THE RELATION BETWEEN HEALTH AND WELLBEING

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Happiness, therefore, must be some form of contemplation. But, being a man, one will also need external prosperity; for our nature is not self-sufficient for the purpose of contemplation, but our body must also be healthy, and have food and other attention. Still, we must not think that the man who is to be happy will need many things or great things, merely because he cannot be blessed without external goods; for self-sufficiency and action do not depend on excess, and we can do noble acts without ruling earth and sea; for even with moderate advantages one can act excellently.

—Aristotle, *Nicomachean Ethics*, Book X, 1178b 32–35, 1179a 1–5

Abstract

This study examined health measures and wellbeing. Aim of the study was to examine the relation between different forms of physical health, knowing the diagnosed condition, self-rated health, health limitations, care consumption and life style, and emotional, social and psychological wellbeing. The study draws on data of a representative panel (Longitudinal Internet Studies for the Social Sciences of CentERdata). 1599 Dutch adults (ages 18-87) filled out the MHC-SF, a health questionnaire and a social integration and leisure questionnaire. The study used ANOVA, correlation, and regression analysis. The results indicate that there was a negative correlation between physical health and wellbeing. The correlation between the health measures and emotional wellbeing was the largest. Except for life style, emotional wellbeing had the highest coherence with the health measures. The largest differences of means within the different forms of wellbeing were found in the self-rated health. This means that the differences in emotional wellbeing are the largest within the self-rated health, compared to the other health measures, thus between a bad and an excellent self-rated health. The results of the regression analysis showed the same, self-rated health independently adds significantly to all forms of wellbeing. This is the only measure of health that added significantly to all forms of wellbeing, whereas health limitations added significantly to only emotional wellbeing, and lifestyle to social wellbeing. This showed that self-rated health is the most important health measure related to the different forms of wellbeing. In conclusion, emotional wellbeing has shown to be the most important form of wellbeing and self-rated health is the health measure with the highest correlation. However, the other forms of wellbeing should be considered as well in future research, as they were found to be significantly correlated as well to the different health measures.

Samenvatting

Deze studie heeft onderzoek gedaan naar gezondheidsmaten en het welbevinden. Het doel van de studie was het onderzoeken van de relatie tussen verschillende vormen van fysieke gezondheid, wetende de gediagnosticeerde aandoening, de ervaren gezondheid, de gezondheidsbelemmering, de zorgconsumptie en de levensstijl en het emotioneel, sociaal en psychologisch welbevinden. De studie gebruikt data uit een representatief panel (longitudinal Internet Studies for the Social Sciences of CentERdata). 1599 Nederlandse volwassenen (leeftijd 18-87) hebben de MHC-SF, een gezondheidsvragenlijst en een sociale integratie en vrijetijdsvragenlijst ingevuld. De studie heeft een ANOVA, correlatie analyse en een regressie analyse uitgevoerd. De resultaten indiceren een negatieve correlatie tussen fysieke gezondheid en het welbevinden. De correlatie tussen de gezondheidsmaten en het emotioneel welbevinden was het grootst. Met uitzondering van de levensstijl had het emotioneel welbevinden de hoogste samenhang met de gezondheidsmaten. De grootste verschillen in gemiddelden tussen de verschillende vormen van welbevinden is gevonden in de ervaren gezondheid. Dit betekent dat de waardes van het emotioneel welbevinden, in vergelijking met de andere gezondheidsmaten, het meest verschillen binnen de ervaren gezondheid, dus tussen een slechte en een uitstekende ervaren gezondheid. De resultaten van de regressie analyse laten hetzelfde zien, de ervaren gezondheid heeft onafhankelijk van de andere variabelen invloed op alle vormen van welbevinden. Dit is de enige gezondheidsmaat die dit laat zien, de gezondheidsbelemmering heeft onafhankelijk invloed op alleen het emotioneel welbevinden en de levensstijl op het sociaal welbevinden. Dit laat zien dat de ervaren gezondheid de meest belangrijke gezondheidsmaat is in relatie tot de verschillende vormen van welbevinden. Concluderend laat deze studie zien dat het emotioneel welbevinden de belangrijkste vorm van welbevinden is en dat de ervaren gezondheid de gezondheidsmaat is met de hoogste correlaties. Echter moeten de overige vormen van welbevinden wel meegenomen worden in vervolgonderzoek, deze blijken ook significant gecorreleerd aan de verschillende gezondheidsmaten.

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Introduction

The present study examines the relation between health and wellbeing. This paper will first discuss wellbeing, thereafter different forms of health and this introduction will conclude with hypotheses and a research question. The procedures and used materials will be discussed in the method. The results and the related conclusions will follow afterwards. This paper will conclude with the strengths and limitations of the study and it will give implications for future research and practice.

Often, mental health is seen as the absence of symptoms or disease. Partly due to the development of the Diagnostic and Statistical Manual of Mental Disorders (DSM), the emphasis nowadays is on the medical model, in which disease is central. As opposed to this view, Westerhof and Bohlmeijer (2010) claim that in mental health there are three major components; emotional functioning, self-realization and social integration. The past years, the 'good life' has become more important. Seligman's (2012) says a 'good life' is an enjoyable, involved and meaningful life. The definition of the World Health Organization (WHO) focuses on the multidimensional character of positive mental health. They say mental health is not just the absence of mental disorder. It is defined as a state of wellbeing in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community (World Health Organization, 2009). Various studies show that a higher level of wellbeing predicts higher income (Diener, Nickerson, Lucas & Sandvik, 2002; Marks & Fleming, 1999), a better health (Danner, Snowdon & Friesen, 2001) and the experience of different positive events (Magnus & Diener, 1991). In the (research)field of positive psychology, the concept of positive mental health includes three concepts, knowing emotional or subjective wellbeing, psychological wellbeing and social wellbeing. For this reason, this study will focus on these three forms of wellbeing.

Emotional or subjective wellbeing

Emotional wellbeing consists of a person's cognitive and affective evaluation of his or her life as a whole. This includes emotional reactions to events as well as cognitive judgments of satisfaction and fulfillment. It is a broad concept that includes experiencing high levels of pleasant emotions and moods, low levels of negative emotions and mood and a high life satisfaction (Argyle, 2001). Wilson (1967) stated that a happy person in general is well-paid,

young, educated, religious and married. Diener, Suh, Lucas and Smith (1999) emphasize that the happy person is blessed with a positive temperament, looks on the bright side of things, and does not ruminate excessively about bad events. Furthermore a happy person should be living in an economically developed society, has social confidants, and possesses adequate resources for making progress toward valued goals.

Psychological wellbeing

The meaning of positive psychological functioning is addressed by extensive theoretical literature, including Maslow's conception of self-actualization, Roger's view of the fully functioning person, Jung's formulation of individuation and Allport's conception of maturity (Maslow, 1969; Rogers, 1961; Jung, 1933; Von Franz, 1964; Allport, 1961). Also Erikson's psychosocial stage model, Buhler's basic life tendencies that work toward the fulfillment of life and Neugarten's descriptions of personality change in adulthood and old age are included in the literature addressing psychological wellbeing (Erikson, 1959; Buhler, 1935; Buhler, 1968; Neugarten, 1968; Neugarten, 1973). Jahoda (1958) replaced definitions of mental health as the absence of illness by her positive criteria of mental health, which also offered extensive descriptions of what it means to be in good psychological health. Ryff and Singer (1996) reviewed the characteristics of wellbeing as described in previously mentioned sources. It became apparent that many theorists were writing about similar features of positive psychological functioning. These theories constitute the six core dimensions of the model of psychological wellbeing of Ryff and Singer (1996). The individual's sense of self-acceptance is the first; it is defined as a central feature of mental health as well as characteristic of self-actualization, optimal functioning and maturity. Holding positive attitudes toward oneself emerges as a central characteristic of positive psychological functioning. The second dimension is the ability to love, having strong feelings of empathy and affection for all human beings and being capable of greater love, deeper friendship and identification with others. The importance of positive relations with others is repeatedly stressed in conceptions of psychological wellbeing (Ryff & Singer, 1996). Autonomy is the third dimension; the fully functioning person can be described as having an internal locus of evaluation, not looking to others for approval but evaluating oneself by personal standards. The process of turning inward in the later years is also seen by life-span developmentalists to give the person a sense of freedom from the norms governing everyday life. The individual's ability to choose or create environments suitable to his or her psychological conditions is defined as the fourth characteristic of mental health. Active participation and mastery of the environment are

important features in an integrated framework of positive psychological functioning. The fifth dimension is having a purpose in life. A positive functioning person has goals, intentions, and a sense of direction, all of which contributing to the feeling that life is meaningful. The sixth and last dimension is personal growth, developing one's potential, to grow and expand as a person (Ryff & Singer, 1996).

Social wellbeing

Individuals are enclosed in social structures and communities, and face numerous social tasks and challenges. According to Keyes (1998) social wellbeing is the appraisal of one's circumstance and functioning in society. Based on his study concerning social wellbeing, he claims that social wellbeing consists of five dimensions: social integration, social contribution, social coherence, social actualization, and social acceptance. Social integration is the extent to which people feel that they have something in common with others who constitute their social reality/neighborhood, as well as the degree to which they feel that they belong to their community and society. Individuals who illustrate social acceptance trust others, think that others are capable of kindness, and believe that people can be industrious. Socially accepting people hold favorable views of human nature and feel comfortable with others (Horney, 1945). People who feel good about their personalities and accept both the good and the bad aspects of their lives exemplify good mental health (Fey, 1955; Ryff, 1989). Social contribution is the evaluation of one's social value. This includes the belief that the person is a vital member of society, with something of value to give to the world. It resembles the concepts of efficacy and responsibility. Social actualization is the belief in the evolution of society and the sense that society has potential which is being realized through its institutions and citizens. Last but not least, social coherence, which is the perception of the quality, organization, and operation of the social world. It includes a concern for knowing about the world (Keyes, 1998).

In conclusion, wellbeing can be divided in emotional, social and psychological wellbeing.

Physical health

Wellbeing can be influenced by, among others, genetics, environmental influences, individual skills, family and relationships, material resources and also by physical health (Nath & Pradhan, 2012; Kendler, Myers, Maes & Keyes, 2011; Archontaki; Lewis & Bates, 2013). This study investigates if there is a relation between the different forms of wellbeing and physical health, because there seems to be a strong relation but still a lack of literature.

Lamers (2012) found a negative correlation between physical health and emotional wellbeing. Physical health is seen as the prevalence of a (chronic) disease (Lamers, 2012). Health and wellbeing seem to influence each other in several ways. It is clear that a physical disease has widespread effects. There are a few studies that report on the relation between physical health and wellbeing. Among others, the disease itself determines the quality of life (Morrisson & Bennett, 2010). A study shows that physical health and emotional wellbeing are found to be positively and significantly related (Okun, Stock, Haring & Witter, 1984). Analysis showed that, in an adolescent population, those who reported greater physical activity also reported less stress and lower levels of depression (Norris, Carroll & Cochrane, 1992). Yakovlev and Leguizamon (2012) also found that amongst others, physical health is a strong predictor for emotional wellbeing. Other studies show that wellbeing is positively associated with a better physical health (Diener & Chan, 2011; Howell, Kern & Lyubomirsky, 2007; Lyubomirsky, King & Driener, 2005). Howell, Kern and Lyubomirsky (2007) emphasized that wellbeing was found to be positively related to both short-term physical health outcomes and long term physical health outcomes, and disease or symptom control. Besides, they report that the effect of emotional wellbeing on physical health is not merely due to the fact that ill-being has a harmful impact on health, but also to wellbeing having a beneficial impact on physical health. Positive feelings predict longevity and physical health beyond negative feelings. Prospective longitudinal studies of normal populations provide evidence that several types of emotional wellbeing predict physical health and longevity (Diener & Chan, 2011). Positive wellbeing is related to physical health, aspects of wellbeing such as happiness and optimism are related to longer life, decreased risk of illness and to increased resistance to illness (Lyubomirsky, King & Diener, 2005; Veenhoven, 2008). From this point on, this study will refer to physical health as health.

There are several ways to measure health. Most studies use measures as physical exercise (Crytzer, Dicianno & Kapoor, 2013; Biddle, 1995), health limitations (Wells, Avers & Brooks, 2012; Ditto, Druley, Moore, Danks & Smucker, 1996), the pure diagnosed condition (Lane, Carroll, Ring, Beevers & Lip, 2002), the use of addictive substances, such as smoking and drinking (Morrisson & Bennett, 2010), health care utilization (Kim, Park, Sun, Smith & Peterson, 2013; Al-Windi, Dag & Kurt, 2002), energy level, symptoms and the evaluation of their health (Belloc, Breslow & Hochstim, 1971; Chamberlain et al., 2013; Jette, 1993). Studies that examined the relation between health and wellbeing mostly used the diagnosed condition, health limitations or self-rated health as health measures. Lamers, Westerhof,

Bohlmeijer & Keyes (in press) investigated the association of age with psychopathology and emotional, social and psychological wellbeing, controlling for potential confounding effects of physical health. They used physical diseases, functional limitations and subjective health as health measures. They found that these three measures of physical health were significantly correlated with emotional wellbeing, as well as with psychological wellbeing. They found that only subjective health was significantly correlated to social wellbeing. Subjective health had the highest correlation with the three forms of wellbeing, and emotional wellbeing had the highest correlation with the three health measures.

Yet most studies regarding to health and wellbeing only focus on one health measure, such as the limitations of the physical health or the diagnosed condition. To fill in this gap, this study chose to work with five health measures to get an overall view on the different forms of health. This also enables us to compare the health measures with each other. Like Lamers, Westerhof, Bohlmeijer & Keyes (in press) this study uses health limitations, the diagnosed condition and the self-rated health. These are measures that are also used in many studies which examined the relation between health and wellbeing. Because of the desire to get a broader picture, care consumption is also investigated, like Kim, Park, Sun, Smith & Peterson (2013) did. This also applies to people's lifestyle, which is investigated by inter alia Fox (1999), Morrison & Bennett (2010) and Biddle (1995). The five ways health will be measured will be explained in the following paragraph.

Measures of health

In this study health is distinguished in five separate ways of measuring, all of them are self reported. There is the diagnosed condition, this includes the diagnoses of illnesses and diseases. There is the self-rated health in which respondents rate the quality of their health. Third and fourth is the degree of health limitations and the care consumption. The last health measure is the measurement of a respondents' life style. This study aims to look at whether there are differences between these health measures, as this could benefit further research and practice. This will be covered in the conclusion and discussion. First, the different ways of measuring health will be explained below.

Diagnosed condition

Most surveys show that reactions on cancer diagnoses are severe and strongly emotional (O'Connor, Wicker & Germino, 1990). Negative emotional reactions are also common among patients dealing with the diagnoses of a heart disease or a stroke (Lane, Carroll, Ring, Beevers

& Lip, 2002; Astrom, 1996; Hosking, Marsh & Friedman, 1996). Morrison and Bennett (2010) say that illnesses may lead to anxiety and depression, this is seen as a 'normal' biological response to a life-threatening disease. The biological response of anxiety and depression is not normal and healthy anymore when it is a long-term illness. They state that the quality of life is among others determined by the diagnoses, the quality of life can be seen as emotional wellbeing (Morrison & Bennett, 2010). George and Landerman (1984) report that objective health ratings are weakly and not significantly correlated with measures of emotional wellbeing. Okun & George (1984) found that physician-rated health is weakly correlated with emotional wellbeing. Physician-assessed health exhibits weaker and less robust associations with emotional wellbeing, than does the self-rated health (George & Landerman, 1984). There is no information available about the relation between the diagnosed condition and psychological and social wellbeing.

Self-rated health

A well-known disease model is the self regulation model of illness and illness behavior that is formulated by Howard Leventhal and colleagues. In this model, illness cognitions are defined as the own, implicit, common sense believes of the patient towards his illness, this can be seen as the self-rated health (Leventhal, Meyer & Nerenz, 1980; Leventhal, Diefenbach & Leventhal, 1992). According to this model, mental representations provide a framework for dealing with and understanding illnesses and to help people recognize illnesses. Illness representations are created once a person experiences a symptom or receives a diagnosed condition. The mind is creating a way to comprehend the current situation, this is done by comparing schemes of previous illnesses (Petrie & Weinman, 2003). There are five consistent themes in the content of illness representations, knowing identity, consequences, cause, duration, and curability/manageability (Lau, Bernard & Hartman, 1989; Leventhal, Meyer & Nerenz, 1980). There can be individual differences between the content and the organization of illness representation dimensions; they can even differ within the same individual in the course of time (Goldman, Whitney-Saltiel, Granger & Rodin, 1991). Findings from thirty-seven replications in seven surveys suggest a moderate and robust relationship between self-rated health and emotional wellbeing (George & Landerman, 1984). Okun, Stock, Haring & Witter (1984) performed a meta-analysis of the relation between self-reported health and emotional wellbeing. The meta-analysis revealed a mean correlation of 0.32. Okun & George (1984) state that self-rated health is the strongest predictor of emotional wellbeing during adulthood. Their study resulted that self-rated health is significantly correlated with emotional

wellbeing. No information has been found relating self-rated health in relation to psychological and social wellbeing.

Health limitations

For some individuals, the inability to perform beloved activities due to limitations or disabilities may be considered a ‘fate worse than death’ (Ditto, Druley, Moore, Danks & Smucker, 1996). Others however will value their life as valuable and meaningful, even though they are disabled or have limitations (Morrison & Bennett, 2010). Study shows (Schor, Lerner & Malspeis, 1995) that the majority of physicians rarely or never ask about the extent to which patients’ health limits their ability to perform everyday activities, neither do they inquire about limitations imposed by emotional problems. They are more likely to make such inquiries in the presence of a chronic illness or a diminished health status. Such assessment remains the exception to usual practice and a large part of functional impairment is undiscovered. More than 60% of the respondents wanted their physicians to assess their functional health status and wellbeing (Schor, Lerner & Malspeis, 1995). No matter which chronic condition a person has, it tends to be associated with adverse effects on most aspects of functioning and wellbeing (Stewart, Greenfield, Hays, Wells, Rogers, Berry, McGlynn & Ware, 1989). Ditto, Druley, Moore, Danks & Smucker (1996) state that for any given health state, evaluations for the quality of life were more negative the more the state was perceived by individuals as likely to interfere with engagement in their valued life activities. Satisfaction with abilities was associated with psychological wellbeing only among those who viewed the abilities being evaluated as very important (Blalock, DeVellis, DeVellis, Giorgino, Sauter, Jordan, Keefe & Mutran, 1992). There is no information about the relation between health limitations and social wellbeing.

Care consumption

Kim, Park, Sun, Smith & Peterson (2013) studied whether higher life satisfaction was associated with fewer doctor visits. They found that higher life satisfaction was indeed associated with fewer doctor visits. The most satisfied respondents of their study made 44% fewer doctor visits than did the least satisfied respondents. Al-Windi, Dag & Kurt (2002) studied the influence of perceived wellbeing and reported symptoms on health care utilization. They found that subjects who reported low scores for perceived health/wellbeing and sleep had significantly more appointments with a physician than did subjects reporting high scores. The effect of perceived health was independent of symptom reporting on health care utilization. Perceived health has been found to be strongly associated with health care

utilization, morbidity and mortality (Miilunpalo, Vuori, Oja, Pasaueu & Uprponen, 1997). Bowling (1989) reported that subjects who had not consulted their physician had fewer physical and mental symptoms and better emotional wellbeing than those who had been in contact with their doctor. No information has been found on the relation between care consumption and psychological and social wellbeing.

Lifestyle

The last health measure is people's life style, this includes eating habits, smoking, drinking alcohol, doing exercise and drug use. Individual studies showed that eating fresh fruit and vegetables have positive effects on people's health (Cummings & Bingham, 1998; Ness & Powles, 1997). Eating unhealthy can cause obesity, which can have an effect on psychological health problems, such as a low self-esteem and social isolation (British Medical Association, 2003a). Alcohol is 'the second most used psychoactive substance in the world' (Julien, 1996: 101), after caffeine, and although it is seen as a stimulating substance, alcohol suppresses the effect of the central nervous system. Heavy alcohol use has an influence on accidents, behavior problems, and on diseases such as liver cirrhosis, curtain forms of cancer, hypertension, strokes and heart failures (Doll & Peto, 1981; Hart, Davey-Smith, Hole & Hawthorne, 1999). At the end of last century, irrefutable evidence came regarding the negative effects of smoking tobacco (Peto & Lopez, 1990; World Health Organization, 2002; Julien, 1996). The fact that physical exercise and physical health have impact on diseases such as coronary heart disease, obesity and diabetes is a long known fact (Fox, 1999). In the last years there has also been increasing research into the role of exercise in the treatment of mental health and in improving mental wellbeing in the general population. Exercise and a good physical health have the potential as a therapy for clinical or subclinical depression or anxiety. The use of physical activity can be a means to upgrading life quality through enhanced self-esteem, improved mood states, reduced state and trait anxiety, resilience to stress, or improved sleep (Fox, 1999). In clinical populations as well as in non-clinical populations, exercise has repeatedly been associated with a favorable effect on the improvement of mood (Morrison & Bennett, 2010). Biddle (1995) studied the effects of exercise on mood, on self-esteem, and on social behavior. This study showed that intense periods of exercise had a beneficial effect on psychological wellbeing.

Research questions

The literature describing the different health measures focuses mostly on emotional wellbeing. This paper started discussing three different forms of wellbeing, social, emotional and psychological, which were found as important concepts of mental health. There is only very little research done on these three forms of wellbeing in comparison with health, which means that this study contributes to the current literature. At the same time, health is measured in different ways by researchers, most of the time they used only one form of health. This study tries to unite these two concepts in order to provide a better insight into the relation between health and wellbeing. This is done by examining all the five health measures in relation to the three forms of wellbeing, opposed to mostly only emotional wellbeing in other studies. It is important to research these different forms of health measures in relation to social, emotional and psychological wellbeing. It can provide insight into the relation between health and wellbeing, and also important, it can show if there are differences between the different forms of wellbeing. As shown above, physical health has significant correlations with wellbeing and a high wellbeing predicts a higher income, better health and the experience of positive events (Diener, Nickerson, Lucas, & Sandvik, 2002; Marks & Fleming, 1999; Danner, Snowdon, & Friesen, 2001; Magnus & Diener, 1991). By getting more insight into the relation between health and wellbeing, practice and research can benefit from this information. This study could offer an insight into which form of health has the largest correlation with wellbeing. This could bring more clearance about which health measure is the most associated with a higher wellbeing. At the same time it could tell more about which form of wellbeing is the most important. Care practitioners could take this in mind and adjust their treatment to it, to provide better care for their patients. This could benefit to a higher wellbeing. Lamers, Westerhof, Bohlmeijer & Keyes (in press) studied the three forms of wellbeing and investigated the association of age with it, controlling for potential confounding effects of physical health. Their study has made a start in the investigation of the relation between wellbeing and physical health. The present study is the first to take all the three forms of wellbeing into account in comparison with five different health measures. This leads to the following question:

"Is there a relation between different forms of physical health, knowing the diagnosed condition, self-rated health, health limitations, care consumption and life style, and emotional, social and psychological wellbeing?"

Several studies stated that there is a negative correlation between physical health and wellbeing (Lamers, 2012; Kivela & Pahkala, 2001; Morrisson & Bennett, 2010; Okun, Stock, Haring & Witter, 1984; Norris, Carroll & Cochrane, 1992; Yakovlev and Leguizamon, 2012; Diener & Chan, 2011; Howell, Kern & Lyubomirsky, 2007; Lyubomirsky, King & Driener, 2005; Veenhoven, 2008). Based on this literature, the hypothesis is that poor physical health has a significantly negative correlation with wellbeing.

Four studies have shown that health limitations have a negative influence on wellbeing, one of them even states it is a fate worse than death (Ditto, Druley, Moore, Danks & Smucker, 1996; Stewart, Greenfield, Hays, Wells, Rogers, Berry, McGlynn & Ware, 1989; Morrison & Bennett, 2010; Blalock, DeVellis, DeVellis, Giorgino, Sauter, Jordan, Keefe & Mutran, 1992). Based on this literature on health limitations, and mostly because it was stated by some as a fate worse than death, the second hypothesis is that health limitations have the highest correlation with wellbeing. We assume that not being able to perform activities has the highest correlation with wellbeing.

Almost all the studies only focus on emotional wellbeing. That is possibly because in the beginning, the instruments were only focusing on emotional wellbeing. Later on Ryff's scales and the MHC-SF were used, to also assess the other forms of wellbeing (George & Landerman, 1984; Okun & George, 1984; Okun, Stock, Haring & Witter, 1984; Stewart, Greenfield, Hays, Wells, Rogers, Berry, McGlynn & Ware, 1989; Ditto, Druley, Moore, Danks & Smucker, 1996; Bowling. 1989; Fox, 1999; Morrison & Bennett, 2010; Biddle, 1995). A third hypothesis is that, of the different forms of wellbeing, emotional wellbeing has the largest correlation with the five health measures. Expected is that the emotional reaction to the disease and its additional consequences, as well as the cognitive judgments of satisfactions and fulfillment are more important than the psychological and social wellbeing (argyle, 2001). There is less known about social and psychological wellbeing in relation to health, nevertheless the hypothesis maintains that emotional wellbeing has the highest correlation.

Method

LISS-panel

LISS stands for ‘longitudinal internet studies for social sciences’ The LISS-panel contains people from every social layer of the Dutch population. It consists of approximately 5000 households (8000 household members), spread over the entire Netherlands. The members of the LISS-panel are selected by CentERdata and Statistics Netherlands. The panel is based on a true probability sample of households drawn from the population register by Statistics Netherlands. The participants fill out questionnaires and by that, they participate in scientific studies. The online questionnaires are filled out every month, members are getting a fee for every filled-out questionnaire.

The LISS Core Studies are longitudinal studies that are executed every year in the panel. This means that the measurements are executed every single year by the same individuals and households. In this manner, the core study can measure changes in the every day life of people, their reactions on life events and the effects of social changes and political measures. The questionnaires are divided in different core studies: health, politic and values, religion and ethnicity, social integration and leisure, family and household, work and schooling, personality, and economical situations. Besides these core studies there are numerous assembled studies.

In this study data will be used from the following modules:

- Health (Core study): questions relating to health will be used to give an indication about possible health problems. This core study was used to get information about the five health measures.
- Social integration and leisure (Core study): questions relating a broad range of social core information about the panel members. This core study was used to indicate if people are active in sports.
- Mental health (Assembled study): the *Mental Health Continuum-Short Form* will be used as an indication of wellbeing. Only one person of a household, and only one third of the households had to fill out this questionnaire.

Procedure

Participants were recruited via the LISS-panel, which is described above. All participants provided basic demographic information, filled out self-report measures on health and filled

out the MHC-SF. These questionnaires were conducted by computer, the participants received an appeal from the panel to fill out the questionnaires. The collected data regarding wellbeing for the study was obtained from December 2007 to September 2008. One moment was chosen from the longitudinal data collection of the LISS-panel, this data was used in this study to analyze. The first point of measuring, December 2007, was used for all the participants who filled out this questionnaire. The data of the second point of measuring, March 2008, was used from the respondents who didn't fill out the first questionnaire. The respondents who did not fill out either of the first two questionnaires were not included in this study. By deleting the respondents who did not fill out one of the first two points of measuring and the respondents who did not fill out the questionnaires about health, this study ends with a data set of 1599 households.

Participants

There was a final sample of 1599 participants derived from Dutch households from the LISS-panel. The participants represented a broad socio-economical spectrum. The mean age of the participants was 48 year 3 months and the age range was 18-87 years. The distribution of gender was almost equal, respectively 49,4% was male (*n* = 790) and 50,6% was female (*n* = 809). The marital status of most participants was married (*n* = 852, 53,3%). Far out the largest main occupation was work in paid employment (44,3%), followed by retired participants (23,0%). Table 1 shows these statistics and some other descriptive statistics of the respondents.

Table 1.

Descriptive statistics of the participants (n = 1599)

	n	*%*
Gender (female)	809	50,6
Age		
15-24	155	9,7
25-34	315	19,7
35-44	224	14,0
45-54	244	15,3
55-64	290	18,1
>65	371	23,2
Marital status		
Married	852	53,3
Divorced from bed and board	6	0,4
Divorced	147	9,2

Descriptive statistics of the participants (n = 1599)

	n	*%*
Widow or widower	105	6,6
Never married	489	30,6
Highest level of education with diploma		
Basic education	75	4,7
VMBO	425	26,6
HAVO/VWO	171	10,7
MBO	348	21,8
HBO	349	21,8
WO	128	8,0
Different	74	4,6
No education completed	28	1,8
Not yet in education	1	0,1
Main occupation		
Work in paid employment	708	44,3
Retired	368	23,0
Care of the household	163	10,2
Student	122	7,6
Independent professional, free-lance or self-employed	83	5,2
Others	155	9,7

Materials

Mental Health Continuum-Short Form (MHC-SF)

The three concepts, emotional, psychological and social wellbeing can be assessed with the Mental Health Continuum-Short Form (MHC-SF), consisting of fourteen items. Years ago, a brief questionnaire that fully covered all three dimensions of mental health wasn't available. Corey Keyes invented the MHC-SF. The MHC-SF is based on the longer version, the MHC-Long Form, consisting of forty items, based on a number of instruments that assess emotional, psychological, and social wellbeing (Keyes, 2002). The fourteen items of the MHC-SF assess emotional wellbeing (three items), social wellbeing (five items) and psychological wellbeing (six items) and they are scored on a six-point scale varying from never (one) to every day (six). Each of the items represent a theoretical dimension of wellbeing, such as "How often did you feel that you liked most parts of your personality?", measuring self-acceptance of psychological wellbeing (Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011; Ryff, 1989).

Factor analysis of a continuous assessment and a categorical diagnosis of the presence and the absence of mental health among 1050 Setswana-speaking adults in the Northwest province of

South Africa showed that the MHC-SF replicated the three-factor structure of emotional, psychological and social wellbeing found in US samples. The internal reliability of the overall MHC-SF scale was found to be 0.74. The total score on the MHC-SF correlated 0.52 with a measure of positive affect, between 0.35 and 0.40 with measures of generalized self-efficacy and satisfaction with life, and between 0.30 and 0.35 with measures of coping strategies, sense of coherence, and community collective self-efficacy (Keyes, Wissing, Potgieter, Temane, Kruger & van Rooy, 2008). For the Dutch version of the MHC-SF, items were translated into Dutch and then backwards into English to ensure comparability. The MHC-SF has shown good psychometric properties in five Dutch pilot studies, it has showed good reliability and validity (Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011). An evaluation of the psychometric properties of the MHC-SF confirms the theoretically based arrangement of the fourteen items in the three subscales emotional, psychological and social wellbeing. The subscales have a good internal reliability and each of the subscales is predictive of the corresponding subscale at follow-up of three and nine months (Lamers, Westerhof, Bohlmeijer, ten Klooster & Keyes, 2011). These studies show a good reliability and validity of the MHC-SF, this also applies to the study of this paper.

A longitudinal evaluation of the MHC-SF evaluated the measurement invariance of the MHC-SF. The study used data of 1,932 Dutch adults, who filled out the MHC-SF at four time points over nine months. It stated that the MHC-SF is highly reliable over time, as there was no differential item functioning across the four time points. Furthermore, the means and reliabilities of the subscales were consistent over time. They emphasized that the MHC-SF is a reliable and valid instrument to measure positive aspects of mental health (Lamers, Glas, Westerhof & Bohlmeijer, 2012). The LISS-panel data used in this study is the same data as was used in the study of Lamers, Glas, Westerhof & Bohmleijer, which represents a high reliability over time and a reliably and valid instrument. The full version of the MHC-SF (Dutch) can be found in appendix A.

Health measures

In this study, health is distinguished in five separate ways of measuring. First is the diagnosed condition, self-reported, asking the respondents if they have any illnesses or diseases etcetera. This was measured through twenty-eight questions such as “Do you suffer from any long-term illness, disease, disability or consequences from an accident?”. Questions asking the respondents if they are limited in inter alia their social life measure the health limitations, using forty questions. Another form of health was measured by asking the respondents to

grade their health, this is their self-rated health. A fourth way of measuring health is the amount of care consumption, asking the respondents how often they have seen a doctor, physiotherapist etcetera in the last year, using ten questions. The fifth way of measuring health is to measure respondents' life style. This was measured with twelve questions assessing daily life habits such as smoking, drinking, eating habits and exercise. Categories of the variables have been made, varying form low/small to high/large. This hierarchy was made to point out the differences in wellbeing within the forms of health. If the respondents have a low score (zero), the concerning health measure is better. This applies to the diagnosed condition, health limitations, life style and the care consumption. The self-rated health works oppositely, a higher score (five) means an excellent self-rated health. A full version of the health measures (in Dutch) and the scoring can be found in appendix B. An overview of the health measures and wellbeing is shown in table 2.

Table 2.

Health measures and wellbeing.

	LISS-module `	Questions
Diagnosed condition	Health (core study)	28
Self-rated health	Health	1
Health limitations	Health	40
Care consumption	Health	10
Life style	Health	11
	Social Integration and Leisure (core study)	1
Social wellbeing	Mental Health (assembled study)	5
Emotional wellbeing	Mental Health	3
Psychological wellbeing	Mental Health	6

Analysis

This study used a cross-sectional research design, examining the correlation between data. It didn't look at the causal relation between the variables, but it examined the interdependence of the variables. The obtained raw data was analyzed with the statistical computer program Statistical Package for the Social Science (SPSS) 21.0. The respondents that didn't fill out one of the first two time points of the MHC-SF were excluded from the data, as well as the respondents that didn't fill out all of the health questions. At first, the descriptive statistics of the health measures were set out. An ANOVA was used to measure the means of the emotional, social and psychological wellbeing as compared to the health measures. Bivariate correlation analyses were used in order to analyze if there is a relation between physical health and wellbeing. At last this study used a regression analysis to estimate if the different

forms of health measures added independently significant to wellbeing. A significance level of 0.01 was used for every test, due to the large sample used in this study. A large sample causes even weak correlations to be statistically significant, therefore this study didn’t use a significance level of 0.05. All the performed tests were tested two-sided.

Results

Frequencies

Table 3 shows an overview of the frequencies of the data. Most of the people have a moderate or low amount of diagnosed condition, and most respondents report they have medium health limitations. 58% of the respondents rate their health as good, and most respondents have a small care consumption (54,5%). Most of the respondents (60,3%) life a moderate healthy lifestyle, meaning they have two or three bad habits (e.g. smoking and no sport). An ANOVA test shows that there are significant differences within groups, except for diagnosed condition with social wellbeing, care consumption with social and psychological wellbeing, and for lifestyle with emotional wellbeing. It shows that for every significant health measure, the respondents with the worst health have a low wellbeing. The respondents with the best health also have the highest wellbeing.

Table 3.

Frequencies of the five health measures (n = 1599)

	n	%	mean (SD)	Emotional wellbeing mean (SD)	Social wellbeing mean (SD)	Psychological wellbeing mean (SD)
Total	1599	100		**4.67 (.96)**	3.31 (1.01)	**4.18 (.99)**
Diagnosed condition	1599		.88 (.60)			
Low amount of diagnosed condition (0)	646	40.4		**4.86 (.85)**	3.39 (.99)	**4.33 (.94)**
Moderate amount of diagnosed condition (1)	499	31.2		**4.59 (.94)**	3.30 (1.00)	**4.13 (.97)**
High amount of diagnosed condition (2)	454	28.4		**4.48 (1.06)**	3.19 (1.02)	**4.01 (1.07)**
Self-rated health	1599		3.11 (0.76)			
Excellent self-rated health (5)	79	4.9		**5.04 (.91)**	**3.60 (1.12)**	**4.67 (.91)**
Very good self-rated health (4)	312	19.5		**4.90 (.79)**	**3.43 (.99)**	**4.32 (.91)**
Good self-rated health (3)	928	58.0		**4.70 (.89)**	**3.33 (.97)**	**4.19 (.97)**
Moderate self-rated health (2)	267	16.7		**4.24 (1.13)**	**3.05 (1.07)**	**3.86 (1.10)**
Bad self-rated health (1)	13	.8		**3.28 (1.15)**	**2.80 (.69)**	**3.24 (1.20)**
Health limitation	1599		.87 (.68)			
Small health limitation (0)	486	30.4		**4.87 (.87)**	**3.42 (1.01)**	**4.34 (.96)**
Medium health limitation (1)	831	52.0		**4.69 (.91)**	**3.31 (.98)**	**4.18 (.94)**
Large health limitation (2)	282	17.6		**4.67 (1.12)**	**3.13 (1.07)**	**3.90 (1.15)**
Care consumption	1599		.60 (.78)			
Small care consumption (0)	870	54.4		**4.78 (.91)**	3.34 (.99)	4.23 (.98)
Medium care consumption (1)	558	34.9		**4.55 (.95)**	3.24 (1.02)	4.10 (.99)
Large health consumption (2)	110	6.9		**4.59 (1.11)**	3.36 (.91)	4.20 (1.16)
Extreme health consumption (3)	61	3.8		**4.32 (1.26)**	3.39 (1.14)	4.05 (.99)
Lifestyle	1597		.82 (.60)			
Healthy lifestyle (0)	460	28.8		4.68 (.92)	**3.40 (.99)**	**4.29 (.93)**
Moderate lifestyle (1)	963	60.3		4.69 (.96)	**3.30 (1.02)**	**4.16 (1.02)**
Unhealthy lifestyle (2)	174	10.9		4.49 (1.05)	**3.10 (.97)**	**4.18 (.99)**

Notes. **Bold** = significant ($p<0.01$), 2-tailed.

Correlations

Table 4 shows the bivariate correlations between the five health measures and emotional, social, psychological and the total wellbeing of the respondents. The five health measures were significantly interrelated with correlations varying from -.18 to .22, with three exceptions: there was no significant relation between lifestyle and emotional wellbeing, nor between care consumption and social and psychological. As shown in table 4 emotional wellbeing has the highest correlation numbers in comparison to social and psychological wellbeing.

Table 4.

Correlation analyses (n = 1599)

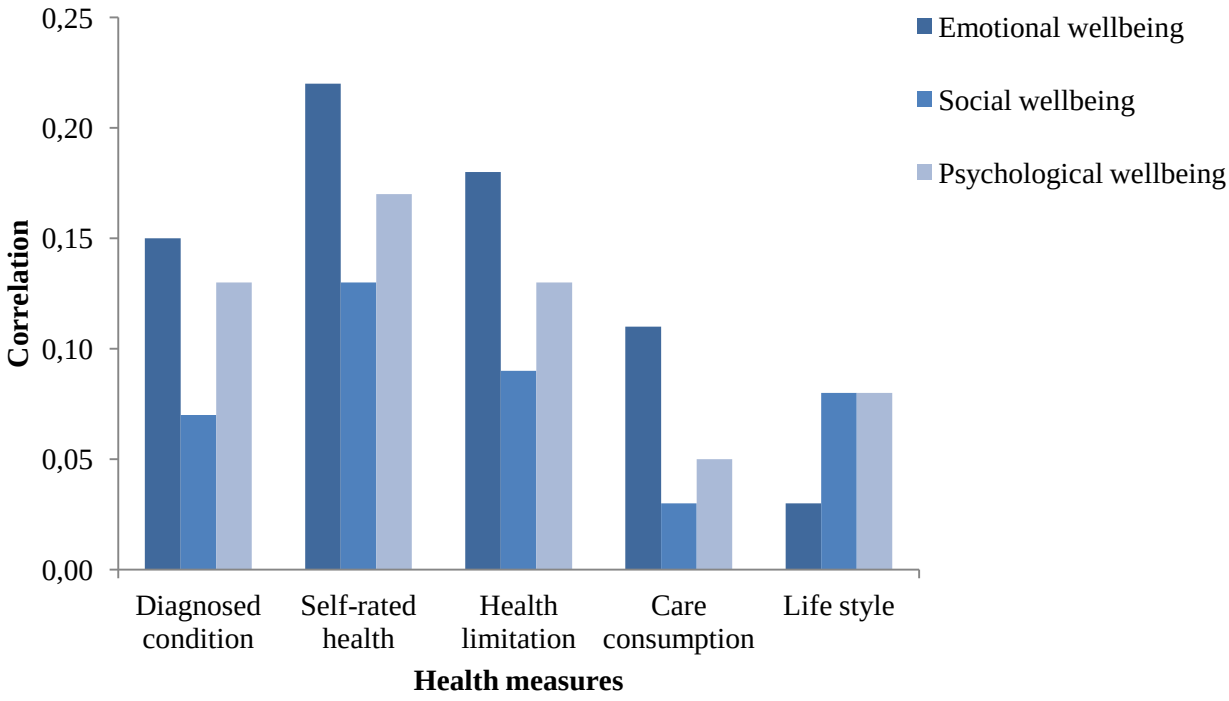
	EW	SW	PW
Diagnosed condition	**-.15**	**-.07**	**-.13**
Self-rated health	**.22**	**.13**	**.17**
Health limitation	**-.18**	**-.09**	**-.13**
Care consumption	**-.11**	-.03	-.05
Life style	-.03	**-.08**	**-.08**

Notes. EW = emotional wellbeing; SW = social wellbeing; PW = psychological wellbeing; TW = total wellbeing; **bold** = correlation is significant ($p<0.01$), 2-tailed.

Graph 1 shows a graphic display and a clear overview of the correlations. This graph demonstrates clearly that emotional wellbeing has the highest correlation, then psychological wellbeing and social wellbeing has the lowest correlation. This applies to all variables, excluding lifestyle, where the correlation with social and psychological wellbeing is the same and the correlation with emotional wellbeing is the lowest.

Graph 1.

Graphic display of the Correlation analysis



Regression

A multiple regression analysis of emotional, social, psychological and total wellbeing with the five health measures was performed to explore the relation between the different health measures. Table 5 shows the beta coefficients of the health measurements in the regression analysis. Self-rated health added significantly to all forms of wellbeing. Health limitations added significantly to emotional wellbeing and life style added significantly to social wellbeing. This means that these health measures are a meaningful addition to the concerning form of wellbeing, changes in the health measure are related to changes in the form of wellbeing. This shows that if the health measures are watched independently, especially self-rated health added significantly to wellbeing. The proportion of variance in wellbeing that can be explained by the health measures, adjusted for the number of variables, is the highest in emotional wellbeing (.068). This means that the five health measures explain 6,8% of the variability of emotional wellbeing. This is not a strong relation, but it is the strongest out of the three forms of wellbeing.

Table 5.

Regression analysis (n = 1599)

	Emotional wellbeing*	Social wellbeing*	Psychological wellbeing*
Diagnosed condition	-.016	-.008	-.029
Self-rated health	**.184**	**.112**	**.146**
Health limitation	**-.105**	-.058	-.076
Care consumption	-.019	.053	.042
Life style	.003	**-.065**	-.060

Notes. * = Beta coefficients; **bold** = significant ($p<0.01$); R = .266, R^2 = .071, R^2_{adj} = .068 for emotional wellbeing; R = .161, R^2 = .026, R^2_{adj} = .023 for social wellbeing; R = .214, R^2 = .046, R^2_{adj} = .043 for psychological wellbeing.

Conclusion & Discussion

The present study examined health measures and wellbeing. Aim of the study was to examine the relation between five health measures and three forms of wellbeing. The results of this study provide new insights in this area.

To answer the question whether there is a relation between physical health and wellbeing, bivariate correlations were used. The low to moderate, but significant, correlations between the five health measures and social, emotional and psychological wellbeing suggest a slight correlation between the two concepts. The hypothesis, poor physical health has a significantly negative correlation with wellbeing, is partly confirmed. In line with the expectation, there is a negative correlation between physical health and wellbeing. The correlation between the health measures and emotional wellbeing is the largest. In every health measure, except for life style, emotional wellbeing has the highest correlation. This confirms the third hypothesis that of the different forms of wellbeing, emotional wellbeing has the largest correlation with the five health measures. As stated in the introduction, "emotional wellbeing consists of a person's cognitive and affective evaluation of his or her life as a whole" (Argyle, 2001), which can possibly indicate that poor physical health has such a large influence on the person's cognitive and affective evaluation of his life that it partly determines the quality of emotional wellbeing. This study shows that a poor health has a significantly negative correlation with not only emotional, but also social and psychological wellbeing. The fact that emotional wellbeing has a significantly correlation is consistent with the study of Okun, Stock, Haring & Witter (1984) who stated that health and emotional wellbeing are found to be positively and significantly related. Also Norris, Carroll & Cochrane (1992); Yakovlev and Leguizamon (2012); Diener & Chan (2011); Howell, Kern & Lyubomirsky (2007); and Lyubomirsky, King & Driener (2005) found the same results. Social and psychological wellbeing were also significantly correlated with the health measures. Stewart et al., 1989; Ditto et al., 1996 and Blalock et al., 1992 found that health limitations were significantly negatively correlated with psychological and emotional wellbeing. Lamers, Westerhof, Bohlmeijer & Keyes (In press) found a negative correlation between the diagnosed condition, self-rated health and health limitations and emotional and psychological wellbeing. They also found that only the self-rated health was significantly correlated to social wellbeing. No other studies were found that proved that social and psychological wellbeing correlated with one of the five health measures, which means these results are a valuable addition to the current literature.

Remarkable is that the care consumption, in contrast to the other health measures, has no significant correlation with social and psychological wellbeing. This could mean that psychological and social wellbeing is not dependent of a person's care consumption. Possibly, a larger amount of care consumption makes respondents feel better about his or her life as a whole but not about their personality and their role in the society. Kim, Park, Sun, Smith & Peterson (2013) found that the most satisfied respondents made 44% fewer doctor visits than did the least satisfied respondents. This study shows that the most emotional satisfied respondents, also made fewer doctor visits, although the number of difference is smaller. The most satisfied respondents made 10% less doctor visits than did the least satisfied respondents.

The biggest differences within the forms of wellbeing are found in the self-rated health, as seen in table 2. This means that the differences in emotional wellbeing are the largest within the self-rated health, compared to the other health measures, thus between a bad and an excellent self-rated health. This is also supported by the findings in table 4, where self-rated health has the largest correlation numbers. The results of the regression analysis shows the same, self-rated health independently adds significantly to all forms of wellbeing. The self-rated health can be seen as the own, implicit, common sense believes of the patient towards his illness, his illness cognitions (Leventhal, Meyer & Nerenz, 1980; Leventhal, Diefenbach & Leventhal, 1992). Possibly this means that the diagnoses itself is not the hardest part to deal with, but the cognitions a patient has about this diagnoses is more important. People make mental representations for dealing with illnesses, this is done by comparing schemes of previous illnesses (Petrie & Weinman, 2003). If a patient is diagnosed with an illness, which he recognizes from by example a family member who died from it, their cognitions would be very different from a patient who knows someone who survived the illness, or can live happily with the illness. The cognition someone has about their diagnoses, how they rate their health, determines how someone feels about themselves, the disease and about how to deal with it. The self-rated health is the only measure of health that adds significantly to all forms of wellbeing, whereas health limitations add significantly to only emotional wellbeing. This does not confirm the second hypothesis that health limitations have the highest correlation with wellbeing. Although health limitations add significantly to emotional wellbeing, the self-rated health has the highest correlation and adds significantly to all forms of wellbeing. From the results above, it is seen that self-rated health is the most important health measure in

comparison with the different forms of wellbeing, because it has the largest correlation. Possibly, the diagnoses have an impact on the respondent, but the value someone gives to it is more important. The expectation was that health limitations were the most important for determining wellbeing, because if people are limited in their daily life, they are possibly less able to participate fully in society and accomplish their own goals. Previous studies showed that this has a negative impact on the wellbeing (Ditto, Druley, Moore, Danks & Smucker, 1996; Stewart et al., 1989; Blalock et al., 1992). This study shows that health limitations have a correlation with all the forms of wellbeing, but regression analysis shows only a relation with emotional wellbeing. This means that these results do not meet the expectation, self-rated health is found to be more correlating with wellbeing than health limitations.

The type of lifestyle a respondent is living is shown to be related to social wellbeing, as seen in the regression analysis. This could possibly be explained because a healthy lifestyle includes no or just one bad habit such as smoking, drinking, doing drugs, eating unhealthy or not exercising. If respondents don't have any of these bad habits, they might feel they are a valuable addition to society and they feel good about themselves. That is, because they do what society tells them what is good for their health. Another explanation could be that respondents who are active in sports meet other people, which contributes to the social wellbeing.

This study has several limitations that need to be considered. First, because of the large sample size, even weak correlations are statistically significant. To account for this, an alpha of .01 has been used instead of the common .05 as a margin of significance in the correlation analyses. The large sample size causes statistically significance in weak correlations, nevertheless it represents a broad range of diverse households with a large age range, different occupations and origins. Second, the data is cross-sectional, due to this nature of the study, causal conclusions cannot be drawn on the correlation between poor physical health and lower wellbeing. The reliability of the study can be affected by the fact that the questionnaires were based on self-report. Self-reported measures of health are generally seen as weak measures of respondents' objective health status (Ambrasat, Schupp & Wagner, 2011). Still, most surveys use self-reported data however to measure health status. Survey respondents may report their health differently depending on their socially driven conceptions of what 'health' means, their expectations of their own health, their use of healthcare, and their comprehension of the actual survey questions asked (Bago d, Uva, Doorslaer, Lindeboom, O'Donnell & Chatterji, 2006;

Johnston, Propper & Shields, 2007). This could apply on this study as well. Cautiousness is advised in the interpretation of the results, due to this bias. Self-report questionnaires could result in socially desirable answers or a central tendency to avoid answers that deviate from the scale and to avoid extreme answers. Despite the possible presence of these biases, the used data were shown to be reliably and valid (Lamers, Glas, Westerhof & Bohlmeijer, 2012).
The use of the MHC-SF is strength of this study. It is, as shown in the literature, a reliable measurement in the replication of the three forms of wellbeing. In addition to the valid nature of the MHC-SF and the high reliability, the use of this instrument is an addition to the current literature. As far as known, no research has been done to examine the relation between these five forms of physical health and social, emotional and psychological wellbeing. This study provides new insights in the relation between the health measures and wellbeing, especially with regard to social and psychological wellbeing, which are underexposed in the current literature.

This study has important implications for both practice and research. As seen in table 4, emotional wellbeing has the highest correlation with all the health measures, excluding life style. This could mean that if the aspects of health decreases, emotional wellbeing could decrease as well. If doctors, specialists and other health authorities know about these findings, they could respond to it by giving their patients extra care regarding emotional wellbeing. Several psychological interventions are effective in enhancing emotional and psychological wellbeing, such as Acceptance and Commitment therapy (Fledderus, Bohlmeijer, Smit & Westerhof, 2010) and wellbeing therapy for psychological wellbeing (Fava, Rafanelli, Cazzaro, Conti & Grandi, 1998). The combined results of 49 studies revealed that positive psychology interventions significantly enhance wellbeing, they did not specify the form of wellbeing. Positive psychology interventions are treatment methods or intentional activities that aim to cultivate positive feelings, behaviors or cognitions, such as mindfulness, positive writing or interventions focusing on gratitude (Sin & Lyubomirsky, 2009).

Another implication for practice applies to psychologists. Psychologist and other specialists in the mental health services should assess the health limitations and the self-rated health of their patients, instead of only the diagnosed condition. They are found to have more impact on the emotional, social and psychological wellbeing than the diagnosed condition. By assessing the health limitations and the self-rated health, patients could feel more understood and this could improve their wellbeing.

Further research should investigate if psychological interventions that focus on enhancing wellbeing, have a positive outcome on the physical health of people. The inclusion of support groups or social network of the respondents in further research could be interesting to see if the supporting people around the respondents have a relation with or an effect on the wellbeing. As described above, self-report can cause biases, to avoid these biases, researches should try and get the information about the diagnosed condition from specialists and/or experts themselves. In this manner, a clear objective way of measuring can be obtained. Further theoretical research focusing on wellbeing should look at the three forms of wellbeing separately, emotional, social and psychological. This study shows that there are significant differences between the different forms of wellbeing and further research could show if this can be confirmed in other studies.

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Appendices

Appendix A

MHC-SF

In de afgelopen maand, hoe vaak had u het gevoel…

1. …dat u gelukkig was?
2. …dat u geïnteresseerd was in het leven?
3. …dat u tevreden was?
4. …dat u iets belangrijks hebt bijgedragen aan de samenleving?
5. …dat u deel uitmaakte van een gemeenschap (zoals een sociale roep, uw buurt, uw stad)?
6. …dat onze samenleving beter wordt voor mensen?
7. …dat mensen in principe goed zijn?
8. …dat u begreep hoe onze maatschappij werkt?
9. …dat u de meeste aspecten van uw persoonlijkheid graag mocht?
10. …dat u goed kon omgaan met uw alledaagse verantwoordelijkheden?
11. …dat u warme en vertrouwde relaties met anderen had?
12. …dat u werd uitgedaagd om te groeien of een beter mens te worden?
13. …dat u zelfverzekerd uw eigen ideeën en meningen gedacht en geuit hebt?
14. …dat uw leven een richting of zin heeft?

Appendix B

Health measures

Diagnosed condition

1. Hebt u last van één of andere langdurige ziekte, aandoening, handicap of lijdt u aan de gevolgen van een ongeluk?
2. Heeft u regelmatig last van: Meer antwoorden mogelijk
    a. Rug-, knie-, heuppijn of pijn in een ander gewricht
    b. Hartklachten of angina, pijn in de borst bij inspanning
    c. Ademnood, problemen met ademen
    d. Hoesten, een versopte neus en/of verkoudheidsklachten
    e. Maag- of darmproblemen
    f. Hoofdpijn
    g. Moeheid
    h. Slaapproblemen
    i. Andere steeds terugkerende klachten
    j. Geen terugkerende klachten
3. Heeft een arts u in het afgelopen jaar verteld dat u één van de volgende ziekten/problemen heeft? Meer antwoorden mogelijk
    a. Angina, pijn op de borst
    b. Een hartaanval inclusief hartinfarct of coronairtrombose of een ander hartprobleem inclusief hartfalen
    c. Hoge bloeddruk of hypertensie
    d. Hoog cholesterol gehalte in het bloed
    e. Een beroerte of herseninfarct of een ziekte aan de bloedvaten in de hersenen
    f. Diabetes of een te hoog bloedsuikergehalte
    g. Chronische longziekte zoals chronische bronchitis of emfyseem
    h. Astma
    i. Artritis, inclusief esteoartritis, of reuma, botontkalking of osteoporose
    j. Kanker of kwaadaardig gezwel, inclusief leukemie of lymphoma, maar exclusief minder ernstige vormen van huidkanker
    k. Een maagzweer of zweer aan twaalfvingerige darm, zweer van het maag-darmkanaal
    l. De ziekte van parkinson

m. Staar
n. Een gebroken heup of dijbeen
o. Een andere breuk
p. Alzheimer, dementie, organisch hersensyndroom, seniliteit, of een ander ernstig geheugenprobleem
q. Goedaardige tumor (huidtumor, poliepen, angioma)
r. Andere kwalen die nog niet genoemd werden
s. Geen ziekten/problemen

Scoring

First question is scored either 0 or 1, 0 meaning no disease and 1 meaning the presence of an illness or disease.\. Questions 2 and 3 were also scored 0 (no complaints) or 1 (complaints), if respondents had 2 or more health symptoms/complaints they had a diagnosed condition. The scores of the three questions were summed ending in the following scoring system.

0 = low amount of diagnosed conditions
1 = moderate amount of diagnosed conditions
2 – 3 = high amount of diagnosed conditions

Lifestyle

1. Hebt u ooit gerookt?
2. Denkt u nu eens aan alle mogelijke soorten drank. Hoe vaak hebt u in de laatste 12 maanden een drank gedronken waar alcohol in zit?
3. Hebt u gedurende de afgelopen maand wel eens één of meer van de volgende middelen gebruikt?
    a. Kalmerende middelen
    b. Soft drugs zoals hasj, wiet, marihuana
    c. XTC
    d. Bewustzijnsverruimende middelen als LSD, paddo’s
    e. Hard drugs (pepmiddelen, cocaïne, heroïne)
4. Eet u rauwe of bereide groenten?
    fruit?
    volkorenproducten (rijst, granen, deegwaren, brood)?
    vis of zeevruchten?

vlees of vleeswaren?

5. Doet u aan sport?

Scoring

The questions were scored 0 (no presence of bad habit) or 1 (presence of bad habit) and accumulated.

0 – 1 = healthy lifestyle

2 – 3 = moderate lifestyle

4 – 5 = unhealthy lifestyle

Self-rated health

1. Hoe zou u over het algemeen uw gezondheid noemen?

Scoring

1 = bad

2 = moderate

3 = good

4 = very good

5 = excellent

Health obstruction

1. In welke mate hebben uw lichamelijk gezondheid of uw emotionele problemen u de laatste maand belemmerd in uw alledaagse activiteiten, zoals een eindje lopen, trappen opgaan, uzelf aankleden, uzelf wassen, naar het toilet gaan?
2. In welke mate hebben uw lichamelijk gezondheid of uw emotionele problemen u de laatste maand belemmerd in uw sociale activiteiten, zoals vrienden of bekenden bezoeken?
3. In welke mate hebben uw lichamelijk gezondheid of uw emotionele problemen u de laatste maand belemmerd in uw werk, bijvoorbeeld in uw baan, in het huishouden of op school?
4. Hieronder staan enkele handelingen waar sommige mensen moeite mee hebben. Wilt u voor elke handeling aangeven of u die zonder moeite, met enige moeite, met grote

moeite of alleen met hulp van anderen kunt doen? Het gaat hier niet om problemen waarvan u verwacht dat ze korter dan drie maanden zullen duren.

a. 100 meter lopen
b. Ongeveer twee uur lang zitten
c. Opstaan uit een stoel als u langere tijd hebt gezeten
d. Meerdere trappen oplopen zonder te rusten
e. Een trap oplopen zonder te rusten
f. Hurken, knielen en kruipen
g. Boven schouderhoogte reiken of uw armen boven schouderlengte uitstrekken
h. Grote voorwerpen verplaatsen zoals een eetkamerstoel
i. Een gewicht van 5 kilo optillen of dragen, zoals een zware tas met boodschappen
j. Een klein muntje oppakken van een tafel

5. Hieronder staan enkele handelingen waar sommige mensen moeite mee hebben. Wilt u voor elke handeling aangeven of u die zonder moeite, met enige moeite, met grote moeite of alleen met hulp van anderen kunt doen? Het gaat hier niet om problemen waarvan u verwacht dat ze korter dan drie maanden zullen duren.

a. Aan- en uitkleden, inclusief schoenen en sokken’
b. Door een kamer lopen
c. Baden of douchen
d. Eten, zoals uw voedsel klein snijden
e. In- en uit bed stappen
f. Gebruikmaken van het toilet, inclusief gaan zitten en opstaan
g. Een kaart lezen om uw weg te vinden in een onbekende omgeving
h. Warm eten klaarmaken
i. Boodschappen doen
j. Telefoneren
k. Medicijnen innemen
l. Huishoudelijk werk verrichten of de tuin onderhouden
m. Geldzaken regelen, zoals rekeningen betalen en de uitgaven in de gaten houden

6. Hieronder staan een aantal activiteiten, waar sommige mensen het moeilijk mee hebben. Kunt u voor ieder van die activiteiten aangeven of u denkt klachten te krijgen bij het verrichten van die activiteiten.

a. Heffen of tillen

b. Duwen of trekken
c. Dragen
d. Staand werken
e. Bukken
f. Knielen, hurken of kruipen
g. Werken onder tochtige omstandigheden
h. Werken onder vochtige/natte omstandigheden
i. Werken in benauwde/stoffige ruimten
j. Bloot staan aan gassen en dampen
k. Werken bij kou
l. Werken bij hitte
m. Werken bij sterkte temperatuurwisselingen
n. Lopen
o. Zitten
p. Met handen en vingers werken
q. Boven uw macht werken
r. In de buitenlucht werken
s. Vergaderen of praten
t. Lezen
u. Schrijven
v. Rekenen
w. Onder tijdsdruk werken

Scoring

First three questions were scored either 0 (no limitations) or 1 (limitations). Questions 4 – 6 were also scored 0 (no limitations) or 1 (limitations), if respondents had trouble with three or more actions they had health limitations. Scores were summed, ending in the following scoring system.

0 = small health limitations
1 – 3 = medium health limitations
4 – 6 = large health limitations

Care consumption

Hoe vaak hebt u de afgelopen 12 maanden gebruik gemaakt van de volgende gezondheidsdiensten?

a. Huisarts
b. Psychiater/psycholoog/psychotherapeut
c. Medisch specialist in ziekenhuis
d. Fysiotherapeut
e. Tandarts
f. Thuiszorg
g. Homeopaat
h. Accupunturist
i. Natuurgeneeskundige
j. Magnetiseur
k. Paranormale genezer
l. Andere alternatieve genezer

Scoring

The respondents answered how often they had visited the specialist, these outcomes were summed and this ended in the following scoring system.

0 – 5 = small care consumption
6 – 20 = medium care consumption
21 – 50 = large care consumption
>50 = extreme care consumption