Social Science & Medicine 150 (2016) 231–238

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

As long as you've got your health: Longitudinal relationships between positive affect and functional health in old age

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ARTICLE INFO

Article history:
Received 23 March 2015
Received in revised form
23 November 2015
Accepted 24 November 2015
Available online 28 November 2015

Keywords:
Positive affect
Functional health
Cross-lagged analysis
Longitudinal
Later life
PAQUID cohort

ABSTRACT

Objective: Reciprocal relationships between positive affect (PA) and health are now subject of a heuristic debate in psychology and behavioral medicine. Two radically opposed approaches address the link between subjective well being (SWB) and physical health: top-down (i.e., psychosomatic hypothesis) and bottom-up (i.e., disability/ability hypothesis) approaches. The aim of the present study was to test these two approaches by investigating thirteen-year longitudinal relationships between PA, as an affective dimension of SWB, and functional health in older people.

Methods: The study included 3754 participants aged 62–101 years assessed 6 times over a thirteen-year period. PA was measured by the mean of the positive affect subscale of the CES-D scale. Functional health was assessed by four composite items: a single-item self-rating of hearing impairment, a single-item self-rating of vision impairment, the number of medically prescribed drugs, and a single-item self-rating of dyspnoea. We used cross-lagged modeling with latent variables, which is appropriate for testing specific theories. Mean arterial pressure, diabetes mellitus and hypercholesterolemia status, sequelae of stroke, gender, level of education, and age at baseline were use as control variables in the models.

Results: Results indicated that good health significantly predicted subsequent levels of PA (average $\beta = -0.58$, $p < 0.001$), but PA did not predict subsequent levels of good health ($\beta = 0.01$, ns).

Conclusion: This finding, obtained from a sample of older people, is in keeping with the bottom-up approach, and supports the popular adage *"As long as you've got your health"*. Limitations of this finding are reviewed and discussed. Models including longitudinal mediators, such as biomarkers and life style patterns, are needed to clarify the nature of the link between these constructs.

The health implications of positive affect (PA) have emerged as a new central topic in psychology and behavioral medicine (Chesney et al., 2005). Positive psychological characteristics, as promoted by positive psychology, seem to be beneficial for physical health. Seligman (2008) was abundantly clear when he wrote that "the most important theme that runs through the tantalising positive physical health outcomes is a link between positive psychology and positive health: Subjective well-being, as measured by optimism and other positive emotions, protects one from physical illness" (p. 7). However, compared to the consistent link between negative emotions and physical health (Brown and Moskowitz, 1997; Chida and Steptoe, 2008; Suls and Bunde, 2005; Watson and Pennebaker, 1989), the relationships between psychological resources and physical health as well as the potential psychobiological and psychosocial mechanisms underlying these relationships are still a matter of debate (Aspinwall and Tedeschi, 2010a; Aspinwall and Tedeschi, 2010b; Coyne et al., 2010; Pressman and Cohen, 2005; Steptoe et al., 2015).

The aim of the present study was to examine the longitudinal reciprocal relationships between PA and functional health in old age. An emerging body of literature supports not only this link in older adults (Ong, 2010; Ong et al., 2011; Steptoe et al., 2015) but also the subjective wellbeing (SWB) paradox, i.e. the phenomenon of increasing happiness (e.g., life satisfaction, positive affect) with advancing age (Gana et al., 2013; Kunzmann et al., 2000; Windsor et al., 2013). This lack of age-related decline of SWB has been qualified as a paradox because it is intuitively expected that with the increase in risks and losses with advancing age, it becomes

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http://dx.doi.org/10.1016/j.socscimed.2015.11.038
0277-9536/

reasonably difficult to maintain SWB (Baltes and Baltes, 1990). However, given that 22% of people in France aged 60 to 74, and 43% of those aged 75 and older report hearing impairment (Direction de la recherche, des études, de l'évaluation et desDirection de la recherchedes étudesde l'évaluation et des statistiques, 2007; see for the USA Lin et al., 2011) and that half of visually impaired people are aged 60 and over (Ministère des affaires sociales et de la santé, 2001; see for the USA Congdon et al., 2004), it seems difficult to admit that these conditions do not compromise enjoyment of life and happiness. For instance, in a cross-sectional study (Hickson et al., 2008), hearing impairment was found to be negatively related to wellbeing among older adults. In the same vein, another cross-sectional study (Harada et al., 2008) showed that sensory impairment (i.e., hearing and vision) was associated with negative wellbeing among people aged 65 and older. Anstey et al., 2001 found that decline in performance on hearing and vision represented significant risks for mortality in older adults.

1. Positive affect and health

As stated by Cohen and Pressman (2006), there is little agreement on what is actually meant by PA. However, PA is considered as an affective dimension in the tripartite structure of hedonic well-being (Diener, 1984), along with negative affect (NA, the other affective dimension), and life satisfaction (as a cognitive dimension). PA involves the experience of positive feelings such as happiness, joy and contentment. Unlike life satisfaction, it is assumed to be strongly influenced by daily hassles and uplifts.

Health, which is not only a state but also a dynamic lifelong process, is a multidimensional construct, including physical, functional, and subjective health. For instance, functional health refers to subclinical diseases and general vitality resulting in good functional capacity. However, an important distinction is made between subjective health (i.e., self-perceived health) and objective health (e.g., external measures of specific disorders). The association between them is now well established. The meta-analysis conducted by Pinquart (2001), based on 180 studies, revealed a strong positive association between self-perceived health and objective health (i.e., physical and functional health), all the more when objective health was measured with symptom checklists. Some researchers suggested that self-perceived health could have a biological basis involving several biomarkers, such as blood levels of albumin, white blood cell count, haemoglobin and HDL cholesterol. Jylha et al. (2006) claimed that self-perceived health can be a sensitive barometer of physiological states. Indeed, self-perceived health was found to be a strong predictor of mortality, and a valid indicator of overall health (Schnittker and Bacak, 2014).

2. The relationship between PA and health

The temporal link between health and PA (and more generally SWB) may be analyzed in reference to two opposite models: Top-Down vs. Bottom-Up models (Feist et al., 1995).

The top-down approach, which represents the psychosomatic hypothesis (Watson and Pennebaker, 1989), considers SWB, including PA, as an antecedent to physical health. Accumulating evidence supports this approach. According to Pressman and Cohen (2005), PA was found to be associated with lower morbidity, fewer symptoms, less pain and longevity. More recently, Diener and Chan (2011) reviewed 7 types of evidence (e.g., longitudinal studies, animal studies, experimental and quasi-experimental studies) indicating that high SWB (such as life satisfaction, absence of negative emotions, and PA) had beneficial effects on health and longevity. For instance, increases in PA over a six-year period were associated with less decline in functional status among individuals aged 60 and older (Brummett et al., 2011). The three meta-analyses dealing with PA-health/longevity relationships (Chida and Steptoe, 2008; Lamers et al., 2012; Rasmussen et al., 2009) provided convergent results indicating that SWB and/or positive psychological constructs (e.g., optimism) are associated with increased longevity in both healthy and diseased populations (see also Boehm and Kubzansky (2012) review).

The bottom-up approach, which represents the disability/ability hypothesis (Watson and Pennebaker, 1989), assumes that life events and contingencies influence SWB (including PA and NA). In this perspective, health is considered as antecedent to SWB (Brief et al., 1993) and as a key determinant of SWB (Palmore and Kivett, 1977). For instance, chronic health conditions deteriorated PA over 4.5 years of follow-up (Kurland et al., 2006). Analyzing longitudinal data from the VA Normative Aging study, Griffin et al. (2006) found that good health predicted high level of PA. Results from a 3-year prospective study (Burr et al., 2011) showed that having fewer illnesses was an important ingredient in affective wellbeing, contributing to both higher positive affect and lower negative affect among retirees. In the same vein, Schöllgen et al. (2012) found a predictive association of physical health with change in PA, and no predictive association of PA with change in physical health.

The disability/ability hypothesis argues that poor health (disability) generates stress and physical discomfort leading to elevated levels of NA and decreased levels of PA, while good health (ability) generates more vitality leading to elevated levels of PA and decreased levels of NA (Ryan and Frederick, 1997). In contrast, using short-term longitudinal data to test the top-down and bottom-up models of the SWB-health link, Feist et al. (1995) found that both models were acceptable, neither model superior to the other.

3. Purpose of this study

To summarize, there is some evidence that PA could enhance health, and it is theoretically and empirically plausible that health could promote PA (Steptoe et al., 2015). However, Coyne et al. (2010) outlined a severe publication bias in favour of positive findings, and exclusion of null and negative findings. And more recently, Steptoe et al. (2015) again drew attention to this publication bias, reflecting the "evidence that studies reporting a favourable effect of wellbeing on health are more likely to be seen in print". In addition, Diener and Chan (2011) called for more methodologically sophisticated design to unravel the precise link between happiness and physical health. Thus, more research is needed to prove the relationship between PA and health. The aim of the present study was to contribute to the debate and increase understanding of the temporal sequence at play between PA and health. We explored thirteen-year longitudinal relationships between PA and functional health in old age using cross-lagged modeling. Cross-lagged modeling is appropriate for research aiming to determine the relative importance of mutually influencing factors (Little, 2013).

4. Method

4.1. Source of data

Data came from The PAQUID (Personne Agée Quid) database. The study initially included a community-based cohort of 3777 elderly people, aged 60 and older, living at home, and representative of Gironde and Dordogne, two administrative areas in the southwest of France. The PAQUID cohort has been shown to be representative of the elderly French population in terms of age, education and mortality (see Dartigues et al., 1992; for more details