Excellent health among disadvantaged individuals

Which factors are protective for a good health in low-educated individuals?

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Abstract

Background: The need for promoting a better health in low socioeconomic status (SES) individuals is high. Great health inequalities between people with low SES and high SES exist, leading to a 7 years shorter life expectancy for people with low SES. Nevertheless heterogeneity within the low SES population exists; some people do have an excellent health. This raises the important question; 'which factors account for a good objective-, and subjective health in people with low SES'?

Method: Based on a health survey executed by GGD Hollands Midden in 2009 the protective role of lifestyle-, social-, and workstatus factors were studied. A cross-sectional design was used. Univariate and multivariate logistic regression were used, controlling for potentially confounding demographic characteristics. The low SES individuals sample of N=2081, consisted of 1187 females and 856 males within the age range 19 to 65 years old. Having no chronic condition – a good objective health -, and rating one's own health excellent, very well or well, - a good subjective health -, were taken as dependent variables.

Results: Objective-, and subjective health were found to be two different concepts, although related. As a consequence, different profiles were found to be protective for a good objective-, and a good subjective health. Not being overweight, having a child in the age 0 to 18 and having either a paid job, being a student or being (early) retired were found protective for a good objective health. Providing informal care decreased the chance on a good objective health. Not smoking, having enough physical activity, not being overweight, being either married, living together or being a widow(er) and having either a paid job, being a student or being (early) retired were found protective for a good subjective health. When separating men and women in the analysis, different protective profiles were found for men and women. Yet, not being overweight and having a paid job, being a student or being (early) retired were found protective for both men and women towards a good objective-, and subjective health.

Conclusion: Following our results, we could not confirm our hypotheses about all lifestyle-, and social factors being protective for a good objective-, and subjective health. Nevertheless, finding different protective profiles for a good objective-, and subjective health and for men and women gave directions to further research. When wanting to promote low SES people's health in general, a integrated profile of factors, protective for both a good objective-, and subjective health should be established.

Samenvatting

Achtergrond: Er bestaat een grote behoefte aan de promotie van een betere gezondheid binnen individuen met een lage sociaaleconomische status (SES). Door de grote gezondheidsverschillen tussen mensen met een lage SES en een hoge SES, hebben individuen met een lage SES gemiddeld een kortere levensverwachting van 7 jaar.Desalnietemin, bestaat er een grote heterogeniteit binnen de lage SES populatie; sommige mensen hebben wel een uitstekend gezondheid. Dit leidt tot de belangrijke vraag; 'welke factoren dragen bij aan een goede objectieve-, en subjectieve gezondheid binnen mensen met een lage SES'?

Methode: Gebaseerd op de gezondheidsenquête, uitgevoerd door GGD Hollands Midden in 2009, werd de beschermende rol van leefstijl-, sociale-, en werksituatie gerelateerde factoren voor een goede gezondheid bestudeerd. Een cross-sectioneel design werd gebruikt. Univariate en multivariate logistische regressie werden gebruikt, controlerend voor mogelijke demografische karakteristieken van invloed. De groep van lage SES individuen bestond uit N=2081, waarvan 1187 vrouw en 856 man, binnen de leeftijdscategorie 19 tot 65 jaar oud. Het niet hebben van een chronische conditie – een goede objectieve gezondheid-, en de beoordeling van de eigen gezondheid met uitstekend, zeer goed of goed, - een goede subjectieve gezondheid-, werden gebruikt als afhankelijke variabelen.

Resultaten: Objectieve-, en subjectieve gezondheid bleken twee verschillende concepten, maar desondanks gerelateerd. Als consequentie, verschillende profielen van beschermende factoren werden gevonden voor een goede objectieve-, en een goede subjectieve gezondheid. Het niet hebben van overgewicht, het hebben van een kind in de leeftijdscategorie 0 tot 18 jaar, en het hebben van een betaalde baan, student zijn of met (vervroegd) pensioen zijn werden gevonden als beschermend voor een goede objectieve gezondheid. Het geven van mantelzorg verkleinde de kans op een goede objectieve gezondheid. Niet roken, genoeg fysieke inspanning, het niet hebben van overgewicht, getrouwd zijn, samen wonen of weduwe(naar) zijn en het hebben van een betaalde baan, student zijn of (vervroegd) met pensioen zijn werden gevonden als beschermend voor een goede subjectieve gezondheid. Wanneer mannen en vrouwen werden gescheiden in de analyse, verschillende beschermende profielen werden gevonden voor mannen en vrouwen. Echter, het niet hebben van overgewicht en het hebben van ofwel een betaalde baan, student zijn of (vervroegd) met pensioen zijn werd zowel voor mannen als vrouwen beschermend gevonden voor zowel een goede objectieve-, als subjectieve gezondheid.

Conclusie: Volgend uit de resultaten, konden we niet al onze hypothezen over de beschermende rol van leefstijl-, sociale-, en werksituatie gerelateerde factoren voor een goede objectieve-, en goede subjectieve gezondheid bevestigen. Desondanks, de bevinding dat verschillende profielen beschermend waren voor een goede objectieve-, en subjectieve gezondheid en voor mannen en vrouwen geeft richting tot vervolgonderzoek. Wanneer we de gezondheid van individuen met een lage SES willen verbeteren, is het raadzaam een geïntegreerd profiel van factoren die zowel beschermend zijn voor een goede objectieve-, en subjectieve gezondheid op te stellen.

Introduction

1.1 Socioeconomic status(SES) affects health and life expectancy.

Differences in mortality rates by social class and occupation have been documented since the 19th century. In 1865 death rate among tax payers – people of high social class - was 10.8 per 1000 people, while among non tax payers – people of low social class – this rate was 24.8 per 1000 people (Adler, Boyce, Chesney, Folkman and Syme, 1993). The hazards, e.g. infectious diseases, that caused the disparity between health and mortality rates among different social classes in the 19th century, are not the hazards that cause differences in mortality rates between social classes in western countries nowadays. Nevertheless, the disparity in health between low SES and high SES still exists. Dalstra, Kunst, Borrell, Breeze, Cambois, Costa, Geurts, Lahelma, van Oyen, Rasmussen, Regidor, Spadea and Mackenbach (2005) found education-related inequalities in common chronic diseases in several European countries as Denmark, France, Finland and the Netherlands. Strokes, diabetes mellitus, arthritis, hypertension, liver- and kidney diseases and more, had higher prevalences among people with low-educational levels. Hanning, Paijmans, van Rossum, Rijkelijkhuizen, Wijngaarden, Dooremaal, Lottman, Terpstra, Tielen, Poos (2010) looked at a specific region of the Netherlands. They reported on the basis of data from 2009, that in this region, Hollands Midden, , people with a low SES, based on educational level, had a less favorable health than people with high SES. A bad physical and/ or mental health was more often experienced and reported in people with low SES. Also, unhealthy behaviors as unhealthy nutrition, alcohol and smoking were more often reported in people with low SES (Hanning et al., 2010). Mainly due to these health inequalities, life expectancy diminishes also in 21th century for people with low SES. People with low SES tend to have a 7 years shorter life expectancy than people with high SES. In case of healthy life expectancy this difference is 17 years (Van der Lucht & Polder, 2010).

1.2 Heterogenity in health at different levels of the SES continuum.

Besides many studies reporting on differences in health, differences in health behaviors, and factors that account for these differences between low SES and high SES, later studies have also started to focus on the heterogeneity within a certain SES level. This way, it has been shown there is considerable variation in health within the low SES continuum. (Schöllgen, Huxhold, Schüz, Tesch-Römer, 2011). Some people with a low SES do have a good health (Dupre and George, 2011; Chen, Strunk, Trethewey, Schreier, Maharaj, Miller, 2011).

1.3 What accounts for a good health within individuals with a low SES?

In the literature a broad range of risk-, and protective factors have been studied in their account for the heterogeneity within the low SES. Nevertheless, no uniformity has been reached about which profile of factors accounts for exceptional health in people with low SES. Therefore, this paper will focus on the prone question: 'What protective factors account for a good objective-, and subjective health in people with low SES?".

1.4 Previously studied protective factors.

In the previous literature, a broad range of possible protective factors were studied which are important to take into our account in our study. The role of lifestyle factors mediating between low SES and health is often studied. Lifestyle factors have been reported to have a great influence on objective health status (Adler et al., 1994; Johansson & Sundquist, 1999). For example, smoking and obesity have both been strongly linked with morbidity, cardiovascular diseases are often reported consequences of smoking and obesity. Due to this morbidity, these health behaviors are also strongly linked with mortality. (Hanning et al., 2010). As people with a lower level of education tend to smoke more, are more often overweight, and have less physical activity than their peers (Lantz, Lynch, House, Lepkowski, Mero, Musick, Williams, 2001), it is often hypothesized that lifestyle factors account strongly for the relationship between low SES and health. Johansson & Sundquist (1999) studied the joint contribution of physical activity, smoking and BMI by testing models of linear regression, and found that physical activity seemed strongly protective in case of obese and smoking individuals. But, even though the association between lifestyle factors and health status has often been found to be strong, the mediating role of lifestyle factors between low SES and health has not always been confirmed. Both Dupre & George (2011) and Lantz et al., (2011) found no protective role for a low level of smoking, alcohol use, healthy nutrition and physical activity in low educated individuals. Schöllgen et al., (2011) studied the protective roles of psychological resources (optimistic self-beliefs) and social resources (available support from a social network) on physical, functional, and subjective health in case of both high and low SES. A positive relationship was found between psychological resources and health in all SES groups - accounting for education and income -, with stronger relationships in the low-education group. Social resources had a stronger effect on functional and subjective health at low compared to high income level, whereas these social resources had the same effect on health in both educational groups (Schöllgen et al., 2011). Matthews & Gallo (2011) reviewed articles in which the individual mediating role of social factors and psychological resources (e.g. self-esteem, optimism, a sense of mastery) were studied. Some mediating role for social resources was found. The psychological resources of optimistic beliefs and problem-solving skills were found as mediating factors of great influence (Matthews & Gallo, 2011). In addition to receiving social support, Sapolsky (2004) suggests that providing social support might even work as a stronger protective factor between adversity and chronic illnesses than receiving social support. This, because it would provide 'a sense of mastery', a sense of doing something good in the world.

Dupre & George (2011) studied a combination of demographic characteristics, family and religious factors, socioeconomic resources, health behaviors, psychological factors, and biological attributes and their protecting role for a good health of low educated men and women. The protective functions of family and religion were intriguing. For low educated women marital stability and having one to three children was protective for health, for men having no children was important in maintaining good health among the low educated. Socioeconomic resources and health behaviors showed only weak contributions to exceptional health among the low educated. The set of mechanism classified as psychological and biological attributes, showed for each factor studied (e.g. absence of depressive symptoms) a positive association with exceptional health (Dupre & George, 2011).

Although Dupre & George studied a broad range of factors, they stress that their factors may have not fully accounted for the heterogeneity within the low SES group. They suggest that an explanatory framework of 'resilience' may do so (Dupre & George, 2011). The dynamic process encompassing positive adaptation within the context of significant adversity, so called 'resilience', was studied mediating between SES and physical health and SES and health behaviors (Cleland, Ball, Salmon and Timperio, 2010). Cleland et al., (2010) studied personal, social and environmental measures of 'resilience' to physical inactivity among socially disadvantaged women. Psychological factors were found to be resilient, followed by social factors. For example, the more self-efficacy, the more physically active these women were.

1.5 The need for promoting health in low SES is high.

The need for promoting health in low SES is high. As described before, low SES affects mortality rates through its connection of worse health outcomes between low SES and mortality. There is a discrepancy of 7 years life expectancy between people with low SES and high SES (Van der Lucht & Polder., 2010). Besides the impact of physical health on mortality rates, it also has economic consequences. Blümmel, Scheller-Kreinsen & Zentner (2010) found for example that individuals with a chronic disease worked less hours, had a lower workforce participation, made more often a job turnover and retired earlier. In addition, having a chronic illness will increase demands and costs for health care services. This will increase public health costs (Geiger, Johnson and Woolf, 2006). Besides the individual-, economic-, and public matter consequences of the effects of low SES on health, it is also useful to know which factors are protective for a good health in people with low SES to promote a good health. More and more often the use of individually tailored interventions is stimulated as it might be more effective in changing people's behavior. When interventions will be tailored to the characteristics and personal situations of people with low SES, this will increase the probability that people feel connected with the intervention strategy (Campbell & Quintiliani, 2006).
In conclusion, in a broad range of areas the need for promoting health is high. Knowing which factors are protective for a good health in people with low SES, will make it easier to focus the promotion of health on the right factors and needs.

1.6 Aim of this study

'What factors account for a good objective-, and subjective health in people with low SES ?' is a prone question, as health disparities as a consequence of low SES raise mortality rates, individual burden, economic consequences and public health costs. Nevertheless has literature on the topic of health disparities within the low SES not found a clear, uniform answer or conceptual framework which accounts for the relationship between low SES and health. The aim of this study is to contribute to the existing literature on the topic of protective factors that account for a good health within low SES. As Adler et al., (1994) describe, most studies study the effect of SES on health outcome through interacting variables by the individual influence of these factors. They added to this, that this does not inform us about the joint functioning of these factors (Adler et al., 1994). As we agree with Adler et al., (1994) we will not only study the individual influence of lifestyle-, social and workstatus factors on

objective health and subjective health, but also study the joint contribution of these factors to health. We will study whether the combination of lifestyle factors (nutrition, smoking, physical activity, alcohol use, BMI), the combination of social factors (receiving social support, marital status, having children, providing informal care) and the combination of all individual protective factors can make up for a 'protective profile' for a good subjective-, and objective health in people with low SES.

1.7 Research Questions

- *Question I*: In answering the first research question, we will study the protective role of lifestyle factors between low SES and objective and subjective health.
  a. 'Are the lifestyle factors 'no smoking', 'no to moderate alcohol use', 'healthy nutrition', 'enough physical activity', and 'no overweight' protective for a good objective and subjective health in individuals with low SES?'
  b. 'Are there healthy lifestyle factors which are protective for a good objective and subjective health in case of presence of other unhealthy lifestyle factors? More specifically; 'Is being physically active protective for obese and/ or smoking individuals?' and, 'Is not being overweight protective in case of not having enough physical activity and/ or unhealthy nutrition?'.

- *Question II*: In answering the second research question, we will study the protective role of a social network between low SES and objective and subjective health.
  a. 'What are the individual protective roles of receiving social support, providing informal care, marital status and having children in the age 0 to 18?'
  b. 'Is providing informal care protective towards health, in case of absence of receiving social support?' and 'Is the combination of receiving social support, being either married, living together or a widow(er) and having a child in the age 0 to 18 protective for a good health?'

- *Question III:* In answering the third research question, we will study the protective role of work status.
  a. 'What is the protective role of either having a paid job, being a student or being (early) retired to objective and subjective health in people with low SES?

- *Question IV:* In answering the fourth research question, we will study the protective role of the joint contribution of protective factors found by hypothesis I, II and III, for a good objective and subjective health.
  a. 'Does a combination of the individual lifestyle factors, social factors and workstatus provide a protective profile for a good objective and subjective health in individuals with a low SES?

- *Question V:* Finally, we will briefly study differences between men and women.
  a. 'Are different factors protective for a good health in men and women?'

1.8 Hypotheses

- *Hypothesis I:*

  a. We hypothesize that the lifestyle factors, 'not smoking', 'no or moderate alcohol use', 'healthy nutrition', 'physical activity' and 'healthy BMI level', are protective for a good objective and subjective health in individuals with low SES.

  b. We hypothesize that having enough physical activity will be protective in case of either smoking, either obese or either both smoking and obese individuals. Also we hypothesize that not being overweight will be protective for individuals which are not having enough physical activity, not having a healthy nutrition and both not being enough physically active and having an unhealthy nutrition.

- *Hypothesis II:*

  a. We hypothesize that having received social support, providing informal care, being either married, living together or widow(er), and having at least one child under the age of 18 will be protective for a good objective and subjective health in individuals with low SES.

  b. Following Sapolsky that providing social support might be more protective for a good health than receiving social support, we hypothesize that providing social support is be protective for a good objective and subjective health in case of not receiving social support. On the basis of Dupre & George (2011) we hypothesize that the combination of marital status, having children and receiving social support will be protective for a good health as all these factors account for a protective social network.

- *Hypothesis III:* We hypothesize that either having a paid job, being a student or being (early)(retired is protective for a good health in low SES individuals.

- *Hypothesis IV:* We hypothesize that the joint contribution of the individual protective lifestyle factors, social network factors and workstatus will provide a protective profile to a good objective and subjective health in individuals with low SES.

- *Hypothesis V:* Finally, we hypothesize on the basis of Dupre & George (2011) that healthy lifestyle behaviors are as protective for men as for women. In addition, we hypothesize that having a child in the age 0 to 18, and being either married, living together or being a widow(er) is more protective for women than for men. At last, we hypothesize that having a paid job, being a student or being (early) retired is more protective for men than for women.

Method

2.1 Participants

This study uses data from a health survey executed by GGD Hollands Midden in 2009. This health survey represents the population of the municipalities of Zuidplas, Teylingen, Noordwijk, Noordwijkerhout, Leiderdorp, Oestgeest, Voorschoten, Leiden, Schoonhoven, Bergambacht, Nederlek, Vlist, Ouderkerk (krimpenerwaard is eigenlijk geen gemeente), Katwijk, Kaag en Braassem,Nieuwkoop,Rijnwoude, Zoeterwoude, Hillegom, Lisse, Gouda, Boskoop, Waddinxveen, Bodegraven-Reeuwijk, Alphen aan den Rijn.
In the age group of 19 till 64 years old 11.830 people received the survey. The survey was filled out by 5.996 participants (51%).

2.2 Demographic data

The survey population of the GGD health survey, consisting of both high and low SES, consisted of 5966 participants in the age range of 19 to 64 years old. The details about the survey population can also be found in table 1. The number of participants in each age group (19 to 34 years old, 35 to 49 years old and 50 to 65 years old) was normally spread. The survey population consisted for 56% of men, and for 44% of women. The greatest amount of people was either married or lived together, only few people were divorced or widow(er). Educational level was based on the Dutch education system. Most people accomplished MBO or HBO. A rather small amount of people finished the highest level of education, WO. The greatest proportion of people had a paid job, with an equal division between the other categories (Retired, receiving unemployement benefits, housewife/houseman, student). The greatest proportion of participants of the health survey had a Dutch or other Western nationality. A little more than half of the health survey population was religious. From the total health survey population, 35% had a low socioeconomic status based on the Dutch education system. People with low SES only completed LO, LBO, or MAVO. From the total survey population of the GGD health survey, those with low SES were taken as the study sample from this cross-sectional study about protective factors for a good objective and subjective health in individuals with low SES.

Table 1. Demographic data of the health survey population and low SES sample with N=number of people and percentages. The study population has N = 5843, the study sample has N=2081.

Variables		Total health survey population	Low SES Sample
		N (%)	(N%)
Age in years	19 to 34	1400 (24)	266(13)
	35 to 49	2156(36)	653(32)
	50 to 65	2410(40)	1154(56)
Gender	female	2603(44)	1197(58)
	male	3340(56)	858(42)
Marital status	married, living together	4624(78)	1661(81)
	not married, never been	937(16)	232(11)
	divorced	309(5)	128(6)
	widow/widower	706(1)	40(2)
Has children in the age 0 to 18	yes	2442(42)	709(35)
	no	3415(58)	1294(65)
Highest completed education	No education	82(1)	82(4)
	LO	160(3)	160(8)
	LBO	929(16)	929(45)
	Mavo	910(15)	910(44)
	MBO	1277(22)	-
	Havo, Vwo	651(11)	-
	HBO	1255(21)	-
	WO	594(10)	-
	different	87(2)	-
Socioeconomic status	High	3762(63)	-
	Low	2081(35)	2081 (100)
Workstatus	Paid job	4363(74)	1317(65)
	(Early) retired	304(5)	144(7)
	Uitkering'	388(7)	207(10)
	Housewife/houseman	564(10)	337(17)
	Studying	281(5)	33(2)
Etnicity	Dutch	5317(89)	1874(90)
	Surinamese	32(0.5)	12(0.6)
	Antilian/Aruban	22(0.4)	5(0.2)
	Turkish	21(0.5)	13(0.6)
	Marrocan	78(1.3)	42(2)
	other Western	387(6.5)	98(4.7)
	other non-western	108(1.8)	34(1.6)
Religion	Religious	3518(59)	1380(66)
	non-religious	2425(41)	701(34)

2.3 The variables

Socioeconomic status is based on educational level. Educational level has been measured as highest completed education. Education is a common used and available indicator of socioeconomic status in the Netherlands (Berkel-van Schaik & Tax, 1990). On the basis of eight possible answers two groups have been separated: low SES (no education, LO, LBO and MAVO) and high SES (MBO, HAVO, VWO, HBO and WO) SES.

Religion is divided into being either a Christian or not. Christians and non Christians differed in their relationship with objective and subjective health.

Etnicity is divided into Western and non-Western. Western and non-Western ethnic people differed in their relationship to objective and subjective health.

Objective health is based on absence or presence of (a) chronic condition(s). A good objective health is based on absence of 18 possible chronic conditions. These eighteen conditions are summarized into seven categories. The categories are: musculoskeletal (severe back condition, arthritis, dysfunctioning of the neck or shoulder, dysfunctioning of elbow, wrist or hand, wasting of the joints), coronary-, and vascular diseases (hyptertension, myocardial infarction, narrowing of the blood vessels in stomach or legs, stroke, other coronary diseases), migraine (migraine), Internal organs (asthma, bronchitis, emphysema, incontinence urine, bowel dysfunction), skin problems (chronic eczema, psoriasis), diabetes (diabetes), cancer (a form of cancer).

Subjective health is defined as how people rate their health in general; Excellent, very well, well, moderate, bad. When health was rated as either excellent, very well or well this was included as a good subjective health.

Smoking was defined as non-smoking when people did not smoke currently and had never smoked before.

Healthy physical activity is defined by the 'Dutch Norm Healthy Moving'. According to this norm , adults engage in healthy physical activity when they are active at least 5 days per week for 30 minutes (Hildebrandt, Ooijendijk, Hopman-Rock, 2007).

Healthy nutrition is defined as a combination of both the national norm of 200 grams of vegetables a day, the national norm of two pieces of fruit or one piece of fruit plus a glass of fruitjuice a day, and eating breakfast.

BMI is measured by weight in kilograms, squared by the square sum of height in meters. In case of more than 30 kg/m^2 someone is defined as overweight.

No to Moderate alcohol use is defined as: men max 21 glasses per week, max 5. glasses per drinking day, max 5 drinking days per week. Women max 14 glasses per week, max 3 glasses per drinking day, max. 5 drinking days per week.

Received social support is measured by social loneliness (the number and quality of personal relationships is less than desired) and emotional loneliness (the missing of intimacy in personal relationships or the missing of a trustworthy person).

Providing informal care is the care of a known person from his/ her environment, when this person is ill for a longer period of time, needy or handicapped. This care can exist of washing, clothing, housekeeping, but also provide social contact. We view providing informal care as a way of providing

social support.

Having children is taken in the analysis as having at least one or more children in the age group of 0 till 18 years old.

Marital status is divided in being married/ registered partnership, living together, not married and never been married, divorced or living divorced, widow/widower. In the analysis being married, living together or being a widow(er) will be researched as protective marital status and will be named a favorable marital status.

Workstatus is divided in either having a paid job, not having a paid job, being housewife/houseman, being a student, or being (early) retired. Either having a paid job, being a student or being (early) retired will be researched as protective work status and will be hypothesized as a favorable workstatus.

2.4 Design and Procedure.

In this study a cross-sectional design is used. A subset of the Dutch population from the region Hollands-Midden is used as study population. The survey is taken at one single point in time.All participants received a request to fill in the survey in September 2009 Two to four weeks after they received a letter with a reminder. Participants were also given the opportunity to fill out the survey by internet.

2.5 Statistic analysis

To test the hypothesis' about the individual contribution of the independent variables 'smoking', 'alcohol', 'nutrition, 'physical exercise', 'BMI', 'receiving social support', 'being married, being a widow(er) or living together, 'having at least one child', 'providing informal care, 'having a paid job', 'being a student' and 'being (early) retired' on the dependent variables 'objective health' and 'subjective health' we will use univariate logistic regression analysis. Only cases that satisfy the condition 'low SES' will be included in the analysis. To test hypotheses about interactions of possible protective lifestyle factors about interactions of possible social status factors, we will use multivariate logistic regression. When significant results are found, in both univariate logistic regression and multiple logistic regression, the possible confounding demographic variables 'gender', 'age', 'religion', and 'etnicity' will be included in the analysis to determine the unique variance explained.

Finally, we will use multivariate logistic regression to see if the addition of protective lifestyle factors, social status factors and workstatus will provide a protective profile for a good objective and subjective health in low SES individuals.

Results

3.1 The study sample

As can be found in table 1, the low SES study sample consisted of 2081 participants, which is 43.7% of the total health survey population. This sample consisted of more women (1197) than men (856), the opposite of the study population as a whole. The majority, 1661 people (81%), was married. Only few people, 128, (6%), were divorced. Also the majority, 1974 people, was Dutch(90.3%), with only

few people from other nationalities. 12 (0,6%) were Surinamese, 5 (0,2%) were Antilian/Aruban, 13 (0,6%) were Turkish, 42 (2,0%) were Marrocan, 98 (4,7%) were from other Western nationalities, and 34 were of other, not western nationalities. 517 (25,1%) were Katholic, 717(34,8%) were Protestant, 67 (3,3%) were Islamitic, 4 (0,2%) were boedhistic, 9 (0,4%) were Hindoeistic, 61 (3,0%) had another religion and 684 (33,2%) were not religious.

3.2 Distribution of independent variables and dependent variables

Frequencies were used to look at the distribution of the dichotomous independent variables and dependent variables for people with low SES. The results are in table 2 and table 3. Many respondents have a healthy weight, do not smoke, have no to moderate alcohol use and are physically active. Meanwhile, only 10.4% had a healthy nutrition. In the social context, 82.5% was either married, living together or widow(er). 50.9% had at least one child in the age range of 0 to 18 years old and 17% provided informal care. A high percentage – 90.4% - scored low on the loneliness scale. 73.3% worked, was a student or (early) retired. When looking at the dependent variables, table 3 shows us us that less than half of the sample had a good objective health (43.4%), and 87.4% rated their own health as good or very good. Crosstabs in table 4 show us that a high percentage of people with a good objective health – 97.1% - , also rated their health as good. Interestingly, from the people who actually had a bad objective health 80.2% also rated their health as good. Interestingly, this shows us that although people may objectively seen, have a chronic condition, a great part still feels healthy. Although this is different from what expected, the significant X^2(131.36; p<0.001)) shows us that a good objective and subjective health are related.

Table 2. N and percentage of total N=2081 meeting criteria for favorable factors for a good objective and subjective health.

Independent variables	N	%
workstatus (paid job/student/ retired)	1494	73.3%
providing informal care	352	17.2%
no overweight	1713	85.4%
non-smoking	1501	73%
no or moderare alcohol use	1664	86%
healthy nutrition	211	10.4%
enough physical activity	1173	58.1%
marital status (married/living together/ widow(er)	1701	82.5%
receiving social support (low on loneliness scale)	1881	90.4%
having a child aged 0-18 years old	366	50.9%

Table 3. N and percentage of total N=2081 with a good objective and subjective health.

Dependent variables	N	%
no chronic condition – good objective health	885	43.4%
good subjective health	1803	87.4%

Table 4. Crosstabs between a good and bad objective-, and subjective health.

| | | | good subjective health | | |
			no	yes	Total
good objective health	no	Count	227	917	1144
		% within good objective health	19,8%	80,2%	100,0%
		% within good subjective health	90,1%	51,9%	56,6%
	yes	Count	25	851	876
		% within good objective health	2,9%	97,1%	100,0%
		% within good subjective health	9,9%	48,1%	43,4%

3.3 Analysis of data – Objective Health as dependent variable

Hypothesis I a.

To test hypothesis 1 about the individual protective roles of the lifestyle factors 'not smoking', 'no or moderate alcohol use', 'healthy nutrition', 'enough physical activity' and 'no overweight' in relation to a good objective health we performed univariate logistic regression (see table 4).

The univariate analyses performed, showed no significant protective roles for 'no smoking' to a good objective health (Exp.B(0.871, p>0.05)), 'no to moderate alcohol use' to a good objective health (Exp.B(0.959; p>0.05), 'healthy nutrition' to a good objective health (Exp.B(0.859; p>0.05), and 'enough physical activity' to a good objective health (Exp.B(1.046; p>0.05)).

The univariate analysis performed to test the protective role of 'no overweight' to a good objective health showed a significant result (Exp.B(2.368; p<0.001)). Table 5 shows that while 46.3% of the people without overweight had a good objective health, this was only the case for 26.6% of people with overweight. When performing multivariate logistic regression with the possible confounders 'gender', 'age', 'etnicity' and 'religion' included in the analysis, the protective role of not being overweight towards a good objective health was found to be confounded by age. Age decreased the strong relationship between not being overweight and a good objective health slightly, nevertheless, the relationship remained strong and significant (Exp.B(2.294; p<0.001)).

Table 5. Univariate Logistic Regression results for no smoking, no to moderate alcohol use, healthy nutrition, enough hysical activity and no verweight to a good objective health with Beta, *p*-value, Odd's ratio, Confidence Interval and Nagelkerke R square.

	B	*p*-value	Exp.*B*	95.0% C.I.for Exp(B) Lower	Upper	R^2
No smoking	-0.138	0.170	0.871	0.715	1.061	0.001
Moderate alcohol use	-0.042	0.751	0.959	0.738	1.244	0.000
Healthy nutrition	-0.152	0.312	0.859	0.639	1.154	0.001
Enough physical activity	0.045	0.628	1.046	0.873	1.252	0.000
No overweight	**0.866**	0.000	**2.378**	1.798	3.144	0.027

Coefficiënts printed in bold are significant (p<0.001).

Table 6. Crosstabs with N and percentage of N between overweight and a good objective health

			good objective health no	yes	Total
Overweight yes/no	yes	Count	210	76	286
		% within Overweight yes/no	73,4%	26,6%	100,0%
	no	Count	904	778	1682
		% within Overweight yes/no	53,7%	46,3%	100,0%

Concluding these results we could confirm that not being overweight is protective for a good objective health. We could not confirm that not smoking, no to moderate alcohol use, a healthy nutrition or having enough physical activity were protective for a good objective health.

Hypothesis I b.

Next we performed multivariate logistic regression analysis to test the hypothesis about the protective interaction between lifestyle factors. We included interaction terms between no overweight and enough physical activity (Exp.*B*(1.288; p>0.05)), between not smoking and enough physical activity (Exp.*B*(0.935; p>0.05)), and between no overweight, enough physical activity and not smoking (Exp.*B*(1.150; p>0.05)). Analyses including these interaction terms did not show significant results, which means that the relationship between physical activity and a good objective health is independent of the other lifestyle factors smoking and overweight.

In addition, the interaction terms between no overweight and a healthy nutrition (Exp.*B*(1.549; p>0.05)), enough physical activity and healthy nutrition (Exp.*B*(1.151; p>0.05)) and between no overweight, enough physical activity and a healthy nutrition (Exp.*B*(1.256; p>0.05) were analyzed, but none of these interactions showed a significant result in its relation to a good objective health.

Concluding these results we could not confirm hypothesis Ib. As described before, only absence of overweight was protective to a good objective health.

Hypothesis II a.

The univariate analysis performed to test the hypothesis about the protective roles of social factors to a good objective health (see table 7), showed no significant protective role for receiving social support (Exp.*B*(1.002; p>0.05)). The univariate analyses performed to test the protective roles of 'providing informal care' for a good objective health (Exp.*B*(0.536; p<0.05)), and 'marital status' for a good objective health (Exp.*B*(0.746; p<0.05) showed significant results in a negative direction. Providing informal care and being either married, living together or a widow(er) decreased the chance on a good objective health. Table 8 shows the relationship between marital status and a good objective health. 42.3% of the people who is either married, living together or a widow(er) had a good objective health, while within the group not meeting these criteria for marital status 49% had a good objective health.. In addition, this table shows that for people who are married, living together or a widow(er) greater percentage (57.7%) had a bad, than a good objective health (42.3%).

Table 9 shows the relationship between providing informal care and a good objective health. 31.4% of the people who provided informal care had a good objective health, while from the people who did not provide informal care 46.1% had a good objective health.

The univariate analysis performed to test the protective role of having a child in the age 0 to 18 to a good objective health showed a significant result (Exp.*B*(1.668; p<0.001) (see table 7). When having a child in the age 0 to 18 the chance on a good objective health was more than 1.5 times higher than when not having a child in this age category. Table 10 shows that 51.6% of the people with a child in the age 0 to 18 had a good objective health, while this was only 39% for the people without a child in this age category.

Table 7. Univariate Logistic Regression results for receiving social support, providing informal care, marital status and having children to objective health with Beta, *p*-value, Odd's ratio, Confidence Interval and Predicted Variance.

	B	Sig	Exp.*B*	R^2	95% C.I. for Exp.(B) Lower	**Upper**
Receiving social suppport	-0.002	0.443	0.998	0.000	0.992	1.004
Providing informal care	**-0.623**	0.000	**0.536**	0.017	0.420	0.684
Marital status	**-0.269**	0.022	**0.764**	0.003	0.607	0.961
Having children	**0.521**	0.000	**1.668**	0.020	1.384	2.010

Coëfficients printed in bold are significant (p<0.05).

Table.8 Crosstabs between being either married, living together or widow(er) and objective health.

			good objective health		
			no	yes	Total
married, living together or widow(er)	no	Count	181	174	355
		% within married, living together or widow(er)	51,0%	49,0%	100,0%
	yes	Count	960	705	1665
		% within married, living together or widow(er)	57,7%	42,3%	100,0%

Table. 9 Crosstabs between providing informal care and objective health

			good objective health		
			no	yes	Total
giving informal care yes/no	no	Count	895	765	1660
		% within giving informal care yes/no	53,9%	46,1%	100,0%
	yes	Count	240	110	350
		% within giving informal care yes/no	68,6%	31,4%	100,0%

Table. 10 Crosstabs between having a child in the age 0 to 18 and objective health

			no	yes	
having a child in the age category of 0 to 18 years old	no	Count	772	493	1265
		% within having a child in the age category of 0 to 18 years old	61,0%	39,0%	100,0%
	yes	Count	338	360	698
		% within having a child in the age category of 0 to 18 years old	48,4%	51,6%	100,0%

Next we included the possible confounders gender, age, ethnicity and religion in the univariate analyses. The protective role of having a child in the age 0 to 18 towards a good objective health was found to be confounded by age. Age weakened the relationship between having children and objective

health (Exp.*B*(1.309;p<0.05)) but remained significant. This means, that the variance in both having children and objective health is partly due to age, and that part of the relationship found between having children and objective health is due to variance in age. The relationship between marital status and objective health disappeared when including age in the model (Exp.*B*(1.032;p>0.05)). This means that the relationship found between marital status and objective health can be explained by variance in age. The relationship between providing informal care and a good objective health increased slightly after including age in the analysis, and remained (Exp.*B*(0.595; p<0.001)) strong and significant.

Concluding the results we could not confirm the hypothesis that receiving social support and either being married, living together or being a widow(er) is protective for a good objective health. Opposite of what expected, providing informal care decreased the chance on a good objective health. We could confirm the hypothesis that having a child in the age 0 to 18 is protective for a good objective health.

Hypothesis II b.

To test the hypothesis whether providing informal care can be protective in case of absence of receiving social support, we performed multivariate logistic analysis including the interaction between receiving social support and providing informal care (see table 11). The interaction between receiving social support and providing informal care showed no significant result (Exp.*B(*1.007; p>0.05)). Opposite of what expected, this means that providing informal care is not protective for a good objective health in absence of receiving social support.

Table 11. Multivariate Logistic Regression results for receiving social support, providing informal care and the interaction between receiving social support and providing informal care to a good objective health with Beta, *p*-value, Odd's ratio and Confidence Interval and Nagelkerke R square.

Variables	B	*p*-value	Exp (B)	95% C.I for Exp.*B*	
				Lower	Upper
receiving social support	0.003	0.414	0.997	0.989	1.004
providing informal care	0.648	0.000	0.523	0.407	0.673
receiving social support * providing informal care	0.007	0.343	1.007	0.992	1.023
Constant	0.149	0.003	0.862		
a.Nagelkerke R square, R^2=0.018					

To test the hypothesis whether the addition of having a child in the age o to 18, being either married, living together or being a widow(er), and receiving social support is protective for a good objective health we performed multivariate logistic regression (see table 12). When first testing the multivariate model in which having a child in the age 0 to 18 in addition (Exp.*B*(1.778; p<0.001)) to either being married, living together or being a widow(er) (Exp.*B*(0.680; p<0.005)) were tested in their relationship to a good objective health, this showed significant results. Nevertheless, when controlling for the confounder 'age', the significant relationship between marital status (Exp.*B*(0.957; p>0.05)) and a

good objective health disappeared. The relationship between having a child in the age 0 to 18 and a good objective health was weakened by addition of age in the model (Exp.B(1.321; p<0.05)). Addition of the variable 'receiving social support' to the model, had as a result a not significant Chi-square of the Block in step 3 (X^2(0.211;p>0.05)). This means, that addition of the variable 'receiving social support' had no effect in optimizing the model of protective social factors to a good objective health. This finally means that – opposite from what expected – the additional combination of having a child in the age 0 to 18, being either married, living together or a widow(er) and receiving social support is not protective for a good objective health.

Table 12. Multivariate Logistic Regression results for having a child in the age 0 to 18, marital status, and receiving social support to objective health, controlled for age, with Beta, p-value, Odd's ratio Confidence Interval and Nagelkerke R square.

Variables	B	p-value	Exp (B)	95% C.I for Exp.B	
				Lower	Upper
age	-0.497	0.000	0.608	0.523	0.676
children	0.278	0.011	1.321	0.991	1.007
marital status	-0.044	0.747	.957	0.454	0.759
receiving social support	0.000	0.941	1.000	0.998	1.019
Constant	0.869	0.000	2.384		
a.Nagelkerke R square, R=^{2}=0.060					

Concluding the results we could not confirm the hypothesis that the protective role of providing informal care to a good objective health is dependent on the presence or absence of receiving social support.. Also we could not confirm the hypothesis that the additional presence of receiving social support, being either married, living together or widow(er) and having a child in the age 0 to 18 is protective for a good objective health.

Hypothesis III

The univariate model which tests the hypothesis that having a paid job, being a student or being (early) retired is protective for a good objective health, showed a significant protective role for a favorable workstatus to a good objective health (Exp.B(2.004; p<0.001)) (see table 13). When having a paid job, being a student or being (early) retired the chance on a good objective health was almost twice as large as people who did not meet these criteria. In table 14 we can see that while 47.8% of the people who had a paid job, were a student or were (early) retired had a good objective health, while only 31.3% of the people who did not have a paid job, who were receiving unemployment benefits were are housewife/houseman had a good objective health. When including the possible confounders gender, age, ethnicity and religion in the analysis, this showed that age decreased the protective effect of workstatus towards a good objective health (Exp.B(1.764; p<0.001)). Nevertheless, the protective effect of having a paid job, being a student or being (early) retired remained a strong and significant predictor of a good objective health. This means that only a small part of the relationship between workstatus and objective health is due to variance in age in both variables.

Table 13. Univariate Logistic Regression results for Workstatus to objective health with Beta, *p*-value, Odd's ratio, Confidence Interval Nagelkerke's R square.

	B	*p*-value	Exp.*B*	95% C.I. for Exp.(B) Lower	Upper	R^2
job, student, retired	**0.695**	0.000	**2.004**	1.624	2.473	0.029

Coëfficients printed in bold are significant (p<0.001).

Table 14. Crosstabs between having a paid job, being a student or (early) retired and objective health

			good objective health		
			no	yes	Total
work, student, retired	no	Count	364	166	530
		% within work, student, retired	68,7%	31,3%	100,0%
	yes	Count	768	702	1470
		% within work, student, retired	52,2%	47,8%	100,0%

Following the results we could confirm the hypothesis that having a paid job, being a student or (early) retired is protective for a good objective health.

Hypothesis IV

In testing hypothesis IV, we performed multivariate logistic regression including the possible confounders gender, age, ethnicity and religion, and the significant predictors of a good objective health from the univariate analyses from hypothesis I, II and III (see table 15). Firstly using the Enter method the possible confounders were additionally added to the model, secondly the predictors 'overweight', 'providing informal care', 'marital status', 'having a child in the age 0 to 18', and 'having a paid job/being a student/ being (early) retired' were additionally added to the model using the Enter method. Gender (Exp.*B*(0.581; p<0.001)) and age (Exp.*B*(0.584; p<0.001)) were found to significantly predict a good objective health. When the individual significant predictors of a good objective health 'no overweight', 'providing informal care', 'marital status', 'having a child in the age 0 to 18', and 'having a paid job/being a student/ being (early) retired' were additionally added to the model, marital status was not found as significant predictor (Exp.*B*(0.984; p>0.05)). Using the backward LR method, marital status was also excluded from the model. Not being overweight, not providing informal care, having a child in the age 0 to 18 and having either a paid job, being a student or being (early) retired was found as a protective combination to a good objective health.

Concluding these results we could not confirm our hypothesis that the addition of all healthy lifestyle behaviors, social factors and having a paid job, being a student or being (early) retired are jointly protective for an optimal objective health.

Table 15. Multivariate Logistic Regression results using the Backard LR method for gender, age, no overweight, providing informal care, marital status, having children in the age 0 to 18, workstatus to objective health with Beta, *p*-value, Odd's ratio, and Confidence Interval.

	Variables	B	*p*-value	Exp.*B*	95% C.I. for Exp.*B*	
					Lower	Upper
Step1a,b	gender	-0.401	0.000	0.669	0.547	0.819
	age	-0.405	0.000	0.667	0.571	0.779
	No overweight	0.762	0.000	2.142	1.588	2.889
	Providing informal care	-0.424	0.002	0.654	0.498	0.859
	Marital status	-0.016	0.910	0.984	0.741	1.305
	Children in the age 0 to 18	0.253	0.026	1.288	1.03-	1.609
	Workstatus	0.359	0003	1.432	1.128	1.817
	Constant	0.392	0.219	1.479		
Step 2a,b	gender	-0.402	0.000	0.669	0.547	0.819
	age	-0.408	0.000	0.665	0.576	0.767
	No overweight	0.761	0.000	2.141	1.587	2.887
	Providing informal care	-0.424	0.002	0.654	0.498	0.859
	Children in the age 0 to 18	0.248	0.021	1.282	1.039	1.582
	Workstatus	0.359	0.003	1.432	1.128	1.817
	Constant	0.389	0.221	1.476		

a.   Variable(s) entered on step1: no overweight, providing informal care, maritalstatus, children, workstatus.
b.   Nagelkerke R square of both models is R^2=0.111

Hypothesis V

In testing the hypothesis that the same lifestyle behaviors are protective for men and women, we performed univariate logistic regression (see table 16). An almost similar protective effect of lifestyle behaviors was found for men and women. For men, not smoking (Exp.*B*(0.749; p>0.05)) a healthy nutrition (Exp.B(0.923; p>0.05)) and enough physical activity (Exp.B(0.916; p>0.05)) were not found protective for a good objective health. Also for women, not smoking (Exp.*B*(1.068; p>0.05)) a healthy nutrition (Exp.B(0.973; p>0.05)) and enough physical activity (Exp.B(1.206; p>0.05)) were not found protective for a good objective health. The effect of not being overweight was found to be protective to a good objective health, but was larger and stronger for women (Exp.*B*(3.284; p<0.001)), than for men (Exp.B(1.720; p<0.05)). Surprisingly, no to moderate alcohol use was found to be a protective factor to a good objective health in women (Exp.*B*(1.624; p<0.05)), but not for men (Exp.*B*(0.909; p>0.05)). When including the possible confounders gender, age, ethnicity and religion, age was found to decrease and weaken the protective relationship between not being overweight and a good objective for men (Exp.*B*(1.566; p<0.05)). For women the protective effect of not being overweight to a good objective health was not confounded by age (Exp.B(3.155; p<0.001)). The relationship between no to moderate alcohol use and a good objective health for women was confounded by age. When adding age to the model the significant relationship between no to moderate alcohol use and objective health disappeared (Exp.*B*(1.481; p>0.05)).

When analyzing the protective effects of social factors, some slight differences were found for men and women. Where having a child in the age 0 to 18 was found to be protective for women (Exp.*B* (1.984; p<0.001)), this had no effect for men (Exp.*B*(1.286; p>0.05)). The earlier found result that either being married, living together or being a widow(er) had a negative effect on objective health, was confirmed for men (Exp.*B*(0.615; p<0.01)), but not for women (Exp.*B*(1.021; p>0.05)). The negative effect of providing informal care to a good objective health was found for both men (Exp.*B*(0.777; p>0.05)) and women, but was only significant for women (Exp.*B*(0.541; p<0.001)).

After controlling for possible confounders, the relationships between having a child in the age 0 to 18 and objective health for women (Exp.*B*(1.539; p<0.005)) and the relationship between providing informal care and objective health for women (Exp.*B*(0.608; p<0.005)) decreased minimally. Nevertheless, both relationships remained strong and significant, which means that the relationships between marital status and objective health and providing informal care and objective health for women is only for a minimal part due to variance in age in all variables. When controlling for possible confounders in the analysis between marital status and objective health for men, age was also found as confounder (Exp.*B*(0.852; p>0.05)). The relationship between marital status and a good objective health for men disappeared when controlling for age. This means that the relationship found between marital status and a good objective health was due to variance in age in both variables.

Both for men and women having a paid job, being a student, or being (early) retired was protective for a good health, with a slightly larger effect for men (Exp.*B*(2.512;p<0.001)) than women (Exp.*B*(1.493; p<0.005)). When controlling for possible confounders, age decreased the relationship between workstatus and a good objective health for men, but nevertheless the relationship remained strong and significant (Exp.*B*(2.379; p<0.001)). For women, age decreased and weakened the relationship between workstatus and a good objective health (Exp.*B*(1.312; p<0.05)), nevertheless the positive relationship remained. This means that part of the relationship between workstatus and a good objective health, might be explained by the variance in age in both workstatus and objective health.

Table 15. Univariate analysis for lifestyle factors, social factors and workstatus to a good objective health with Odd's ratio's, p-value's, and Confidence Intervals, separated for men and women.

Variables	Men				Women			
	Exp.B	p-value	95% C.I. for exp.B Lower	Upper	Exp.B	p-value	95% C.I. for exp.B Lower	Upper
no smoking	0.749	0.056	0.557	1.008	1.068	0.644	0.808	1.411
no to moderate alcohol use	0.909	0.582	0.647	1.277	**1.642**	0.038	1.029	2.622
healthy nutrition	0.923	0.778	0.526	1.618	0.973	0.878	0.683	1.386
physical activity	0.916	0.534	0.695	1.207	1.206	0.135	0.943	1.543
no overweight	**1.720**	0.011	1.132	2.614	**3.284**	0.000	2.184	4.938
receiving social support	0.997	0.533	0.998	1.006	0.998	0.635	0.990	1.006
providing informal care	0.777	0.299	0.483	1.250	**0.541**	0.000	0.401	0.731
being married, living together or widow(er)	**0.615**	0.005	0.437	0.864	1.021	0.903	0.734	1.419
having a child in the age 0 to 18	1.286	0.081	0.970	1.706	**1.984**	0.000	1.537	2.560
having a paid job, student or (early) retired	**2.512**	0.000	1.617	3.902	**1.493**	0.002	1.158	1.925

Coëfficients printed in bold are significant (p<0.05).

In using multivariate logistic analyses to test which combination of individual protective factors was protective for a good objective health in men, we firstly used the Enter method including the possible confounder 'age'. Age was found to significantly predict a good objective health (Exp.B(0.631;p<0.001). Next, using the Enter method the additional combination of the individual significant predictors not being overweight, being either married, living together or being a widow(er), and having either a paid job, being a student or being (early) retired were analyzed. Marital status was not found as a significant predictor and excluded from the model (Exp.B(0.777; p>0.05)). Not being overweight was also not found to be significant predictor in the second model (Exp.B(1.454; p>0.05)). Nevertheless, when using the backward LR method, this variable was not excluded and the combination of not being overweight and having a paid job, being a student or being (early) retired was found to be protective for a good objective health in men (see table 16)

The same method was used for women. Age was found to significantly predict a good objective health (Exp.B(0.751; p<0.05)). Using the Enter method the additional combination of the individual significant predictors no to moderate alcohol use, not being overweight, having a child in the age 0 to 18, providing informal care and workstatus were analyzed. No to moderate alcohol use (Exp.B(1.537; p>0.05)) and either having a paid job, being a student or being (early) retired (Exp.B(1.244; p>0.05)) were not found as significant predictors of a good objective health. Nevertheless, when using the backward LR method, only workstatus was excluded from the model. The combination of no to moderate alcohol use, not being overweight, having a child in the age 0 to 18, and not providing informal care was found to be protective for a good objective health in women (see table 17).

Tabel 16. Multivariate Logistic Regression results for men for no overweight, marital status and workstatus to objective health with Beta, *p*-value, Odd's ratio and Confidence Interval.

		B	*p*-value	Exp(B)	95% C.I. for Exp(B)	
					Lower	Upper
Step 1a	age	-0,46	0	0,631	0,511	0,78
	No overweight	0,386	0,082	1,47	0,952	2,272
	Marital status	-0,252	0,22	0,777	0,519	1,163
	Workstatus	0,975	0	2,65	1,627	4,317
	Constant	0,156	0,693	1,169		
Step 2a	age	-0,508	0	0,601	0,493	0,733
	No overweight	0,375	0,091	1,454	0,942	2,246
	Workstatus	0,916	0	2,5	1,551	4,029
	Constant	0,127	0,747	1,136		

a. Variables entered on step 1: No overweight, Marital status and Workstatus
b. Nagelkerke R square in model 1 R^2=0.085, in model 2 R^2=0.083

Table 17. Multivariate Logistic Regression results for women for no overweight, no to moderate alcohol use, a child in the age 0 to 18, providing informal care and workstatus to a good objective health with Beta, *p*-value, Odd's ratio and Confidence Interval.

		B	*p*-value	Exp(B)	95% C.I. for Exp(B)	
					Lower	Upper
Step 1a	age	-0.286	0.010	0.751	0.605	0.933
	No overweight	1.042	0.000	2.835	1.834	4.382
	No to moderate alcohol use	0.430	0.092	1.537	0.933	2.532
	Child in the age 0 to 18	0.500	0.001	1.649	1.214	2.241
	Providing informal care	-0.496	0.004	0.609	0.436	0.851
	Workstatus	0.219	0.135	1.244	0.934	1.657
	Constant	-1.350	0.004	0.259		
Step 2a	age	-0.312	0.004	0.732	0.591	0.907
	No overweight	1.058	0.000	2.880	1.864	4.449
	No to moderate alcohol use	0.432	0.090	1.541	0.935	2.538
	Child in the age 0 to 18	0.494	0.002	1.639	1.207	2.227
	Providing informal care	-0.515	0.003	0.598	0.428	0.835
	Constant	-1.153	0.010	0.316		

a. Variables entered on step 1: no overweight, no to moderate alcohol use, having a child in the age 0 to 18, providing informal care, workstatus.
b. Nagelkerke R square of model 1 R^2=0.109, of model 2 R^2=0.106.

Following the results, we could confirm the hypothesis that having a paid job, being a student or being (early) retired is more protective for men than women for a good objective health.

We could not confirm the hypotheses about similar lifestyle behaviors being protective to a good objective health for men and women, plus we could not confirm that marital status and having a child in the age 0 to 18 is more protective for women than men.

Summary hypothesis I, II, III, IV & V

Following the results from testing hypothesis I,II and III, being not overweight, having a child in the age 0 to 18 and having either a paid job, being a student or being (early) retired were strongly positive related to a good objective health, and can be seen as individual protective factors to a good objective health. Providing informal care had a negative influence on health. Following hypothesis IV, the additional combination of not being overweight, having a child in the age 0 to 18, not providing informal care, and having either a paid job, being a student or being (early) retired was found as optimal protective combination for a good objective health. Nevertheless, separating men and women showed that different factors were protective for men and women. Both for men and women not being overweight and having a paid job, being a student or being (early) retired were individually protective for a good health and in additional combination. For women having a child in the age 0 to 18, and not providing informal care were also found protective for a good objective health, both individually and in additional combination to not being overweight and having either a paid job, being a student or being (early) retired. For men no additional factors, next not being overweight and having either a paid job, being a student or being (early) retired, were found protective for a good objective health.

3.4 Analysis of data – Subjective Health as dependent variable

Hypothesis I a.

To test hypothesis 1 about the individual protective roles of the lifestyle factors 'not smoking', 'no or moderate alcohol use', 'healthy nutrition', 'enough physical activity' and 'no overweight' in relation to a good subjective health we performed univariate logistic regression (see table 18).

The univariate analyses performed, showed significant protective roles for 'no smoking' to a good subjective health (*Exp.B*(1.648; p<0.001)), 'enough physical activity' to a good subjective health (*Exp.B*(1.555;p<0.01)), and 'no overweight' to a good subjective health (*Exp.B*(2.947; p<0.001)). This tells us that the chance of having a good subjective health when not smoking is 1.6 times higher than when smoking, 1.5 times higher when being physically active than when not being physically active, and almost 3 times higher when not being overweight than when being overweight. When adding possible confounders to the models this showed that the relationship between 'no smoking' and a good subjective health was strengthened by age (Exp.*B*(1.833; p<0.001) The relationships between no overweight and a good subjective health (Exp.B(2.809; p<0.001)) and physical activity and a good subjective health (Exp.*B*(1.608; p<0.005)) were not weakened or strengthened by age. The univariate analyses which showed the relationship between 'no to moderate alcohol use' and a good subjective health (*Exp.B*(1.404; p>0.05)) and 'healthy nutrition and a good subjective health (*Exp.B*(1.151; p>0.05)) showed that these variables were not protective for a good subjective health.

Table 18. Univariate Logistic Regression results for smoking, alcohol, nutrition, physical activity and overweight to subjective health with Beta, p-value, Odd's ratio, Confidence Interval and Nagelkerke's R Square

	95% C.I.	

Variables	B	p-value	Exp.B	Lower	Upper	R²
				for		
				Exp.B		
No smoking	**0.499**	0.000	**1.648**	1.250	2.171	0.011
No to moderate alcohol use	0.399	0.066	1.404	0.978	2.016	0.003
Healthy nutrition	0.141	0.545	1.151	0.730	1.815	0.000
Enough physical activity	**0.441**	0.001	**1.555**	1.187	2.037	0.01
No overweight	**1.081**	0.000	**2.947**	2.169	4.004	0.04

Coefficiënts printed in bold are significant (p<0.001).

Following the results we could not confirm the hypothesis that no to moderate alcohol use and a healthy nutrition are protective for a good subjective health. We could confirm the hypothesis that not smoking, enough physical activity and no overweight are protective for a good subjective health.

Hypothesis I b.

Next we performed multivariate logistic regression analysis to test the hypothesis about the protective interaction of lifestyle factors. We included the interaction terms between no overweight and enough physical activity (Exp.B(1.146; p>0.05)) and between enough physical activity and smoking (Exp.B(0.693; p>0.05)). We also included the interaction term between no overweight, enough physical activity and not smoking (Exp.B(0.886; p>0.05)). Analyses including these interaction terms did not show significant results, which means that the relationship between having enough physical activity and a good subjective health is independent of the other lifestyle variables overweight and smoking.

In addition the interaction terms between physical activity and nutrition (Exp.B(0.981;p>0.05)), nutrition and overweight (Exp.B(1.828;p>0.05) and nutrition, physical activity and overweight (Exp.B(1.004;p>0.05)) were analyzed, but none of these interactions showed a significant result in its relation to subjective health.

Following the results we could not confirm the hypothesis that enough physical activity is protective for a good subjective health in case of smoking or obesity. We could also not confirm that not being overweight is protective in case of not having enough physical activity or a unhealthy nutrition.

Hypothesis II a.

The univariate analyses performed to test the hypothesis about the protective roles of social factors for a good subjective health, showed no significant protective roles for receiving social support (Exp.B(0.998; p>0.05)), providing informal care (Exp.B(1.097; p>0.05)) and having at least one child in the age group of 18 years old (Exp.B(1.196; p>0.05)) for a good subjective health. The univariate analysis which tests the protective role of marital status to a good subjective health had a significant result (Exp.B(1.457; p<0.05)). The chance on having a good subjective health is almost 1.5 times higher when being either married, a widow(er) or when living together than when being single or

divorced. The results of the univariate analyses can be found in table 19. When performing a multivariate logistic analysis in which the relationship between marital status and a good subjective health was explored by adding confounders to the model, age influenced the relationship between marital status and a good subjective health. By adding age to the model, marital status became a stronger and greater predictor of a good subjective health (Exp.B(1.908; p<0.001)).

Table 19. Univariate Logistic Regression results for receiving social support, providing informal care, marital status and having children to good subjective health with Beta, p-value, Odd's ratio, Confidence Interval and Nagelkerke R square.

Variables	B	p-value	Exp.B	95% C.I. for Exp.B Lower	Upper	R^2
receiving social suppport	-0.002	0.622	0.998	0.990	1.006	0.000
providing informal care	0.093	0.613	1.097	0.766	1.572	0.000
marital status	**0.376**	0.02	**1.437**	1.060	2.002	0.005
having children	0.179	0.220	1.196	0.898	1.592	0.001

Coefficiënts printed in bold are significant (p<0.05).

Following the results we could not confirm the hypothesis that receiving social support, providing informal care and having a child in the age 0 to 18 are protective for a good subjective health. We could confirm that being married, living together or being a widow(er) is protective for a good subjective health.

Hypothesis II b.
The multivariate logistic analysis which tests whether the interaction between receiving social support and providing informal care is protective for a good subjective health, showed a significant result (Exp.B(0.977; p<0.05)) (see table 20). Following the regression equation ($y=$ a$+B_{receiving\ social\ support}* X_1$ $+B_{providing\ social\ support}t* X_2 + B_{receiving\ social\ support*providing\ social\ support} * X_{12}$) and the results in table 15, we can see that the chance on a good subjective health is quite high in case of both providing informal care and receiving social support(y=3.299). This chance on a good subjective health, is much higher than in case of absence of both receiving social support and providing informal care (y=1.925). Nevertheless, the hypothesis that providing informal care is protective in case of absence of social support cannot be confirmed.

Table 20. Multivariate Logistic Regression results for Receiving social support, providing informal care and the interaction between receiving social support and providing informal care to subjective health, controlled for age, with Beta, *p*-value, Odd's Ratio, Confidence Interval and Nagelkerke R-square.

| | B | *p*-value | Exp(B) | 95% C.I. for Exp.*B* | |
				Lower	Upper
Age	-0.451	0.000	0.637	0.516	0.786
Receiving social support	0.010	0.193	1.010	0.995	1.026
Providing informal care	0.276	0.153	1.318	0.903	1.923
Receiving social support by providing informal care	**-0.026**	00.017	0.974	0.953	0.995
Constant	3.039	0.000	20.889		
Nagelkerke R square = 0.022					

Coefficiënts printed in bold are significant (p<0.05).

When testing the hypothesis of the protective role of additionally receiving social support (Exp.*B*(0.999; p>0.05)), being either married, living together or being a widow(er) (Exp.*B*(1.403; p<0.05)), and having a child in the age 0 to 18 (Exp.B(1.126; p>0.05)) showed only a significant result for marital status. Marital status was found as individual protective factor, but addition of either having a child in the age 0 to 18 and addition of receiving social support had no significant model as result (X^2(5.263; p>0.05)) (see table 21).

Table 21. Multivariate Logistic Regression results for the additional model with children in the age 0 to 18, marital status and receiving social support to subjective health with Beta, *p*-value, Odd's Ratio, Confidence Interval and Nagelkerke R square.

| | B | *p*-value | Exp(B) | 95% C.I.for Exp.(B) | |
				Lower	Upper
Children in the age 0 to 18	0.119	0.429	1.126	0.839	1.512
Marital status	0.339	0.048	1.403	1.003	1.963
Receiving social support	-0.001	0.874	0.999	0.988	1.01-
Constant	1.653	0.000	5.221		
Nagelkerke R square = 0.005					

In line with the earlier found result that providing social support was not protective for a good subjective health, we could also not confirm the hypothesis that providing social support was protective to a good subjective health in absence of receiving social support. Although earlier found that either being married, living together or being a widow(er) was protective for a good subjective health, we could not support the hypothesis that the addition of marital status, having a child in the age 0 to 18 and receiving social support was protective for a good subjective health.

Hypothesis III
The univariate analyses performed to test the hypothesis that having a paid job, being a student or being (early) retired would be protective for a good subjective health, showed a significant protective role for either having a paid job, being a student or being (early) retired for a good subjective health

(Exp.B(3.601; p<0.05)) (see table 22). When having a paid job, being a student or being (early) retired, the chance on a good subjective health is 3.6 times higher, compared to being a housewife/houseman, receiving unemployment benefits and/or not having a job. This can also be seen in table 23; from the people with either having a paid job, being a student or being (early) retired 91.8% has a good subjective health, compared to only 8.2% having a bad subjective health. Also within the group of people without a paid job or who are receiving unemployment a high percentage of people (75.6%) has a good subjective health, nevertheless this percentage is not as high as within the group meeting criteria for a favorable workstatus. When performing a multivariate analysis with the possible confounders gender, age, etnicity and religion workstatus was still an as great and strong predictor of a good subjective health (Exp.B(3.382; p<0.001)).

Tabel 22. Univariate Logistic Regression Result for workstatus with Beta, p-value, Odd's Ratio, Confidence Interval and Nagelkerke R square.

Variable	B	p-value	Exp.B	95% C.I. for Exp.B Lower	Upper	R^2
Workstatus	**1.281**	0.000	**3.601**	2.749	4.717	0.077

Coefficiënts printed in bold are significant (p<0.05).

Table 23. Crosstabs between having a paid job, being a student, or being retired and subjective health

			good subjective health		
			no	yes	Total
work, student, retired	no	Count	132	408	540
		% within work, student, retired	24,4%	75,6%	100,0%
	yes	Count	122	1358	1480
		% within work, student, retired	8,2%	91,8%	100,0%

Following the results we could confirm the hypothesis that having a paid job, being a student or being (early) retired was protective for a good subjective health.

Hypothesis IV

In testing hypothesis IV, we performed multivariate logistic regression including the possible confounders gender, age, ethnicity and religion, and the significant predictors of a good subjective health from the univariate analyses from hypothesis I, II and III (see table 24). Firstly using the Enter method the possible confounders were additionally added to the model, secondly the predictors 'not smoking', 'enough physical activity', 'no overweight', 'marital status', and 'workstatus' additionally added to the model using the Enter method. Age (Exp.B(0.624; p<0.001)) and etnicity (Exp.B(2.432; p<0.005)) and religion (Exp.B(1.413;p<0.05)) were found to significantly predict a good objective

health. When the individual significant predictors of a good subjective health, 'not smoking', 'enough physical activity', 'no overweight', 'marital status', and 'workstatus' were additionally added to the model, all factors were found as predictive of a good subjective health. Using the backward LR method, the analysis showed that the additional combination of not smoking, enough physical activity, not being overweight, being either married, living together or a widow(er) and having either a paid job, being a student or being (early) retired accounted for a protective profile for a good subjective health. Concluding these results we could not confirm that the addition of all healthy lifestyle behaviors, social factors and having a paid job, being a student or being (early) retired was protective for a good subjective health.

Table 24. Multivariate Logistic Regression results with not smoking, enough physical activity, no overweight, marital status and workstatus controlling for gender and age to subjective health with Beta, *p*-value, Odd's ratio, Confidence Interval and Nagelkerke R square.

		B	*p*-value	Exp(B)	95% C.I.for Exp.(B)	
					Lower	Upper
Step 1a	Gender	0,447	0,006	1,564	1,133	2,158
	Age	-0,344	0,005	0,709	0,558	0,901
	Not smoking	0,592	0	1,808	1,319	2,478
	Enough physical activity	0,333	0,027	1,396	1,038	1,876
	No overweight	0,992	0	2,697	1,914	3,799
	Marital status	0,434	0,028	1,543	1,047	2,274
	Workstatus	1,335	0	3,798	2,757	5,233

a. Variables included at step 1: Not smoking, enough physical activity, no overweight, marital status and workstatus
b.Nagelkerke R square, R^2=0.145

Hypothesis V

When separating men and women in the univariate analyses testing the protective effects of lifestyle factors for a good subjective health, not smoking was found protective for both men (Exp.*B*(1.893;p<0.005)) and women (Exp.*B*(1.470;p<0.05)), but the effect was much stronger for men. Also not being overweight was protective for both men (Exp.*B*(2.196;p<0.005)) and women (Exp.*B*(3.607;p<0.001)). Where having enough physical activity was found to be protective when analyzing men and women together, it was here found strongly protective for women (Exp.*B*(2.031;p<0.001)), but not for men (Exp.*B*(1.054; p>0.05)). Noticeable is that when separating men and women, also no to moderate alcohol use was found as a protective factor, but only for men (Exp.*B*(1.765; p<0.05)). When including possible confounders in the analysis, age was found as confounder to the relationship between no to moderate alcohol use and a good subjective health (Exp.*B*(1.744; p<0.05)) and between not being overweight and a good subjective health (Exp.*B*(1.961; p<0.05)) for men. Nevertheless the relationships between these variables remained strong and significant. This means that a small part of the relationship between no to moderate alcohol use and a good subjective health and not being overweight and a good subjective health is due to variance in age in these variables.

For women no confounders to the relationships between not smoking and a good subjective health and between enough physical activity and a good subjective health were found. Both for men (Exp.*B*(2.313; p<0.001)) and women (Exp.*B*(1.541; p<0.05)), the addition of age in the analysis increased and strengthened the relationship between not smoking and a good subjective health.

When looking at the social factors, a positive effect was found for being either married, living together or being a widow(er), nevertheless this result was only significant for men (Exp.*B*(1.599;p<0.05)). Adding possible confounders in the analysis increased and strengthened the relationship between marital status and a good subjective health for men (Exp.*B*(2.892; p<0.001)).

Having a paid job, being a student or being (early) retired was found strongly protective for a good subjective health, with for men (Exp.*B*(9.588; p<0.001)) increasing the chance on a good subjective health almost 9.5 times, and for women (Exp.*B*(2.581; p<0.001)) 2.5 times. Both for men and women no confounders were found to the relationship between workstatus and a good subjective health.

The results of the univariate logistic regression analyses for men and women separated can be found in table 25

Table 25. Univariate analyses for lifestyle factors, social factors and workstatus to a good subjective health with odd's ratios, p-value and confidence intervals.

	men				women			
	Exp.*B*	*p*-value	95% C.I. for Exp.*B* lower	upper	Exp.*B*	*p*-value	95% C.I. for Exp.*B* lower	upper
no smoking	**1.893**	0.003	1.249	2.869	**1.470**	0.045	1.008	2.143
no to moderate alcohol use	**1.765**	0.017	1.106	2.816	1.008	0.981	0.535	1.897
healthy nutrition	3.816	0.066	0.915	15.916	0.892	0.654	0.543	1.467
physical activity	1.054	0.807	0.691	1.607	**2.031**	0.000	1.420	2.905
no overweight	**2.196**	0.003	1.309	3.683	**3.607**	0.000	2.449	5.313
receiving social support	0.995	0.408	0.984	1.007	1.000	0.958	0.989	1.011
providing informal care	0.896	0.757	0.445	1.804	1.187	0.431	0.774	1.820
being married, living together or widow(er)	**1.599**	0.045	1.010	2.531	1.334	0.205	0.854	2.083
having a child in the age 0 to 18	1.296	0.244	0.838	2.007	1.080	0.694	0.738	1.580
having a paid job, student or (early) retired	**9.588**	0.000	5.973	15.392	**2.581**	0.000	1.816	3.669

Coëfficiënts printed in bold are significant (p<0.05).

In using multivariate logistic analyses to test which combination of individual protective factors was protective for a good subjective health in men, we firstly used the Enter method including the possible confounder 'age'. Age was found to significantly predict a good objective health (Exp.*B*(0.458 ;p<0.001). Next, using the Enter method the additional combination of the individual significant predictors 'not smoking', 'no to moderate alcohol use', 'no overweight', 'marital status' were analyzed. All variables, besides age, were found to positively, and significantly related to a good subjective

health. Also in using the backward LR method not smoking, no to moderate alcohol use, not being overweight, being either married, living together or widow(er) and having either a paid job, being a student or being (early) retired were found as combination optimally protective for a good subjective health for men (see table 26).

The same method was used for women. Age was found to significantly predict a good objective health (Exp.B(0.751; p<0.05)). Using the Enter method the additional combination of the individual significant predictors 'not smoking', 'enough physical activity', 'no overweight', and 'workstatus' were analyzed. Only age was excluded from the model. Next, when using the backward LR method, also only age was excluded from the model. The combination of not smoking, having enough physical activity, not being overweight and either having a paid job, being a student or being (early) retired was found to be protective to a good subjective health for women (see table 27).

Table 26. Multivariate Logistic Regression results for not smoking, no to moderate alcohol use, no overweight, marital status and workstatus to subjective health for men, controlled for age with Beta, p-value, Odd's Ratio, Confidence Interval and Nagelkerke R square.

| | | B | p-value | Exp(B) | 95% C.I.for EXP(B) | |
					Lower	Upper
Step 1a	Age	-0.888	0.000	0.412	0.272	0.624
	No smoking	0.719	0.006	2.051	1.234	3.410
	No to moderate alcohol use	0.673	0.015	1.960	1.139	3.373
	No overweight	0.696	0.025	2.006	1.091	3.688
	Maritalstatus	0.620	0.057	1.858	0.982	3.516
	Workstatus	2.127	0.000	8.386	4.835	14.544
	Constant	0.500	0.456	1.649		

a. Variables included in step 1: Not smoking, No to moderate alcohol use, No overweight, marital status and workstatus.
b.Nagelkerke R square is R^2=0.269

Table 27. Multivariate Logistic Regression results with not smoking, enough physical activity, no overweight and workstatus to subjective health for women, controlled for age, with Beta, *p*-value, Odd's Ratio, Confidence Interval and Nagelkerke R square.

		B	*p*-value	Exp(B)	95% C.I.for EXP(B)	
					Lower	Upper
Step 1a	Age	-0,787	0	0,455	0,309	0,669
	No smoking	0,714	0,005	2,041	1,241	3,358
	Eough physical activity	-0,024	0,922	0,976	0,605	1,575
	No overweight	0,71	0,02	2,033	1,118	3,698
	Workstatus	2,098	0	8,146	4,835	13,725
	Constant	1,265	0,048	3,543		
Step 2a	Age	-0,787	0	0,455	0,309	0,669
	No smoking	0,712	0,005	2,039	1,24	3,351
	No Overweight	0,708	0,02	2,03	1,117	3,69
	Workstatus	2,097	0	8,142	4,832	13,716
	Constant	1,255	0,047	3,508		

a. Variables included in step 1: Not smoking, enough physical activity, no overweight, workstatus.
b. B. Nagelkerke R square, $R^2=0.234$

Following the univariate results, we could confirm the hypothesis that having a paid job, being a student or being (early) retired is more protective for men than for women. Nevertheless, following the multivariate results, we could not confirm this hypothesis. Following both the univariate and multivariate results, we could not confirm our hypothesis about the gtsame lifestyle behaviors being protective for a good subjective health, and that marital status and having a child in the age 0 to 18 would be more protective for women than for men.

<u>Summary hypothesis I, II, III, IV & V</u>

In testing hypothesis I, II and III, not being overweight, having enough physical activity, not smoking, being either married, living together, or a widow(er), and either having a paid job, being a student, or being (early) retired were found as individual protective factors for a good subjective health. No factors that had a negative influence on subjective health were found. The combination of receiving social support and providing informal care was found to be a protective combination towards a good subjective health. The individual protective factors found following hypothesis I, II and III, were found to make up for a protective combination towards a good subjective health following the multivariate analyses executed in testing hypothesis IV.

When separating men and women in the analyses not smoking, not being overweight, and having either a paid job, being a student or being (early) retired were found protective for a good subjective health in both men and women. Where no to moderate alcohol use was found protective for a good objective health for women, it was found protective for a good subjective health in men. In univariate testing, enough physical activity was found protective for a good subjective health in women, but following the multivariate analysis this variable was excluded from the protective profile of variables for women.

Discussion

4.1 Discussion of results

Different factors, and combinations of factors, are protective for a good objective-, and subjective health. This is not in line with our expectations; we hypothesized that the combination of not smoking, no to moderate alcohol use, a healthy nutrition, enough physical activity, not being overweight, receiving social support, providing informal care, having a child in the age 0 to 18, being either married, living together or a widow(er), and having either a paid job, being a student or being (early) retired would be protective for a good objective-, and subjective health. As already seen before, having a good objective health did not inversely mean a good subjective health, and the other way around. Even more striking was that many people who did not have a good objective health, did rate their health subjectively seen as good. This showed that although related, objective and subjective health are two different concepts. This might also explain, why different factors account for a good objective-, and subjective health.

Do people with a healthy lifestyle have a better objective and subjective health than people with an unhealthy lifestyle?

Hypothesis I: On the basis of previous literature from Adler et al., (1994) and Johansson & Sundquist (1999) we expected that within the group of people with low SES not smoking, no to moderate alcohol use, a healthy nutrition, enough physical activity and not being overweight would be protective for a good objective and subjective health. These expectations were strengthened by the findings by Hanning et al., (2010) – on the basis of the same database as we used – that people with low SES more often experienced and reported a bad objective health than high educated individuals, plus that these people with low SES more often reported unhealthy behaviors. Yet, studies from Dupre & George (2011) and Lantz et al., (2011) found that healthy behaviors only had a minimal causal influence in a good health. Resulting from this contrast in the literature, it was our aim to contribute to the existing literature to find a uniform answer on what factors are protective to a good health. When looking at objective health, we found opposite to Dupre & George (2011), that not being overweight was protective for a good health. Nevertheless, in line with Dupre & George (2011), we found that most healthy lifestyle factors were not protective for a good objective health in low SES individuals. Seemingly more in line with expectations was the protective effect of lifestyle behaviors to a good subjective health. In line with objective health, not being overweight was found strongly protective for a good subjective health. In addition, not smoking and having enough physical activity were also found protective for a good subjective health. This was in line with Johansson & Sundquist (1999). Although having a healthy nutrition and no to moderate alcohol use were not found as protective for a good subjective health in the first place, no to moderate alcohol use was found protective for men, when separating men and women in the analysis.

Differently from what expected, we did not find an interactive protective effect for lifestyle factors; the

relationship between not being overweight and health was not dependent on physical activity, smoking, and nutrition.

That we could not confirm our hypothesis about the protective role of lifestyle behaviors to a good objective health might be due to several reasons. Lifestyle behaviors were based on one-time measures, which might not have fully captured exposure over the life-course and thus our measures might have been incomplete markers for the impact of behavioral factors on health status (Lantz et al., 2011). For example, currently being enough physically active, does not mean people have been physically active in previous years. This at the same time might account for the fact that being physically active now, gave people a subjective feeling of being healthy, while in fact, physically seen, it hasn't achieved a protective effect for a good objective health yet.
Another explanation might be found in tertiary prevention; Once having a chronic condition, people are often stimulated to change their lifestyle behaviors. For example patients with coronary heart diseases are advised to change their diet and to become more physically active (Mills & Chambers, 2012). As a consequence, the chronically ill population might seem to perform proportionally more healthy behaviors, than the actually healthy population.

An additional explanation was given by George & Dupre earlier on. They suggested that favorable health practices only act as protective agents for an exceptional health within the context of resilience, a constellation consisting of psychological resources that promote a proactive stance towards the environment, a way of effective problem solving and social competence (Dupre & George, 2011). It might be that when studying the individual role of lifestyle factors to a good health, their protective role is not strong enough to show independently, but that they only show to be protective when studying them as a part of a framework of resilience.
Nevertheless, this should not be taken to mean that major health risk behaviors are not important determinants of individual or population health. Also the fact that some healthy behaviors do give a good subjective feeling of being healthy show that healthy behaviors definitely have an impact. These results maybe only show that objective inequalities within the low socioeconomic group might not fully be explained by differences in current health behaviors.

The finding that a healthy nutrition did not make people objectively and subjectively more healthy, might be due to more unknown and unnoticeable consequences. This way, not showing the unhealthy behaviors, might not inversely give the positive reward of feeling healthy. For example, smoking and obesity are well known to have cardiovascular-, and internal problems (asthma, bronchitis e.a) and people notice the consequences of for example smoking easily, by coughs or shorter breath. The consequences of not eating enough vegetables and fruits are not that easy noticeable on short term, and this way people might not easily realize that they are healthy when they do eat them.

Are receiving social support, providing informal care, having a child in the age 0 to 18 and either being married, living together or a widow(er) protective to a good objective-, and subjective health?

Hypothesis II: On the basis of previous literature from Matthews & Gallo (2011), Dupre & George (2011) Schöllgen et al., (2011) and Sapolsky (2004) we expected that within the group of people with low SES, receiving social support, providing informal care, being either married, living together or widow(er), and having a child in the age 0 to 18 would be protective for a good physical and subjective health. Schöllgen et al., (2011) found a protective effect for social resources on health, but still rather weak. Sapolsky (2004) expected that providing informal care was a stronger predictor of objective health than receiving social support, and based on that expectation we expected providing informal care to interact with receiving social support in relation to a good health. We did not find this result.

Social support and marital status had no effect on objective health. Providing informal care was found to decrease the chance on a good objective health, but this result was only significant for women. Having a child in the age 0 to 18 was found as a protective factor for a good objective health, but when separating men and women this result was only found significant for women.

In case of subjective health, providing informal care, receiving social support as well as having a child in the age 0 to 18 did not have any effect on how people rated their own health. Notable was marital status. Being either married, living together or a widow(er) was found to be strongly protective for the subjective feeling of a good health.Yet, this result was only found significant for men, when separating men and women in the analysis.

Based on multivariate analysis, the relationship between providing informal care and a good health was not found to be dependent on presence or absence of receiving social support. Also, no additional combination of social factors was found to be protective for a good health.

Notable is that we could confirm some of our hypotheses about the protective role of social factors, while at the same time some results showed the total opposite of what was hypothesized; some social factors decreased the chance on a good objective health. Matthews & Galo (2011) pointed out that social resources can vary along many dimensions, including qualitative or quantitative aspects of support or integration, and individual-level or community-level aspects of support. This may bring about different effects and results when studying the protective roles of social factors. We hypothesized that all social factors would have a protective role, but we might have been limited by our data gathered, as some of our social factors were qualitative, while others were actually quantitative. This point of Matthews & Galo (2011) might also explain our result that receiving social support was not found as protective for a good objective-, and subjective health. Our measurement was based on absence of social-, and emotional loneliness. Although this includes both quality and quantity, it is purely based on personal, individual relationships, not on community-level social relationships. Also, we can doubt whether absence of loneliness is reversible into presence of a feeling of receiving social support. These two points taken together might make us doubt whether we captured the essence of social support, which showed to have a protective effect to health in previous studies.

The result that providing informal care decreased the chance on a good objective health might be

explained by the mediating role of unconsciously experiencing stress. We should take into account that the low educated might experience more adverse situations, maybe having problems make ends meet (Bosma, Mheen, Borsboom and Mackenbach ,1999). Within these adverse situations, experiencing the demands of having to take care of a family, and maybe even taking care of other loved ones, might unconsciously cause physical stress. As unconscious stress was found to have a bad influence on objective health, this mediation through stress might explain the negative influence of providing informal care (Brosschot, Thayer & Verkuil, 2010).Taking care of a family might at the same time bring about a rewarding feeling, a feeling of doing something good to others. This might explain the positive result of the protective role of marital status on subjective health.

Another explanation for the fact that providing informal care seemed to decreased the chance on a good objective health, might be that chronic ill patients are actually more often surrounded by other chronically ill through supporting networks, or family members that might face chronic diseases, for example when disease re hereditary. As a consequence the might more often provide informal care than their healthy counterparts, and providing informal care might not be a cause to a chronic disease, but maybe even a psychosocial consequence.

Do people with a paid job, who are student or are being (early) retired have a better objective and subjective health than people with without a paid job, or who are receiving social benefits?
<u>Hypothesis III</u>: On the basis of literature of Sapolsky (1994), Schöllgen (2011) and Matthews & Gallo (2011) we expected that having a paid job, being a student or being (early) retired would be protective for a good objective and subjective health. We expected that having a job, having had a job for a great part of your life, or studying would work protectively through the social aspects of having a job or being a student, and through the feeling of a 'sense of mastery' described by Sapolsky (2004). Following our hypothesis, we found that having a paid job, being a student or being (early) retired was favorable for both a good objective and a good subjective health. When separating men and women in the analysis, this strong positive relationship between having a paid job, being a student or being (early) retired was found for both men and women.

Is the combination of the individual protective lifestyle factors, social status factors and workstatus protective for a good objective and subjective health?
<u>Hypothesis IV</u>: On the basis of Dupre & George (2011) we expected that the combination of individual protective factors would account for a protective framework for a good objective and subjective health in low SES individuals. On the basis of multivariate analysis we found different protective models for a good objective and a good subjective health. What factors were protective, showed no effect or decreased the chance on a good health when using univariate analyses, can be found in table 28. The same factors that were found to be individually protective for a good health, after controlling for age, were also found as additive protective profile to a good health.
For low SES individuals, the combination of not being overweight, having a child in the age 0 to 18, not providing informal care and having a paid job, being a student or being (early) retired was protective for a good objective health. The combination of not smoking, having enough physical

activity, not being overweight, either being married, living together or a widow(er) and having either a paid job, being a student or being (early) retired was protective for a good subjective health in low SES individuals.

When separating men and women, for men only the combination of workstatus and not being overweight was found protective for a good objective health. For women also not being overweight was found protective to a good objective health, but in combination with having a child in the age 0 to 18 and not providing informal care.

The combination of not smoking, no overweight and either having a paid job, being a student or being (early) retired was found to be protective for a good subjective health for women with low SES. For men no to moderate alcohol use was, in addition to the protective factors for women, also protective for a good subjective health.

Table 28. Independent variables being protective, having no influence, or decreasing the chance on a good objective-, and/ or subjective health on the basis of univariate analyses.

Variables	Objective health	Subjective health
Not smoking	0	+
No to moderate alcohol use	0	0
Healthy nutrition	0	0
Enough physical activity	0	+
No overweight	+	+
Receiving social support	0	0
Providing informal care	-	0
Married, living together or widow(er)	-*	+
Having a child in the age 0 to 18	+	0
Having a paid job, being a student or being (early) retired	+	+

0= no influence, - = a negative effect, + = a positive effect.

* Relationship with health could be explained by variance in age.

We hypothesized that the same lifestyle-, social-, and workstatus factors would be protective for a good objective-, and subjective health. As already seen before, although objective-, and subjective health are related, these are two different concepts. This might explain why different factors account for a good objective-, and subjective health.

Are men and women with low SES protected to a good objective-, and subjective health by different factors?

Hypothesis V: On the basis of Dupre & George (2011) we expected that different factors would be protective for a good objective-, and subjective health in men and women. To test our hypothesis we performed univariate and multivariate analyses. What factors are protective, had no effect, or decreased the chance on a good objective-, and subjective health for men and women, on the basis of univariate analyses, can be found in table 29.

Table 29. Independent variables being protective, having no influence or decreasing the chance on a good objective-, and subjective health for men and women on the basis of univariate analyses.

Variables	Men Objective health	Men Subjective health	Women Objective health	Women Subjective health
no smoking	0	+	0	+
no to moderate alcohol use	0	+	+*	0
healthy nutrition	0	0	0	0
enough physical activity	0	0	0	+
no overweight	+	+	+	+
receiving social support	0	0	0	0
providing informal care	0	0	-	0
married, living together or widow(er)	-*	+	0	0
having a child in the age 0 to 18	0	0	+	0
having a paid job, student, (early) retired	+	+	+	+

0= no influence, - = a negative effect, + = a positive effect.
* Relationship with health could be explained by variance in age.

We could not confirm our hypothesis that there is a uniform pattern in what lifestyle behaviors are protective for a good objective-, and subjective health for men and women. Also we could not confirm that familial resources – marital status and having a child in the age 0 to 18 – were more protective for men and women. Although we could confirm, as expected, that having a paid job, being a student or being (early) retired was more protective for men than women following univariate analyses, we could not confirm this following multivariate analyses.

The result that different factors were protective for a good health in men and women has not often been reported and is hard to explain. George & Dupre (2011) explained their found gender differences partly by biological superiority. Men and women are known to differ in biological and genetic predispositions to obtain a healthy physical state (Vlassoff, 2007). This, in combination with the limitation that we did not take psychological resources into account, might explain the differences in subjective health. The impact of objective health problems, might be different for men and women, through the way both genders adapt to the situation (Vingerhoets & Heck, 1990) by their psychological resources, as for example general goal attainment or self-efficacy.

4.2 Limitations, Strenghts, and future research.

There are some limitations to our study. Our data are cross-sectional, which permits no the causal interpretation of our results. For example, when looking at lifestyle behaviors, it is not clear whether healthy lifestyle behaviors preceded a good objective-, but mainly subjective health, or whether they were a consequence of a good health. People who are healthy or feel healthy might have a greater ability to obtain healthy lifestyle behaviors. The same with workstatus, people who are and feel healthy might have a greater ability to obtain a paid job than people who are unhealthy. Following this limitation it is suggested that future research used a measure which takes lifestyle behavioral change into account. Another suggestion about measurement of lifestyle behaviors, lies within the fact that it is

advisable to study behavioral factors within the context of resilience. Yet, in line with previous literature from Dupre & George (2011), this might be advisable for all factors. Hence, some factors might show stronger protective effects when studying them within the context of psychological resources that promote a proactive stance towards the environment, as a way of effective problem solving and social competence (Dupre & George, 2011).

Secondly, health was measured by self-reports. This way it cannot be concluded whether the present findings generalize to objective measures of physical health, although the validity of self-reported morbidity has been shown in several studies (Schöllgen et al., 2011). Following this limitation of measurement of objective health, it might be advisable for future research to take into consideration whether people are limited by their chronic condition in daily life. This, as some chronic conditions might have a greater impact on general objective functioning than others. For example, when comparing asthma and diabetes; some patients asthma do not need everyday medication, a patient with diabetes cannot do without medication. Another suggestion in measuring objective health, would be taking into consideration whether the chronic condition developed during life; protective factors might protect people from developing chronic conditions, but might not reverse the illness when they exist from birth on.

Another limitation in our study was that psychological resources, for example self-esteem, optimistic beliefs and general control-beliefs to obtain goals, were not taken into account, as they were not questioned by our survey. Previous studies showed that psychological resources might be even greater predictors of a good health than social resources and lifestyle behaviors (Schöllgen, 2011). Including these psychological resources might have provided the option to study a protective model that was more complete.

The last limitation was the measurement of receiving social support. We measured absence of emotional-, and social loneliness, but this might not have inversely meant presence of receiving social support. It is advisable to, in the future, use measures of social factors which imply both quantitative, qualitative, individual-, and community levels.

A particular strength of our study is the sample size. This enhances the generalisability of our results to the general Dutch low SES population. Secondly, we did not only take into account individual protective roles, but also looked at possible interactions of variables, and whether addition of individual protective factors was also protective for a good health. This makes the results more representative to real life situations. Plus, in combination with our strength to additionally analyse men and women separately, it shows on which combinations of factors there could better be focused at, when promoting good health.

4.3 Practical implications

In sum, our results suggest that the protective effect of lifestyle behaviors and social factors in individuals with low SES differ for a good objective -, and subjective health and for men and women. Where some factors have a positive effect on a good objective health, they have no effect on subjective health, and the other way around. When taking into mind that the aim of our study was contribute to the existing literature on what factors are protective for a good health, to promote more

targeted health promotion to decrease health disparities low SES individuals are faced with nowadays, this has its consequence. When wanting to promote health optimally, this should, to our opinion, not only include extending healthy life duration, but also enhancing quality of life. This, as objective health has influence on mental state, and mental state influences objective health. For this reason, further studying integrated profiles of possible protective factors, in which both factors that have a positive effect on objective health and factors that have a positive effect on subjective health are taken into account, is suggested.

Secondly, as different factors were found protective for men and women, it is advisable to promote health through gender specific interventions, in which factors are targeted that account for both a good objective and subjective health for either men or women.

In conclusion our research contributed to the existing literature on what factors are protective for a good objective-, and subjective health, for both men and women. Our results give directions to future research, and can be practically used to tailor interventions promoting objective health and feeling healthy in low SES individuals.

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