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Optimists report fewer physical and mental health conditions than pessimists in the general Norwegian population

BACKGROUND

Several studies have found that optimism is associated with better health. However, all those studies have investigated the subject in a specific context: gender, age group, diagnosis, situation, or population segment. Given the association found between optimism and physical health, mental health and well-being in previous studies, one would expect optimistic individuals in the general population to report fewer physical and mental health conditions during their lifetimes than pessimists. The aim of the present study was to test this hypothesis.

PARTICIPANTS AND PROCEDURE

A random sample of 1792 people participated in a survey on a broad variety of mental and physical health conditions. In addition they filled out the Life Orientation Test-Revised (LOT-R). Optimism was defined as a score of ≥ 17 on the LOT-R.

RESULTS

Optimists reported a lower prevalence of a wide range of mental and physical health conditions compared with pessimists. The associations between optimism and better health conditions persisted for the majority of health conditions investigated, even after adjustment for age, gender and education. Overall, pessimists had a greater estimated risk of disease in general. In addition 11.30% of the pessimists reported having had five or more different diseases during their lifetimes, compared with 3.90% of the optimists.

CONCLUSIONS

Our results add to growing evidence that optimism plays an important role in health and support the view that fostering optimism is an appropriate strategy for promoting health.

KEY WORDS

survey; dispositional optimism; general population; health conditions

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TO CITE THIS ARTICLE – Schou-Bredal, I., Bonsaksen, T., Heir, T., Skogstad, L., Lerdal, A., Grimholt, T., & Ekeberg, Ø. (2019). Optimists report fewer physical and mental health conditions than pessimists in the general Norwegian population. *Health Psychology Report*, 7(1), 9–18. <https://doi.org/10.5114/hpr.2019.81003>

RECEIVED 29.07.2018 · REVIEWED 22.11.2018 · ACCEPTED 22.11.2018 · PUBLISHED 04.01.2019

BACKGROUND

Optimism relates to the way people see the future; people who are optimists expect good things to happen to them across a variety of domains in their lives (Scheier & Carver, 1985). A person is commonly referred to as being optimistic or pessimistic; however, a person may be more optimistic, more pessimistic or somewhere in the middle. Being an optimist does not mean denying or avoiding negative events. Optimism is defined as a personality trait, which means it is relatively stable over time. A recent study found women's levels of optimism to be unchanged despite a diagnosis of breast cancer (Schou-Bredal & Ekeberg, 2016). By contrast, it appears that for at least some people, the level of optimism may change over longer periods. In a previous study, one 10-year test-retest correlation was only .35 (Segerstrom, 2007), while in another, it was .71 (Matthews, Raikkonen, Sutton-Tyrrell, & Kuller, 2004). An estimate of the heritability of optimism is 25.00%, which is substantial, although lower than that of many other personality traits (Plomin et al., 1992). Optimism has been found to be a universal phenomenon, and higher levels of optimism are associated with better subjective well-being and perceived physical health worldwide (Gallagher, Lopez, & Pressman, 2013).

An individual personality is thought to develop early in life (Hampson & Friedman, 2008), so it may influence health over the life course. Optimism is viewed as a trait that empowers people to cope with life's challenges, and it has been associated with a variety of adaptive outcomes (Carver, Scheier, & Segerstrom, 2010). Studies on optimism and subjective well-being have mostly been conducted not only in medical settings, but also in the context of health crises. Research has shown that optimism actually helps people cope with stressful events in more beneficial ways (Allison, Guichard, & Gilain, 2000; Schou, Ekeberg, Ruland, Sandvik, & Karesen, 2004). Optimism appears to have a moderating role in the association between feelings of loss of hope and suicidal ideation (Hirsch & Conner, 2006). Several studies have found that optimism is associated with better physical health (Cauley et al., 2017; Matthews et al., 2004; Segovia, Moore, Linnville, & Hoyt, 2015; Tindle et al., 2017) and mental health (Brissette, Scheier, & Carver, 2002; Schou et al., 2004; Segovia et al., 2015; Shnek, Irvine, Stewart, & Abbey, 2001), although there are some exceptions (Gallagher et al., 2013). A recent study by Kim et al. (2017) found an association between lower levels of optimism and mortality due to heart disease, stroke, respiratory disease and cancer. Optimism has also been associated with healthy aging (Steptoe, Wright, Kunz-Ebrecht, & Iliffe, 2006) and reduced risk of coronary heart disease (Boehm, Peterson, Kivimaki, & Kubzansky, 2011; Kim, Smith, & Kubzansky, 2014), and appears to be a protective factor against stroke (Kim, Park, & Peter-

son, 2011). Some studies have even found that optimists live longer than pessimists (Giltay, Geleijnse, Zitman, Hoekstra, & Schouten, 2004; Tindle et al., 2009).

The most rigorous evidence for the association between optimism and better health comes from the cardiovascular domain. One would expect the prevalence of cardiovascular disease to be low in individuals with a high level of optimism (optimists) compared with that of individuals with low optimism (pessimists) in the general population. However, to our knowledge no study has investigated whether this is the case.

All of the above studies have investigated optimism in a specific context: gender, age group, diagnosis, situation, or population segment. Thus, the question remains whether optimism is related to broader health outcomes regardless of gender or age. The present study extends previous work by examining the relationship between optimism and subjective well-being, perceived health and a variety of medical conditions in a sample of the general population.

Given the association found between optimism and physical health, mental health and well-being in the abovementioned studies, one would expect optimistic individuals in the general population to report fewer physical and mental health conditions during their lifetimes than pessimists. The aim of the present study was to test this hypothesis.

PARTICIPANTS AND PROCEDURE

STUDY DESIGN

The Norwegian Population Study (NorPop) was a cross-sectional survey design study. The collected data reflect a wide variety of health conditions in the general population and provide national norm scores from several questionnaires used for assessing symptoms, attitudes and behaviors. For a detailed description of the survey methodology, see Schou-Bredal et al. (2017).

PARTICIPANTS

A random sample of adults (≥ 18 years of age), stratified by age, gender and geographic region, was selected by the National Population Register for possible inclusion in the study. The questionnaires were sent by regular mail to 5500 people together with a letter explaining the purpose and procedures of the study. All data were collected in 2015 and 2016.

DATA COLLECTION MEASUREMENTS

The *Life Orientation Test-Revised* (LOT-R) was used to measure dispositional optimism (Scheier et al.,

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1994). The LOT-R is composed of 10 self-reported items, where four items are “distractors” used to disguise the purpose of the measure. Of the remaining six items, three are phrased optimistically and three pessimistically. An example of an optimistic statement is “In uncertain times, I usually expect the best,” whereas a pessimistic example is “If something can go wrong for me, it will.” The respondents indicated the extent to which they agreed with each of the items on a five-point scale from 0 (*strongly disagree*) to 4 (*strongly agree*). For the present study, the total LOT-R score was calculated as the mean of the optimism and pessimism item scores, with the pessimism scores reversed. Thus, scores ranged from 0 to 4, with higher scores indicating greater optimism.

Some researchers have split the LOT-R into two subscales: one consisting of the positive items and the other of the negative items. However, optimism is most accurately captured when the scale combines the positive items that are endorsed and the negative items that are rejected (Ryff & Singer, 2007; Segerstrom, Evans, & Eisenlogr-Moul, 2011). To date, no naturally occurring or clinically meaningful cutoff for distinguishing between optimists and pessimists has been established for the LOT-R. For theoretical reasons as well as those based on research in this area, we chose to use median splits (Iacobucci, Posavac, Kardes, Schneider, & Popovich, 2015; Ryff & Singer, 2007; Segerstrom et al., 2011). We dichotomized the LOT-R using the median of 17. Respondents were defined as pessimists if they scored < 17 and optimists if they scored ≥ 17.

PERCEIVED QUALITY OF LIFE AND HEALTH

The participants were asked to indicate on a scale from 0 (*extremely poor*) to 10 (*excellent*) how they would rate their perceived quality of life and health in the previous week.

HEALTH CONDITIONS

Health conditions were self-reported (yes vs. no) and included heart disease, stroke, respiratory disease, diabetes, cancer, osteoporosis, fibromyalgia, arthritis, arthrosis, prolonged muscle and skeletal disease, gastrointestinal disease, tinnitus, chronic pain, depression, anxiety, insomnia, eating disorder and psychosis. Body mass index (BMI) was calculated from self-reported weight and height. In addition, the participants were asked whether they had ever attempted to commit suicide or injured themselves on purpose.

ETHICS

Respondents gave their consent to participate in the research by returning their completed questionnaire

in a sealed envelope. The Regional Committee for Medical and Health Research Ethics was consulted, and because the data were collected anonymously, no formal ethical approval was required.

DATA ANALYSIS

Data were analyzed using SPSS for Windows version 24 (IBM Corporation, 2016). Initial descriptive analyses employed frequencies, percentages, means and standard deviations (SDs) as appropriate. The LOT-R was dichotomized using the median score. A chi-square test was used to assess whether the frequency of health conditions differed significantly between optimists and pessimists. The risk estimates were calculated using a 2 × 2 table. Independent *t*-tests were used to compare optimists’ and pessimists’ quality of life and perceived health. Multivariate logistic regressions were conducted to assess the cross-sectional association between optimism/pessimism and health conditions, controlling for age, gender and education. Multivariate linear multivariate regressions were conducted to assess the association between optimism/pessimism and perceived health and quality of life. The significance level in this study was set at 5.00%.

RESULTS

A total of 1792 people (36.00%) participated in the study. The mean age of the participants was 53.20 years (*SD* = 16.63, age range = 18-94), and the majority were female (53.10%). The respondents were evenly distributed with regard to place of residence. The mean LOT-R score for the whole population was 17.23 (*SD* = 3.05). The mean scores for pessimists and optimists were 14.27 (*SD* = 1.82) and 19.20 (*SD* = 19.18), respectively. Significantly (*p* < .001) more optimists (66.70%) than pessimists had received higher education (41.60%) and significantly (*p* < .001) more optimists (67.00%) were employed (55.20%) (Table 1).

The respondents rated their perceived health as a mean of 7.48 (*SD* = 2.30) on a scale from 0 to 10, and their quality of life as 7.61 (*SD* = 2.19). Optimists’ perceived health scores were significantly higher than those of pessimists: 8.11 (*SD* = 1.90) vs. 6.86 (*SD* = 2.38), respectively (*p* < .001). Optimists also reported better quality of life than pessimists: 8.31 (*SD* = 1.80) vs. 6.86 (*SD* = 2.38), respectively (*p* < .001).

The BMI of the respondents was 26.63 (*SD* = 18.87). The BMI of optimists was 25.97 (*SD* = 8.34) and 27.33 (*SD* = 13.14) for pessimists. There was significantly more obesity (BMI > 30 kg/m²) among pessimists than among optimists (17.50% vs. 12.50%, *p* = .012). The most prevalent health conditions reported in the

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Table 1
Sociodemographic data

	Optimist	Pessimist	<i>p</i>
Age in years; mean (<i>SD</i>)	51.65 (15.76)	54.65 (17.60)	< .001
Range (years)	18-94	18-93	
	%	%	
Gender			n.s.
Male	46.10	47.60	
Social status			n.s.
Married/cohabitant	74.50	70.20	
Single	12.70	13.20	
Divorced/separated	5.50	5.40	
Widow/widower	2.60	5.70	
Girlfriend/boyfriend	4.70	5.30	
Living companions			n.s.
Alone	17.30	21.80	
Parents	3.10	4.90	
Spouse/cohabitant	67.60	65.60	
Other persons 18 years or older	5.00	3.70	
Other persons under 18 years	7.00	4.10	
Education			< .001
Primary school	4.70	10.90	
Secondary school	18.10	36.10	
High school	10.20	11.40	
College or university less than 4 years	28.30	21.40	
College or university 4 years or more	38.40	20.20	
Employment			< .001
Employed	67.00	55.20	
Full-time housewife/husband	0.50	0.60	
Student	5.80	1.50	
Unemployed/on leave	1.10	1.50	
Retired	21.00	30.50	
On social security/work assessment allowance	4.70	7.70	
Military service	0.00	0.10	
Residential area			< .001
Village (fewer than 2000 inhabitants)	18.80	23.40	
Town (2000-19,999 inhabitants)	28.90	26.00	
Small city (20,000-99,999)	23.30	25.10	
Large city (100,000 or more inhabitants)	24.40	32.00	

Note. Missing values ranged from 0.51% to 7.46% of the sociodemographic characteristics.

general population were insomnia (36.90%), depression (28.90%) and chronic pain (21.70%) (Table 2).

Secondary analyses were conducted controlling for age, gender and education. Except for heart disease, diabetes and respiratory disease, the health

conditions presented in Table 2 continued to be associated with pessimism.

Secondary analyses were conducted for perceived health and quality of life controlling for age, gender and education. The association between optimism

Table 2

Lifetime prevalence of health problems reported by optimists and pessimists, and risk estimates for pessimists

Health condition	Total n = 1792 %	Pessimist n = 718 %	Optimist n = 1074 %	p*	Risk estimate	95% CI
Heart disease	10.50	13.10	8.80	.004	1.49	1.14-1.96
Stroke	2.80	4.50	1.70	.001	2.65	1.50-4.70
Respiratory disease	11.80	13.80	10.50	.037	1.13	1.10-1.70
Diabetes mellitus	5.20	6.40	3.90	.020	1.31	0.90-1.90
Cancer	7.90	8.60	7.40	.334	1.26	0.85-1.62
Osteoporosis	3.10	3.60	2.70	.268	1.34	0.79-2.26
Fibromyalgia	4.50	7.20	2.60	< .001	2.77	1.77-4.36
Rheumatoid arthritis	5.00	8.10	3.00	< .001	2.71	1.78-4.13
Arthrosis	16.70	21.00	13.90	< .001	1.51	1.23-1.86
Prolonged muscle/skeletal disease	13.10	15.70	11.40	.008	1.38	1.09-1.76
Gastrointestinal disease	16.80	17.10	16.60	.797	1.03	0.83-1.28
Tinnitus	17.80	22.40	14.70	< .001	1.52	1.25-1.86
Chronic pain	21.70	28.40	17.10	< .001	1.65	1.39-1.97
Anxiety	21.10	27.20	17.00	< .001	1.59	1.33-1.91
Depression	28.90	35.70	24.40	< .001	1.46	1.26-1.69
Insomnia	36.90	45.70	31.00	< .001	1.47	1.31-1.66
Eating disorder	7.50	10.40	5.50	< .001	1.90	1.37-2.64
Psychosis	1.80	3.30	0.80	< .001	3.98	1.86-8.53
Self-inflicted injury	3.70	5.80	2.20	< .001	2.61	1.60-4.28
Attempted suicide	3.00	4.50	2.00	.004	2.17	1.28-3.71

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Note. *p values between pessimists' and optimists' perceived health – percentage scores.

Table 3

Total percentage count of mental and physical health conditions during one's lifetime

Total number of health conditions	Total n = 1792	Pessimist n = 718	Optimist n = 1074	p*
0	26.50	20.20	30.60	
1	24.10	20.30	26.50	
2	15.60	15.30	15.80	
3	12.20	13.00	11.60	
4	8.70	10.70	7.40	
5	6.10	9.10	4.20	
> 5	7.00	11.30	3.90	< .001

Note. *Arthritis, arthrosis and prolonged muscle/skeletal disease were combined into one group and counted as one disease.

and better perceived health ($\beta = .19$, 95% confidence interval (CI) 0.65-1.09) and quality of life ($\beta = .26$, 95% CI 0.97-1.39) remained significant ($p < .001$).

Optimists reported a lower prevalence of insomnia (31.00% vs. 45.70%), depression (24.00% vs. 35.70%) and chronic pain (17.10% vs. 28.40%) compared with pessimists. The estimated risk of having one of these conditions for pessimists was 1.5-1.8 times that of optimists (Table 3).

We grouped arthritis, arthrosis and prolonged muscle/skeletal disease as “musculoskeletal system diseases,” which were reported by 26.10% of the participants. Pessimists reported a significantly ($p < .001$) higher prevalence of musculoskeletal system diseases (31.80%) than optimists (22.30%).

As shown in Table 2, we found that optimists reported a lower lifetime prevalence of the majority of physical and mental diseases. Moreover, the prevalence of suicide attempts and self-inflicted injuries was lower for optimists than for pessimists: 2.00% vs. 4.50% and 2.20% vs. 5.80%, respectively. Overall, pessimists had a greater estimated risk of disease in general. In addition, 11.30% of the pessimists reported having had five or more different diseases during their lifetimes, compared with 3.90% of the optimists (Table 3).

DISCUSSION

In the present study, optimists reported a lower prevalence of a wide range of lifetime health conditions compared with pessimists. In addition, we found that optimists also had significantly fewer health conditions during their lifetime than pessimists. To our knowledge, this is the first study to show that pessimists report a higher prevalence of musculoskeletal diseases, tinnitus, insomnia, eating disorders, psychosis and self-inflicted injuries than optimists. In view of our findings, we wonder if optimism may be a protective factor against a broad range of diseases, not only strokes or cardiovascular disease, as reported by previous studies (Boehm et al., 2018; Kim et al., 2011). However, longitudinal studies are warranted before a conclusion can be drawn.

In this study, optimists reported higher levels of perceived health and quality of life; this is consistent with the majority of previous research findings that optimists report better subjective well-being (Gison, Dall’Armi, Donati, Rizza, & Giaquinto, 2014; Kung et al., 2006; Pais-Ribeiro, da Silva, Meneses, & Falco, 2007; Schou, Ekeberg, Sandvik, Hjermstad, & Ruland, 2005) and perceived health (Gallagher et al., 2013; Rasmussen, Scheier, & Greenhouse, 2009) than pessimists. The same applies to our findings that pessimists report a higher prevalence of anxiety and depression. Decades of research have demonstrated that greater optimism is associated with less distress in a wide

range of groups and contexts, such as students starting college, survivors of missile attacks, cancer caregivers and cancer and cardiovascular patients (for an overview, see Carver et al., 2010). The present study found that optimists reported fewer suicide attempts than pessimists; this is consistent with previous findings associating optimism with fewer suicidal thoughts and behaviors (Bryan, Ray-Sannerud, Morrow, & Etienne, 2013; Chang et al., 2013; Huffman et al., 2016; O’Keefe & Wingate, 2013). However, to our knowledge, this is the first study to report that optimists report a lower prevalence of self-inflicted injuries. One reason that optimists report fewer suicide attempts or self-inflicted injuries may be that optimism is associated with better physiological adjustment to a stressful situation (Puig-Perez et al., 2015). Optimism is also associated with increased psychological well-being, fewer perceived stressors, a lower tendency to be depressed and problem-solving coping. Furthermore, optimism has been associated with higher scores in life satisfaction, positive effects, self-esteem, self-acceptance, positive relations with others, autonomy, environment mastery and personal growth (Bailey, Eng, Frisch, & Snyder, 2007; Chang, 2009; Daukantaite & Zukauskienė, 2012; Hart, Vella, & Mohr, 2008; Vacek, Coyle, & Vera, 2010). Optimism is also associated with the ability to find meaning after negative life events (Nolen-Hoeksema, 2000), and is not inevitably altered by changes in disease status (Schou, Ekeberg, Sandvik, & Ruland, 2005).

The mechanism underlying the link between optimism and better health has become a topic of interest. It is possible that optimists enjoy better health because they lead healthier lifestyles and have better social networks. According to Carver and Scheier (2014), optimists appear more likely to take steps to protect their health, which may lead to healthier lifestyles. Indeed, evidence from a recent meta-analysis reported that optimists in both healthy and patient populations are less likely to smoke and more likely to eat healthier food and be physically active (Boehm et al., 2018). In the present study, we found that more optimists than pessimists had received higher education and fewer optimists than pessimists were obese. This is consistent with previous studies (Cauley et al., 2017; Salovey, Rothman, Detweiler, & Steward, 2000; Smagula, Faulkner, Scheier, Tindle, & Cauley, 2016; Steptoe et al., 2006). All these factors are associated with better health.

In summary, it appears that optimists take more direct action to safeguard their health by minimizing health risks. In addition, optimism has also been found to co-occur with higher socioeconomic status and social integration, which in turn may benefit mental and physical health (Kawachi & Berkman, 2001; Lorant et al., 2003).

In addition to behavioral advantages, optimism may have biological benefits that improve health. It

appears that optimism may have a direct positive effect on the neuroendocrine system and immune responses (Avvenuti, Baiardini, & Giardini, 2016). Pessimism has been linked to higher ambulatory blood pressure and greater daily experience of stress (Rai-kkonen, Matthews, Flory, Owens, & Gump, 1999). Pessimism has been linked to higher fasting insulin (Tindle et al., 2017), unhealthy lipid profiles (Boehm, Williams, Rimm, Ryff, & Kubzansky, 2013) and inflammatory biomarkers (Roy et al., 2010). It has also been suggested that optimism is associated with reduced hypothalamus–pituitary–adrenal axis reactivity (Chida & Hamer, 2008). Thus, optimism may induce an adaptive physiological adjustment that protects against stress-related disAnother mechanism underlying the link between optimism and better health is coping. A person’s way of coping with a potential stressor could determine whether that stressor has an adverse effect (Cooper & Payne, 1988). Optimists appear to experience less distress than pessimists in adversity. Studies have shown that optimists cope differently and more effectively than pessimists (Nes & Segerstrom, 2006). Optimists generally appear to be approach copers, using problem-focused coping and seeking social support (Scheier & Carver, 1985). Thus, they may be more compliant with their medical treatment regimens. This view is supported by findings that optimists show better adherence to treatment, both pharmacological and behavioral (Nabi et al., 2010; Tindle, Davis, & Kuller, 2010). Furthermore, researchers have found that optimistic individuals have stronger feelings of self-worth and are more creative in their pursuit of goals than pessimists.

Because it appears that optimists engage in healthier behavior, future research should investigate whether improvements in optimism could translate to behavioral or health benefits. Optimism appears to be a promising target for intervention to enhance behavioral or health benefits. However, because optimism is considered a trait that is relatively stable over time, the question remains whether optimism is modifiable. Studies have found that some pessimists actually engage in goal-driven efforts to change the course of their negative expectations for the future, which in turn often lead to achieving goals (Norem & Chang, 2002; Norem, 2008). Thus, the belief that one’s future can be changed may induce some pessimists to act proactively in the pursuit of positive goals and outcomes (Chang, 2001). In terms of public health, several studies have found that optimism can be altered temporarily by interventions such as brief manipulations consisting of positive future thinking and positive imagery exercises (Peters, Flink, Boersma, & Linton, 2010; Meevissen, Peters, & Alberts, 2011; Murphy et al., 2015; Ji, Holmes, & Blackwell, 2017); however, the durability of such alterations has not yet been examined.

STRENGTHS AND LIMITATIONS

Unlike previous investigations of optimism and health conditions, to our knowledge, this is the first study to investigate the prevalence of a wide range of both mental and physical health conditions in the general population, including both genders and adults (≥ 18 years of age). The associations between optimism and better health conditions persisted for the majority of health conditions investigated, even after adjustment for age, gender and education.

Some limitations should be noted when interpreting the results of this study. Self-reported outcomes rely completely on the respondent as a source of information and are therefore subjective in nature. Optimists may be biased toward reporting better health than pessimists.

The analyses are based on cross-sectional survey data, which do not allow for conclusions regarding the direction of the relationship between optimism and health problems. Conversely, optimism appears to promote a healthier lifestyle, but poor health status may lead to more pessimism. An overall 36.00% response rate raises the question of whether the sample is representative of its target population. Declining response rates to mailed public health surveys have been reported in recent decades in several countries (Holbrook, Krosnick, & Pfent, 2008). However, lower response rates do not necessarily produce more nonresponse errors (Holbrook et al., 2008). We consider our sample to be representative of the general Norwegian population (Schou-Bredal et al., 2017).

CONCLUSIONS

In the present study, optimism was broadly associated with fewer mental and physical health conditions in the general population. This finding adds to a growing body of evidence that optimism plays an important role in health and supports the notion that optimism is a promising target for intervention to enhance behavioral or health benefits.

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