive perceptions about their remaining length of life are about 1.4 times as likely as females in this category compared to elderly with equal perceptions on their remaining length of life. Sex is significantly related to the separation of the positive perceptions and equal perceptions on remaining length of life. From literature, we know that age is the main indicator for subjective age, and thereby perceptions on remaining length of life (Barack and Stern, 1986). The hypothesis states that the older people are, the younger they perceive themselves to be. Previous research has shown that older people perceive themselves as being younger than their actual age (Montepare and Lachman, 1989; Hubley and Russel, 2009). Differences between real and subjective age become more pronounced becoming older (Rubin and Berntsen, 2006; Galambos et al., 2005; Hubley and Russel, 2009). Table 4.4 shows that every age groups below Dutch elderly aged 85 years and higher have more negative perceptions compared to equal perceptions. For instance, Dutch elderly aged 60-64 years are 25.6 times as likely as elderly aged 85 years and higher in the category of negative perceptions compared to equal perceptions. Elderly aged 75-79 have the highest odds ratio, meaning that they have the most negative perceptions on remaining length of life compared to the highest age group. It is stated that the o1dest age groups thereby reports that they more often think they have more time left in life than elderly in other age groups. The high odds ratios in the category negative perceptions can be explained by the fact the oldest age group (85 and over) have a very small percentage (only 0.5%) of negative perceptions (see table 4.1). On the other hand are all the age groups of Dutch elderly except elderly aged 85 years and over also more likely to be in the category positive perceptions. Elderly aged 65-69 years are 1.82 times more likely than elderly aged 85 years and higher in the category positive perceptions (difference of three thru highest) compared to equal perceptions (difference from minus three thru three). The amount of elderly in the age groups 65-69 years, 70-74 years and 75-79 years significantly differ from people aged 85 and over in the category positive perceptions compared to equal perceptions on remaining length of life. But the odds ratios for positive perceptions compared to equal perceptions are not as high as comparing negative perceptions to equal perceptions.

From previous research we know that people with a higher education level perceive

themselves as younger. From table 4.4 we can see that this is the case for Dutch elderly. Dutch elderly with no education are 3.7 times more likely to have negative perceptions than equal perceptions on remaining length of life compared to Dutch elderly with higher education.
Table 4.4 shows that the better Dutch elderly perceive their health, the less likely they have negative perceptions compared to equal perceptions. Dutch elderly who perceive their subjective health as excellent are 0.43 times as likely as elderly who perceive their health as sometimes bad/poor in the category with negative perceptions compared to equal perceptions. Dutch elderly who perceive their subjective health as fair are 0.39 times as likely as elderly who perceive their health as sometimes bad/poor having negative perceptions instead of equal perceptions. On the other hand, good and fair self-perceived health gives compared to sometimes good/bad or poor self-perceived health also significantly less positive perceptions as equal perceptions on remaining length of life.

4.4 Effect of selected possible confounding variables

Where the indicator for social well-being, loneliness did not seem to have a direct relationship with perceptions of remaining length of life of Dutch elderly, still the interaction between loneliness and the possible confounding variables is tested. The confounding variables which show an association with perceptions on remaining length of life are taken into further analysis, in order to detect for interaction effects on the relationship between perceived remaining length of life and loneliness. From the literature review we expect age, marital status, education level and subjective health to have effect on the relationship between perceptions on remaining length of life and loneliness. From the analysis, it results that there are no relationships between perceptions on remaining length of life, loneliness and the selected possible confounders.

The variable of self-perceived health was on the other hand significantly related with perceptions on remaining length of life. Therefore, self-perceived health is implemented as a control variable. As we know from literature, health variables tend to have the largest effect on perceptions of remaining length of life (Barak and Stern, 1986). Holmen and Furukawa (2002) and Tijhuis et al. (1999) state that loneliness is also related to how one perceives its health. Therefore, the relationship between subjective health and the difference between subjective and real remaining length of life by the different background characteristics of Dutch elderly is tested. It shows that there is a relationship between perceptions on remaining length of life of Dutch elderly and their subjective health is dependent on age category and the level of education. This seems reasonable, where these variables showed to be significantly related to perceptions on remaining length of life. In order to keep a good overview, only the categories of the independent and moderating factors that show a significant relationship are shown in the tables 4.5 and 4.6.

Table 4.5 Results of the effect of age on the relationship between perceptions of remaining length of life and health

	Interaction variables	**Exp (B)**	**Sig.**
Negative perceptions			
Equal perceptions			
Positive perceptions	Excellent health * 65-69 years	7.857	0.099
	Excellent health * 70-74 years	18.424	0.034

The categories negative perceptions and equal perceptions do not differ significantly for the interaction on self perceived health and age. In the category of positive perceptions compared

to equal perceptions, there is shown a significant interaction for the categories of excellent health with the age categories 65-69 years and 70-74 years. From bivariate and multivariate multinomial logistic regression we know that are all the age groups of Dutch elderly except elderly aged 85 years and over also more likely to be in the category positive perceptions. This is also shown in the relation to subjective health. Not included in this model is that the younger people are, also the more negative perceptions on remaining length of life they have compared to equal perceptions. However as stated before, only for the age categories 65-69 years and 70-74 years this relationship with subjective health is significant in influencing perceptions on remaining length of life.

Table 4.6 Results of the effect of education level on the relationship between perceptions of remaining length of life and health

	Interaction variables	**Exp (B)**	**Sig.**
Negative perceptions	Excellent health * primary education	8.867	0.050
Equal perceptions			
Positive perceptions	Fair health * no education	6.773	0.088

From previous research we know that people with a higher education level perceive themselves as younger. The interaction health and education shows that indeed elderly with lower (in this case primary) education show more negative perceptions compared to equal perceptions, even when their health is perceived as excellent. The table furthermore shows that Dutch elderly perceiving a fair health and having attained no education is significantly related to the separation of the positive perceptions and equal perceptions. Dutch elderly perceiving a fair health with no education seem to have significantly more positive perceptions compared to equal perceptions.

5 Results part II

This chapter shows the results for the binary logistic regression. The buildup of this section is the same as chapter four, but a distinction is made for positive perceptions and negative perceptions of remaining length of life as outcome variables. Further explanation on this division is provided in the methodology section (paragraph 3.5). First the outcomes of the positive perceptions on remaining length of life are being discussed, next the results of the negative perceptions of remaining length of life are taken into account.

5.1 Positive perceptions on remaining length of life

5.1.1 Difference between subjective and chronological remaining length of life by background characteristics

First a deeper insight is gained in the distribution of perceptions of remaining length of life of Dutch elderly by several background characteristics. Taking positive perceptions (a positive difference between subjective remaining age and real remaining age) as outcome variable (value=1) in the binary logistic regression model, the distributions are as follows. From table 5.1 on the next page, in total 76.4% of the respondents have positive perceptions on their remaining length of life. Another 23.6% shows not positive (but negative or equal) perceptions on the difference between their subjective remaining and real remaining age.
A difference is shown in the share of positive perceptions on remaining length of life between men and women. Males tend to have more often a positive difference between subjective remaining length of life and real remaining length of life. The different age groups also show some differences. The youngest age group of Dutch elderly (60-64) has the less positive perceptions and the age group 75-79 is the most optimistic about their remaining length of life. More than 82% of this group shows to have positive perceptions. For marital status, the table shows that divorced elderly have the lowest share of positive perceptions on remaining length of life. Never married Dutch elderly show the highest number on positive perceptions on remaining length of life. This was expected from literature. It is stated that the more education people attained, the more positive age identities they have. Dutch elderly who attained secondary or higher education show the highest percentage (77.3%) on positive perceptions on remaining length of life, followed by elderly with no education and the lowest percentage is shown for elderly who attained primary education (74.3%). As expected, having four or more children gives the most positive perceptions on remaining length of life. There is not much difference in the categories of church membership of Dutch elderly, the highest percentage of positive perceptions however can be found back in the category of other religions. About 76.7% of Dutch elderly who live independent have positive perceptions on their remaining length of life, which is slightly higher than people living in a residential home. People who feel safe in the neighborhood show a higher percentage of a positive difference between their subjective remaining age and real remaining age than elderly who do not feel safe in the neighborhood in the evening. Dutch elderly who perceive their health as excellent show the highest positive perceptions. This is in the line of expectation. But notable is that for the category of elderly who think their health is sometimes good/bad or even poor, also relatively many people perceive their remaining time left in life higher than the real time they on average have left in life.

Table 5.1 The difference between subjective and real remaining length of life by background characteristics of Dutch elderly

	Difference between subjective and real remaining length of life		
	No positive difference (%)	**Positive difference (%)**	**N**
Sex			
Male	21.1	78.9	767
Female	25.7	74.3	878
Age			
60-64	30.2	69.8	263
65-69	24.7	75.3	367
70-74	21.3	78.7	334
75-79	17.6	82.4	260
80-84	23.4	76.6	239
85 and higher	24.7	75.3	182
Marital status			
Never married	20.5	79.5	88
Married	23.6	76.4	939
Divorced	25.8	74.2	89
Widowed	23.6	76.4	529
Education level			
No education	23.4	76.6	137
Primary education	25.7	74.3	463
Secondary or higher education	22.7	77.3	1045
Children			
None	23.5	76.5	204
1 to 3	24.3	75.7	922
4 or more	22.4	77.6	519
Church membership			
No member	24.0	76.0	601
Protestant	22.8	77.2	540
Roman Catholic	24.1	75.9	477
Other	22.2	77.8	27
Housing			
Independent	23.6	76.4	1590
Residential home	24.5	75.5	55
Feeling safe			
Yes	23.3	76.7	314
No	24.5	75.5	1322
Subjective health			
Excellent	21.3	78.7	169
Good	23.5	76.5	889
Fair	25.3	74.7	411
Sometimes good/bad or poor	22.0	78.0	173
Total	**23.6**	**76.4**	**1625**

5.1.2 Relation between difference and social well-being of Dutch elderly

For the independent variable in this study, loneliness, table 5.2 shows the division of the perceptions on remaining length of life of Dutch elderly for the different categories of loneliness. From literature we expect that the more lonely elderly are, the more negative perceptions they have on their length of life. But from the cross tabulation we see that the category of Dutch elderly who feel moderate lonely show the highest percentage for a positive difference between subjective and real remaining length of life, by having positive perceptions for 79.1%. Next are severe lonely elderly, which show positive perceptions for

77.6% and the group less likely to perceive positive perceptions are the group who does not feel lonely, which does not confirm the stated hypotheses. Next to that, there is no significant association as we can see from the chi-square statistic (p=0.258).

Table 5.2 The difference between subjective and real remaining length of life by the different categories of loneliness of Dutch elderly

	Difference between subjective and real remaining length of life			
Loneliness	**No positive difference (%)**	**Positive difference (%)**	**N**	**P value chi square test**
Not lonely	24.7	75.3	1061	
Moderate lonely	20.9	79.1	506	P=0.258
Severe lonely	22.4	77.6	58	

Table 5.3 Results of the relationship between perceptions of remaining length of life of Dutch elderly and loneliness

Loneliness	**Exp(B)**	**Sig.**
Not lonely	0.881	0.695
Moderate lonely	1.090	0.769
Severe lonely		

Table 5.3 confirms the results from table 5.2 in showing that Dutch elderly who are not lonely are 0.881 times as likely as elderly who are severe lonely (the reference category) to have positive perceptions on remaining length of life. Elderly who feel moderate lonely have slightly higher odds of positive perceptions on remaining length of life than elderly who feel severe lonely. However, the categories for loneliness do not differ significantly on positive perceptions on remaining length of life.

5.1.3 Difference between subjective and real remaining length of life explained

Table 5.4 below shows the outcomes for the logistic regression model on perceptions on remaining length of life and several selected background characteristics. From this table, we can see how perceptions on remaining length of life are predicted from the background characteristics of Dutch elderly. In the bivariate analysis the single variables were added independently; in the multivariate analysis their effects were controlled for the other variables. The multivariate confirms in a high degree the outcomes of the bivariate analysis. From this onset, there is tried to predict which variables are affecting the relationship between perceptions on remaining length of life and loneliness. From both bivariate and multivariate analysis only sex and the age group 75-79 years show to be significantly related to perceptions on remaining length of life. The results remained basically the same as the results from the cross tabulations.

Table 5.4 Results of the relationship between perceptions of remaining length of life of Dutch elderly and background characteristics

	Bivariate analysis			**Multivariate analysis**	
	P value chi square test	**Exp(B)**	**Sig.**	**Exp(B)**	**Sig.**
Sex	P= 0.028**				
Male		1.294	**0.028**	1.322	**0.033**
Female					
Age	P=0.026**				
60-64		0.761	0.211	0.744	0.232
65-69		1.000	0.999	1.018	0.939
70-74		1.212	0.377	1.252	0.340
75-79		1.535	**0.070**	1.570	**0.071**

80-84		1.073	0.758	1.085	0.732
85 and higher					
Marital status	P=0.866				
Never married		1.203	0.514	1.369	0.362
Married		0.999	0.996	0.938	0.675
Divorced		0.888	0.651	0.827	0.489
Widowed					
Education level	P=0.422				
No education		0.962	0.859	1.004	0.987
Primary education		0.848	0.203	0.855	0.253
Secondary or higher education					
Children	P=0.706				
None		0.935	0.733	0.830	0.438
1 to 3		0.897	0.404	0.929	0.590
4 or more					
Church membership	P=0.952				
No member		0.907	0.836	0.865	0.761
Protestant		0.969	0.946	0.919	0.860
Roman Catholic		0.899	0.823	0.859	0.752
Other					
Housing	P=0.993				
Independent		1.003	0.993	1.020	0.956
Residential home					
Feeling safe	P=0.646				
No		1.070	0.646	1.026	0.871
Yes					
Subjective health	P=0.701				
Excellent		1.040	0.882	1.015	0.956
Good		0.916	0.660	0.903	0.619
Fair		0.831	0.391	0.804	0.320
Sometimes good/bad or poor					

Notes: Total explained variance (R^2) of perceptions of remaining length of life with all determinants in the multivariate logistic regression model was 2.2 %.
P values for the chi square test: *significant on the p<0.01 level
**significant on the p<0.05level
***significant on the p<0.10 level

For all the variables, the last category is the reference category. For every category a comparison is made to this reference category. Males have a higher odds ratio on positive perceptions on remaining length of life than women. Men are 1.32 times more likely to be positive on remaining length of life. Their perceptions differ significantly of those of women. For the different age categories it seems the older one becomes, with exception of the 80-84 year old, the more likely it is to have positive perceptions, compared to the reference category of 85 years and higher. The assumption that the older people are, the more positive perceptions they have on their remaining length of life, is thereby not adopted. A decline in positive perceptions is shown for people aged 80 and over. However, only the age category 75-79 years shows a significant difference with the reference category. Never married elderly seem to have the most positive perceptions compared to the reference category of widowed elderly. Still there is no convincing evidence that marital status influences perceptions on remaining length of life. Dutch elderly with secondary or higher education have a little lower odds ratios of positive perceptions on remaining length of life compared to people with no or primary education. Still, there are no significant differences for the levels of education in influencing perceptions on remaining length of life. Less children gives less positive perceptions on remaining length of life, there is a lower odds ratio of positive perceptions for

having 1 to 3 children or no children. But the categories do not differ significantly; it seems the number of children does not influence the perceptions of elderly that much. Church membership has no influence on having positive perceptions or not. Also the different categories for housing show no difference in effect on perceptions on remaining length of life. This is also the case for feeling safe or not in the neighborhood in the evening. Elderly who perceive their health as excellent have an odds ratio of positive perceptions that is 15% higher than that of elderly who perceive their health as sometimes good/bad or poor. People with a subjective good or fair health show lower odds ratios than the reference category. Since the significance level is higher than 0.10, there is no convincing difference in perceptions on remaining length of life for the different self-perceived health categories.

5.1.4 Effect of selected possible confounding variables

From the bivariate and multivariate logistic analysis we expect that the variables which interact with the dependent and independent variables are sex and age. Indeed, sex shows again a significant effect when it is interacts with loneliness. But there is no effect of age on the relationship between loneliness and perceived remaining length of life.

Table 5.5 Perceptions of remaining length of life of Dutch elderly by loneliness and sex

Loneliness	Sex	No positive difference (%)	Positive difference (%)	N
Not lonely	Male	110 (21.7%)	397 (78.3%)	507
	Female	152 (27.4%)	402 (72.6%)	554
Moderate lonely	Male	44 (19.2%)	185 (80.8%)	229
	Female	62 (22.4%)	215 (77.6%)	277
Severe lonely	Male	4 (22.2%)	14 (77.8%)	18
	Female	9 (22.5%)	31 (77.5%)	40

From table 5.5 we see that the highest share of positive perceptions can be found back for elderly who feel moderate lonely. Males who are not lonely also have a great percentage of positive perceptions of remaining length of life, but women who are not lonely tend to have relatively more negative perceptions on remaining length of life. The category of severe lonely elderly shows about the same distribution for males and females on perceptions on remaining length of life.

Table 5.6 Results of the relationship between perceptions of remaining length of life of Dutch elderly, loneliness and sex

Interaction variables	Exp (B)	Sig.
Not lonely * male	1.238	0.107
Not lonely * female	0.704	**0.007**
Moderate lonely * male	1.442	0.047
Moderate lonely * female	0.924	0.637
Severe lonely * male	1	
Severe lonely * female	1	

Table 5.6 shows the results for the interaction effects in the logistic regression model. Males who are moderate lonely are 1.442 times as likely to have positive perceptions than males being severe lonely. Females being not lonely are almost 30% less likely to have positive perceptions on remaining length of life compared to females who are severe lonely.
Again, this table shows that males are in general more optimistic about their perceptions remaining length of life, both for being not lonely or moderate lonely. Females have for every

category of loneliness lower odds ratios of positive perceptions compared to males.
The less lonely males are, the more positive perceptions they have on their remaining length of life. This seems a logical outcome. On the other hand, women tend to have less positive perceptions when they are not lonely compared to women who are moderate or severe lonely. The question remains why women who do not feel lonely have significantly less positive perceptions on remaining length of life?

5.2 Negative perceptions on remaining length of life

5.2.1 Difference between subjective and real remaining length of life by background characteristics

As we take the negative difference perceptions as outcome value in the binary logistic regression model, it shows the following outcomes. Table 5.7 shows that in total, 7.1 % of the respondents have a negative difference between subjective remaining length of life and real remaining length of life. The other 92.9% seems to have not negative perceptions on their remaining age; that is having positive or equal perceptions. Females tend to have more negative perceptions on remaining length of life than males. The assumption that the older a person is, the more positive remaining length of life can largely be deducted from table 5.7. For the different age categories, especially the youngest age groups show high scores on negative perceptions. The oldest age group, people aged 85 and higher, tend to have almost no negative perceptions (only 0.5%). Elderly who are married have the highest percentage (8.1%) for a negative difference between subjective remaining age and real remaining age. Never married elderly show again the lowest percentage of negative perceptions, as it was hypothesized. People with the lowest level of education have relatively the most negative perceptions on their remaining length of life. With the attainment of a higher education level, the less negative perceptions on remaining length of life are shown. This was also stated in literature. Having no children gives, remarkably, the lowest percentage of negative difference between subjective and real remaining length of life. Roman Catholic elderly are the most negative about their remaining length of life. The categories for housing do not seem to differ very much and elderly feeling safe in the neighborhood, tend to have more negative perceptions on remaining length of lode than elderly who do not feel safe in the neighborhood in the evening. For subjective health we see the expected relation that elderly, who perceive their health the worst, show the most negative perceptions on remaining length of life.

Table 5.7 The difference between subjective and real remaining length of life by background characteristics of Dutch elderly

	Difference between subjective and real remaining length of life		
	Negative difference (%)	**No negative difference (%)**	**N**
Sex			
Male	6.4	93.6	767
Female	7.7	92.3	878
Age			
60-64	9.5	90.5	263
65-69	10.3	89.7	367
70-74	5.7	94.3	334
75-79	7.7	92.3	260
80-84	5.9	94.1	239
85 and higher	0.5	99.5	182
Marital status			
Never married	3.4	96.6	88
Married	8.1	91.9	939

Divorced	4.5	95.5	89
Widowed	6.4	93.6	529
Education level			
No education	11.7	88.3	137
Primary education	8.2	91.8	463
Secondary or higher education	6.0	94.0	1045
Children			
None	5.9	94.1	204
1 to 3	7.4	92.6	922
4 or more	7.1	92.9	519
Church membership			
No member	6.3	93.7	601
Protestant	7.0	93.0	540
Roman Catholic	8.2	91.8	477
Other	7.4	92.6	27
Housing			
Independent	7.1	92.9	1590
Residential home	7.3	92.7	55
Feeling safe			
Yes	7.5	92.5	314
No	5.7	94.3	1322
Subjective health			
Excellent	5.9	94.1	169
Good	6.7	93.3	889
Fair	7.1	92.9	411
Sometimes good/bad or poor	10.4	89.6	173
Total	**7.1**	**92.9**	**1625**

5.2.2 Relation between difference and social well-being of Dutch elderly

Table 5.8 shows that for the different categories of loneliness we see an inverse relationship that people that are severe lonely, show the fewest negative perceptions on remaining length of life. The less loneliness, the more negative differences are shown between subjective and real remaining length of life. This was not in the line of expectation. However, loneliness and perceptions on remaining length of life are not significantly related (p=0.258).

Table 5.8 The difference between subjective and real remaining length of life by the different categories of loneliness of Dutch elderly

	Difference between subjective and real remaining length of life			
Loneliness	**Negative difference (%)**	**No negative difference (%)**	**N**	**P value chi square test**
Not lonely	7.7	92.3	1061	
Moderate lonely	5.9	94.1	506	P=0.258
Severe lonely	3.4	96.6	58	

Table 5.9 Results of the relationship between perceptions of remaining length of life of Dutch elderly and loneliness

Loneliness	**Exp(B)**	**Sig.**
Not lonely	2.345	0.242
Moderate lonely	1.765	0.445
Severe lonely		

Table 5.9 shows that the less lonely Dutch elderly are, the higher the odds ratio is for having negative perceptions on remaining length of life, compared to elderly who are severe lonely.

This confirms the outcomes of table 5.8. People who are severe lonely seem to have less negative perceptions on remaining length of life than the other categories of loneliness. However, the relationship between perceptions on remaining length of life and loneliness is not significant.

5.2.3 Difference between subjective and real remaining length of life explained

Table 5.10 shows the outcomes for the chi square test and the logistic regression model on perceptions on remaining length of life and several selected background characteristics, but now for negative perceptions on the difference between subjective and real remaining length of life as the outcome variable. Again, the multivariate confirms in a high degree the outcomes of the bivariate analysis. From both bivariate and multivariate analysis age and education level show to be significantly related to perceptions on remaining length of life. Different from the cross tabulation, in the logistic regression good subjective health is significantly associated with perceptions on remaining length of life..

Table 5.10 Results of the relationship between perceptions of remaining length of life of Dutch elderly and background characteristics

	Bivariate analysis			**Multivariate analysis**	
	P value chi square test	**Exp(B)**	**Sig.**	**Exp(B)**	**Sig.**
Sex	P= 0.286				
Male		0.813	0.286	0.897	0.615
Female					
Age	P=0.001***				
60-64		19.093	0.004	26.472	**0.002**
65-69		20.842	0.003	28.950	**0.001**
70-74		10.952	0.020	13.839	**0.012**
75-79		15.021	0.008	18.695	**0.005**
80-84		11.262	0.020	13.280	**0.014**
85 and higher					
Marital status	P=0.213				
Never married		0.514	0.278	0.352	0.136
Married		1.282	0.245	1.063	0.806
Divorced		0.685	0.485	0.592	0.347
Widowed					
Education level	P=0.030**				
No education		2.061	0.015	2.463	**0.004**
Primary education		1.394	0.120	1.529	**0.062**
Secondary or higher education					
Children	P=0.754				
None		0.814	0.549	1.406	0.393
1 to 3		1.037	0.863	1.096	0.682
4 or more					
Church membership	P=0.707				
No member		0.844	0.822	0.776	0.742
Protestant		0.946	0.942	0.895	0.886
Roman Catholic		1.113	0.887	1.023	0.976
Other					
Housing	P=0.962				
Independent		0.975	0.962	0.415	0.138
Residential home					
Feeling safe	P=0.278				
No		1.331	0.279	1.219	0.483
Yes					
Subjective health	P=0.337				

Excellent		0.542	0.135	0.535	0.141
Good		0.623	**0.094**	0.563	**0.053**
Fair		0.654	0.177	0.630	0.157
Sometimes good/bad or poor					

Notes: Total explained variance (R^2) of perceptions of remaining length of life with all determinants in the multivariate logistic regression model was 7.6 %.
Notes: P values for the chi square test: *significant on the p<0.01 level
**significant on the p<0.05level
***significant on the p<0.10 level

We can say that the odds of having negative perceptions compared to not negative perceptions decrease by a factor of 0.897 by being male compared to a female (table 5.10). Males have fewer negative perceptions on remaining length of life than females, but the category male and female do not differ significantly on perceptions on remaining length of life. All the age categories compared to the reference age category 85 and higher show significant different and higher odds ratios for Dutch elderly having negative perceptions. This was expected from literature. This is mainly caused by the fact that the eldest age category shows a very low percentage of negative perceptions (only 0,5%) compared to the other age categories. There are no significant differences in influencing perceptions of remaining length of life for the different categories of marital status. Dutch elderly with no education show a higher odds ratio of negative perceptions of more than 2 compared to Dutch elderly with secondary or higher education. Dutch elderly having attained primary education are 1.5 times more likely to have negative perceptions on remaining length of life compared to Dutch elderly with secondary or higher education. Having less children gives more negative perceptions. One to three children shows a slightly difference with the reference category, which is four or more children. Roman Catholics show the most negative perceptions compared to the other categories of church membership. Noted is that the contrasts are not significant. Also the categories for housing do not differ significantly in influencing Dutch elderly their perceptions on remaining length of life. Elderly who do not feel safe in the neighborhood show a higher odds ratio on negative perceptions on length of life, still this relationship is not significant. The better one perceives its own health, the less likely it is to have negative perceptions on remaining length of life, compared to the reference category poor or sometimes good/bad health. Emphasized is that there is only a significant effect for Dutch elderly who perceive their health as good (p=0.053), measured on a 90% confidence interval.

5.2.4 Effect of selected possible confounding variables

From both bivariate and multivariate analyses on the relation on perceptions on length of life and loneliness we expect that the variables which significant interact with the dependent and independent variables are age, education and subjective health. From analyses it results that interactions are shown for age and education. The following tables show cross tabulations on the perceptions on remaining length of life, loneliness and the background characteristics age and education. Then the relationship between perceptions on remaining length of life and loneliness by age and education is measured. The reference category is for both the variables the highest category: severe lonely*85 and higher and severe lonely* secondary education.

Table 5.11 Perceptions of remaining length of life of Dutch elderly by loneliness and age category

Loneliness	**Age category**	**Negative difference (%)**	**No negative difference (%)**	**N**
Not lonely	60-64 years	18 (8.7%)	190 (91.3%)	208
	65-69 years	32 (11.9%)	237 (88.1%)	269
	70-74 years	14 (6.6%)	197 (93.4%)	211
	75-79 years	10 (6.5%)	143 (93.5%)	153

	80-84 years	8 (5.8%)	129 (94.2%)	137
	85 and higher	0 (0%)	83 (100%)	83
Moderate lonely	60-64 years	7 (14.6%)	41 (85.4%)	48
	65-69 years	5 (5.4%)	87 (94.6%)	92
	70-74 years	4 (3.7%)	104 (96.3%)	108
	75-79 years	9 (9.6%)	85 (90.4%)	84
	80-84 years	4 (4.5%)	84 (95.5%)	88
	85 and higher	1 (1.3%)	75 (98.7%)	76
Severe lonely	60-64 years	0 (0%)	5 (100%)	5
	65-69 years	0 (0%)	5 (100%)	5
	70-74 years	1 (7.7%)	12 (92.3%)	13
	75-79 years	0 (0%)	11(100%)	11
	80-84 years	1 (9.1%)	10 (90.9%)	11
	85 and higher	0 (0%)	13 (100%)	13

From table 5.11 it seems that the older people become, the less negative perceptions they have on their remaining length of life, for all the categories of loneliness. This is expected from literature. Even more in the highest age group (85 and higher) there are almost no negative perceptions on remaining length of life. In the category of not lonely elderly there is 0% negative difference values, for moderate lonely elderly this amount is 1.3% (one person) and again 0% for elderly who are severe lonely. Furthermore, Dutch elderly who are severe lonely do not seem to have negative perceptions on remaining length of life at all. For the biggest share, they have positive perceptions on their remaining length of life. This is not in line with our expectation. The question remains why people who feel severe lonely have such optimistic perceptions on remaining length of life.

Table 5.12 Results of the relationship between perceptions of remaining length of life of Dutch elderly, loneliness and age category

Interaction variables	**Exp (B)**	**Sig.**
Not lonely * 60-64 years	6.758	**0.002**
Not lonely * 65-69 years	9.632	**0.000**
Not lonely * 70-74 years	5.069	**0.012**
Not lonely * 75-79 years	4.988	**0.016**
Not lonely * 80-84 years	4.424	**0.030**
Moderate lonely * 60-64 years	12.179	**0.000**
Moderate lonely * 65-69 years	4.100	**0.057**
Moderate lonely * 70-74 years	2.744	0.192
Moderate lonely * 75-79 years	7.553	**0.003**
Moderate lonely * 80-84 years	3.397	0.114
Severe lonely * 85 and higher		

The logistic regression modeling confirms the relations from table 5.11 between perceived remaining length of life, loneliness and age of Dutch elderly. From table 5.12 we can see that for Dutch elderly who feel not lonely, all the age categories show significant higher odds ratios on having negative perceptions than elderly who are severe lonely and in the highest age category. Again, the younger people are the more negative perceptions they have on their remaining length of life. Dutch elderly feeling not lonely in all age categories, have significant more negative perceptions on remaining length of life than Dutch elderly who feel severe lonely in the age category 85 and higher. Also Dutch elderly in the age categories 60-64 years, 65-69 years and 75-79 years, have higher odds on negative perceptions on remaining length of life. This seems reasonable, where from literature and previous research it was hypothesized that the younger people are the more negative perceptions on remaining length of life they would have. For loneliness we do not see the expected relationship that the more lonely people are, the more negative perceptions they have on remaining length of life.

Table 5.13 Perceptions of remaining length of life of Dutch elderly by loneliness and education

Loneliness	Education level	Negative difference (%)	No negative difference (%)	N
Not lonely	No education	12 (12.6%)	83 (87.4%)	95
	Primary education	24 (8.5%)	259 (91.5%)	283
	Secondary or higher education	46 (6.7%)	637 (93.3%)	683
Moderate lonely	No education	3 (8.1%)	34 (91.9%)	37
	Primary education	10 (6.9%)	135 (93.1%)	145
	Secondary or higher education	17 (5.2%)	307 (94.8%)	324
Severe lonely	No education	0 (0%)	4 (100%)	4
	Primary education	2 (7.4%)	25 (92.6%)	27
	Secondary or higher education	0 (0%)	27 (100%)	27

The more education Dutch elderly who are not lonely have, the less negative perceptions on remaining length of life they have. This is the same for the category of moderate lonely elderly; the higher the level of education, the more not negative perceptions on remaining length of life. The category of severe lonely elderly show something different. For almost every respondent in this category, a not negative difference between subjective remaining length of life and real remaining length of life is perceived. Only two respondents which attained primary education seem to have negative perceptions on remaining length of life.

Analyzing the interaction between loneliness and education, it becomes clear less education and less loneliness show higher odds ratios on having negative perceptions on remaining length of life. For the category Dutch elderly with no education, this differs significantly ($p=0.017$). Taking severe lonely and secondary education as the reference category, it seems that people who are not lonely and did not have education have significant higher odds of perceiving a negative difference between their subjective and real remaining length of life (table 5.14). This confirms the outcomes of table 5.13, because of the fact that severe lonely people have less negative perceptions and more education also gives less negative perceptions. It seems interesting to understand why severe lonely elderly do not perceive a negative difference between subjective and real remaining length of life, whereas this was expected.

Table 5.14 Results of the relationship between perceptions of remaining length of life of Dutch elderly, loneliness and education

Interaction variables	Exp (B)	Sig.
Not lonely * no education	2.224	**0.017**
Not lonely * primary education	1.426	0.154
Moderate lonely * no education	1.357	0.620
Moderate lonely * primary education	1.140	0.710
Severe lonely * secondary education		

6 Conclusion

This chapter finalizes this study by providing the main findings. First the most important results are stated. There is tried to explain the outcomes, by referring to theories and literature on subjective age and loneliness. Next a reflection on the used methods and data obtained from the LASA data collection is provided. The final section tends to provide recommendations for policy implementation and further research.

6.1 Main conclusions

In this thesis different types of logistic regression have been applied, in order to answers the main research question: What is the relation between perceptions of remaining length of life and social well-being of Dutch elderly and how can this relation be understood? In order to answer this main question the four sub questions are discussed, for both the multinomial and binomial model.

In the multinomial model, three categories of perceptions of remaining length of life of Dutch elderly were analyzed; negative, equal and positive perceptions. It showed that 7.1% of the respondents have negative perceptions on their remaining length of life. A share of 16.5 % of the Dutch elderly perceives their subjective remaining length of life about the same as their real remaining length of life. Elderly with positive perceptions, that is perceiving a higher subjective remaining length of life than their real remaining length of life count for 76.4%. On average Dutch elderly perceive themselves as having 16 years more left in life than their real remaining life expectancy. Related to the difference between subjective remaining length of life and real remaining length of life, we did not see the expected relationship that the more lonely Dutch elderly are, the more negative values for this difference. Elderly who feel severe lonely show compared to the other categories of loneliness the less negative perceptions on their remaining length of life. Only 3.4% of the severe lonely elderly perceive their remaining subjective age lower than their real remaining age.
Analyzing the relationship between perceptions on remaining length of life and loneliness, it resulted that *Dutch elderly who are not or moderate lonely have as well more negative as positive perceptions than equal perceptions compared to elderly who are severe lonely.* Still, there was no significant relation between perceptions on remaining length if life and loneliness. The level of loneliness of Dutch elderly is not significantly related to the separation of the different categories of perceptions on remaining length of life.
From theory, health variables were expected to have the most positive effect on perceptions on remaining length of life. Indeed, the better Dutch elderly perceive their health, the less likely they are to have negative perceptions compared to equal perceptions. Furthermore, the confounding variables showing a relation with perceptions on remaining length of life are sex, age and education.
There are no interactions between perceptions on remaining length of life, loneliness and the selected possible confounders. It showed that there is a relationship between perceptions on remaining length of life of Dutch elderly and subjective health by age category and the level of education. Subjective health of Dutch elderly seems to have more effect than loneliness. From literature, health is also considered as being a main factor influencing perceptions on age and is also strongly related to loneliness. There is shown a significant interaction for the categories of excellent health with the age categories 65-69 years and 70-74 years in having positive perceptions on remaining length of life. This can be considered as logical from the bivariate analysis on self perceived health and age with perceptions on remaining length of life. A remarkable outcome is shown for the interaction of subjective health with education level. Dutch elderly perceiving a fair health with no education seem to have significantly more positive perceptions compared to equal perceptions.

To gain more insight in these results, next to the analysis with the three categories of perceptions of remaining length of life an analysis was conducted with two categories of perceptions on remaining length of life. In this second analysis positive perceptions on remaining length of life are the outcome variable. Like in the multinomial analysis, 76.4% of the respondents have positive perceptions on their remaining length of life. Another 23.6% shows not positive (but negative or equal) perceptions on the difference between their subjective remaining and real remaining age.
It resulted that there was no significant relationship between perceptions on remaining length of life and loneliness. It did give a remarkable outcome that *Dutch elderly who are not lonely are less likely as elderly who are severe lonely to have positive perceptions on remaining length of life. Elderly who feel moderate lonely have slightly higher odds of positive perceptions on remaining length of life than elderly who feel severe lonely.*
Testing the relationships between perceptions on remaining length of life and the background characteristics of Dutch elderly, significant relations were shown for sex and age. Sex shows again a significant effect when it interacts with loneliness. The less lonely males are, the more positive perceptions they have on their remaining length of life. Women tend to have less positive perceptions when they are not lonely compared to women who are moderate or severe lonely.

The third analysis was conducted for negative perceptions on remaining length of life as outcome variable. As in the first model, 7.1 % of the respondents show a negative difference between subjective remaining length of life and real remaining length of life. The other 92.9% seems to have not negative perceptions on their remaining age. It showed that *the less lonely Dutch elderly are, the more negative perceptions on length of life they have, compared to elderly who are severe lonely. People who are severe lonely seem to have less negative perceptions on remaining length of life than the other categories of loneliness.* More loneliness gives less negative perceptions on remaining length of life. From the stated hypotheses, this was not expected. For loneliness we do not see the expected relationship that the more lonely people are, the more negative perceptions they have on remaining length of life.
For the background characteristics of Dutch elderly, age, education and subjective health effect perceptions on remaining length of life. The stated hypothesis was confirmed that the younger people are, the more negative perceptions on remaining length of life they have. The better one perceives its own health, the less likely it is to have negative perceptions on remaining length of life. Still there is only a significant effect for Dutch elderly who perceive their health as good.
Furthermore, the significant background characteristics of age and education that showed a relationship with perceptions on remaining length of life, also seemed to have effect on the relationship between perceptions on remaining length of life and loneliness. It resulted that the older people become, the less negative perceptions they have on their remaining length of life, for all the categories of loneliness. A striking outcome is that for almost every age category, *Dutch elderly who are severe lonely do not seem to have negative perceptions on remaining length of life at all.*
For the biggest share, elderly who are severe lonely have positive perceptions on their remaining length of life. This is -again- not in line with our expectation.
Elderly with less education and less loneliness show higher odds ratios on having negative perceptions on remaining length of life. For the category Dutch elderly with no education, this differs significantly. Severe lonely people have less negative perceptions and more education also gives less negative perceptions. For education this was expected from literature, but for loneliness this remains a remarkable outcome.

6.2 Discussion

Most respondents show positive perceptions on their remaining length of life. It can be concluded that in both the multinomial logistic model and the two binary models there were no direct relationship found between perceptions on remaining length of life and loneliness. We found that the less lonely Dutch elderly are, the more negative perceptions on length of life they have, compared to elderly who are severe lonely. The expected relationship between perceptions on remaining length of life and social well-being was thereby not confirmed. In the multinomial model we looked further in analyzing the relationship between perceptions on remaining length of life and subjective health. If we treated both negative perceptions and positive perceptions on remaining length of life as an outcome variable in the binary logistic models, it resulted as well that there was no direct relationship between perceptions on remaining length of life and loneliness. Also for the binomial model with negative perceptions as outcome variable, the included health factor -subjective health- seemed to be a better factor in explaining perceptions on remaining length of life of Dutch elderly.
However, in these binomial analyses there were significant relationships found between perceptions on remaining length of life and loneliness when this relationship was controlled for the possible confounding variables. Interactions were shown for loneliness and sex in the model with positive perceptions as an outcome variable. The negative perceptions model showed an interaction for loneliness with age and education level in influencing perceptions on remaining length of life. The relationship between perceptions of remaining length of life and social well-being can been understood by sex, age and education level of Dutch elderly. Therefore the stated hypothesis is partly confirmed. Marital status and subjective health did not have its effect on the relationship between perceived remaining length of life and loneliness.

From the results stated in this chapter we noticed furthermore that there are some remarkable outcomes. The outcomes of this study bring us to some remaining questions. Why do people who feel severe lonely have such optimistic perceptions on remaining length of life? Why do Dutch elderly perceiving a fair health with no education seem to have significantly more positive perceptions compared to equal perceptions? Why do women who do not feel lonely have significantly less positive perceptions on remaining length of life?

Many of these results are difficult to understand. It seems that these outcomes merely result from the fact that severe lonely elderly have the most positive perceptions on remaining length of life. This can be understood by the theories on coping. Elderly can tackle their feelings of loneliness by the use of several types of coping behavior or coping strategies. A coping strategy is ‘a general tendency to use a special method to deal with a stressful occurrence’ (Horchner et al., 2002, cited by Baarsen, 2002). Elderly tend to enhance self-protecting coping strategies, for example, by ‘dampening’ negative experiences (Lawton, 1996, cited by Baarsen, 2002). As their sources of stress change, they may change their coping strategies to stay involved in life. Coping behavior can be the main cause of not seeing the expected relationship that the more lonely people are, the more negative perceptions they have on remaining length of life. Not many people perceive feelings of severe loneliness. It seems that this feelings of loneliness and worse self-perceived health are tackled. The elderly who do feel severe lonely change their coping strategy in reporting they think they have a long time left in life. In this way, they stay involved in life.

Not only for loneliness, but also in the aging process in general coping strategies are involved. Different researcher tended to suggest that the increasing discrepancy between subjective age and real age is generally regarded as an age-denial view that becomes most pronounced in old

age (Barak, Mathur, Lee and Zhang, 2001; Peters, 1971; Ward, 1977; cited by Rubin and Berntsen, 2006). In this way elderly adjust to growing older, in rejecting the label ‘elderly' and reporting a younger subjective age than actual age which accelerates with becoming older. This is for instance shown in elderly aged 85 and over showing the lowest amount of negative perceptions on remaining length of life compared to the other age categories.

Another explanation can be found in the subjective experience of loneliness. The cognitive discrepancy model by Perlman and Peplau (1997) emphasizes the perceived discrepancy between actual and desired levels of contact. Loneliness is a subjective concept in the way that a person can perceive feelings of loneliness and may be surrounded by many people. An individual can have a large social network but may still feel lonely (Perlman, 2003; Savikko et al., 2005). People might be surrounded by many others, but still report feeling severe lonely. Many of their relatives and even their spouse can still be alive. For example they can have older brothers and sisters, and think they will also reach a high age. Feeling lonely, their perceptions on aging can still be positive.

6.3 Reflection on the data and methods

In the research process, always choices have to be made in order to conduct the research. In the study on the relationship between the difference in subjective remaining length of life and real remaining length of life and social functioning of Dutch elderly, decisions of the researcher may influence the outcomes of study.
In this research, the subjective age lifeline variable (dlifeline) was the first point of discussion. Some of the respondents perceived themselves as becoming 5000 years, and therefore a cut-off point was set. Questioned was whether every respondent in the LASA database properly understood the subjective age lifeline question. Decided was to leave the values for dlifeline up until 0.4 out of analysis. This decision will certainly influence the results of this study.
Furthermore, the choice of background characteristics (possible confounders) may have influenced the outcome of study. Barak and Stern (1986) already noticed that conflicting evidence may be caused by methodological or sample differences. The size of a sample can also influence the results of study. Where the LASA data collection included many more variables on the background of Dutch elderly, a choice has been made on several of these background characteristics which were mainly described in theory and literature on subjective age and loneliness. Therefore not a complete overview of background characteristics is provided and there might be patterns remained undiscovered. For instance, income is a factor that might also influence the perceptions on remaining length of life and social well-being of Dutch elderly. Here, further research is needed.
Several relationships between the possible confounding variables and perceived remaining length of life were detected. However, in many of the conducted analyses, the R square was small and much of the variability remained unexplained. This is also due the fact that not every single variable can be studied and (probable) important variables are left out of analysis.

In this thesis, several analytical techniques have been applied in order to gain a broad insight in the relationship between perceptions on remaining length of life and social well-being of Dutch elderly. In the former section it is shown that this has lead to differences in results on the relationship between perceptions on remaining length of life of Dutch elderly and their level of loneliness. This is mainly caused by the differences in the multinomial and binary logistic regression techniques. In a multinomial logistic regression model it in only possible to make a comparison between two of the three categories. Separately a comparison is made between negative and equal perceptions on remaining length of life and between positive and equal perceptions on remaining length of life. The outcomes seemed to be largely dependent

on the values of the comparison category, in this case the equal perceptions category. It resulted several times that a category for Dutch elderly (e.g. for loneliness, the different age categories and having children) showed as well more negative as more positive perceptions compared to equal perceptions. In order to avoid this 'bias' in results, binary logistic regression was applied. In binary logistic regression model, it is only possible to make comparisons between two categories (i.e. negative or positive) perceptions. Therefore two of the three categories were combined in order to make a comparison between these categories. Positive perceptions are compared to equal and negative perceptions together and negative perceptions are compared to equal and positive perceptions combined. We know the application of these different techniques gives differences in the results and the interpretation of these results.

6.4 Recommendations for policy implication and further research

This study examined the relationship between perceptions on remaining length of life and social well-being of Dutch elderly. To our knowledge, the relation between these concepts was never studied before in the Netherlands. However, this study was solitary a quantitative study. It has been accomplished by the use of secondary data, provided by the Longitudinal Aging Study Amsterdam. This data was already gathered and combined. To gain even more insight in the results, other techniques of data collection should be used. It would be interesting to conduct further research on several outcomes, for instance why these severe lonely elderly perceive positive perceptions on their remaining length of life. Can this indeed be explained by coping strategies? Therefore qualitative techniques ought to be applied. For instance in-depth interviews with elderly on specific remaining questions could be held.

In the next decades more and more attention has to be paid to the aging of society and the thereby increasing loneliness. In 2040 the Netherlands is inhabited by more than four million elderly; people with the age of 65 or higher. Savikko et al. (2001) already noticed that research on loneliness in old age is of main importance. Such research can be used to develop interventions aimed at a more positive aging experience and greater well-being in later life. More insight on the experience of aging and the effect of loneliness on this experience can contribute to successful aging in society (Steverink et al., 2005). The objective of the used LASA framework is by using longitudinal data, policy relevant aspects of aging can be identified and new policy aims can be developed. This study tends to contribute to the objective of the LASA in focusing on loneliness as a predictor of the aging experience. Nowadays policies on the elderly are mainly focused on overall well-being or quality of life. In the future policies on the elderly can then be more directed on loneliness, where loneliness seems to become one of the main problems among elderly in society.

Still further research is needed on the relationship between perceptions on remaining length of life and loneliness and the way this relationship is influenced by other variables. This research might be a first step into that direction.

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