Positive affect, psychological well-being, and good sleep

Andrew Steptoe*, Katie O’Donnell, Michael Marmot, Jane Wardle

Department of Epidemiology and Public Health, University College London, 1-19 Torrington Place, London, United Kingdom

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Abstract

Objective: To discover whether positive affect and purpose in life (eudaimonic well-being) are associated with good sleep independently of health problems and socioeconomic status, and to evaluate their role in mediating the influence of psychosocial risk factors on poor sleep. Methods: A cross-sectional study was carried out with 736 men and women aged 58–72 years, with positive affect assessed by aggregating ecological momentary samples. Sleep problems were assessed with the Jenkins Sleep Problems Scale, and psychosocial risk factors were measured by standardized questionnaires. Results: Both positive affect and eudaimonic well-being were inversely associated with sleep problems after adjustment for age, gender, household income, and self-rated health (P<.001). Negative psychosocial factors including financial strain, social isolation, low emotional support, negative social interactions, and psychological distress were also related to reported sleep problems. The strength of these associations was reduced by 20–73% when positive affect and eudaimonic well-being were taken into account, suggesting that effects were partly mediated by positive psychological states. Conclusions: These results suggest that both positive affect and eudaimonic well-being are directly associated with good sleep and may buffer the impact of psychosocial risk factors. The relationships are likely to be bidirectional, with disturbed sleep engendering lower positive affect and reduced psychological well-being, and positive psychological states promoting better sleep.

Keywords: Sleep disturbance; Positive affect; Well-being; Stress; Socioeconomic status

1. Introduction

Disturbed sleep is widespread in the population and between one quarter and one third of adults complain of insomnia, insufficient, or disrupted sleep [1,2]. Sleep problems are associated with impaired cognitive function, chronic illness, and reduced mental health and premature mortality [2–4]. There is a need to investigate the factors associated with sleep problems in order to understand the processes underlying sleep disturbance and advise people about managing the problem more effectively.

There has recently been a growth of interest in positive psychology and in the role of positive emotional states on health and quality of life. Positive well-being has health-protective biological correlates, including low cortisol output, reduced cardiovascular stress responsivity, and heightened antibody responses to vaccination [5–7]. It has also been found to predict reduced risk of stroke, functional disability, and mortality in older populations [8,9], although evidence is still limited [10]. Two distinct types of positive well-being have been delineated: positive affect or hedonic well-being, characterized by feelings of happiness and enjoyment; and eudaimonic well-being, which relates to purposeful engagement with life, the realization of human potential and human actualization [11,12]. In this article, hedonic well-being is referred as positive affect.

There has been relatively little research on relationships between positive psychological states and sleep. An inverse association between positive affect and sleep quality has been described in patients with narcolepsy and sleep apnoea [13,14], but Jean-Louis et al. [15] found no relationship between positive subjective state and sleep quality in a community sample. By contrast, Ryff et al. [16] reported that
aspects of eudaimonic well-being, including purpose in life, environmental mastery, and positive relationships, were associated with good sleep in a cohort of older adults.

No study has yet investigated the relationships between sleep disturbance and both types of positive psychological state. The first aim of the present study was therefore to examine the associations between self-reported good (undisturbed) sleep and both positive affect and eudaimonic well-being in a healthy middle-aged and older sample. Sleep problems are more common in people of lower socioeconomic status (SES) as defined by income, education, and occupational status [17–19]. Additionally, disturbed sleep is associated both with chronic medical conditions and poor self-rated health [2,3,17]. Since SES and health may affect positive psychological states as well, these factors were taken into account in the analyses of relationships with good sleep.

Psychosocial factors may also be related to sleep disturbance and impaired positive well-being. General psychological distress, depression, and anxiety have all been associated with sleep problems and insomnia [2,4,17]. People who report greater chronic life stress including general stress, financial difficulties, and work strain experience more disturbed sleep [4,19,20]. Sleep quality is impaired in individuals who are socially isolated and in people who describe unsatisfactory social relationships [4,21]. These factors may combine to generate a high level of psychosocial adversity in people experiencing chronic life stress coupled with low social support. For example, in a study of middle-aged working men and women, Steptoe and Marmot [22] showed that sleep problems were more common in people reporting high work, financial, and neighborhood stress coupled with low emotional support and social connectedness.

People who experience psychological distress, chronic life stress, low emotional support, and social isolation may be less happy and less fulfilled in their lives than others. But positive psychological states may also act as protective factors, buffering the impact of psychological distress and adversity on health outcomes. Consequently, associations between psychosocial risk factors and poor sleep may be modified by positive psychological states. The second aim of this study was to test this possibility by examining whether relationships between psychosocial risk factors and sleep are independent of positive psychological states, or are attenuated when these factors are taken into account. We measured life stress, social relationships, and psychological distress, and tested the effect of adding positive affect and eudaimonic well-being into the regressions on sleep problems.

2. Method

2.1. Participants

Participants were 827 men and women who were members of the Whitehall II epidemiological cohort [23]. None had taken part in previous investigations of positive affect or psychological well-being. They were a subset of the 6914 men and women who participated in the 18- to 19-year follow-up in 2003–2004 and were recruited for a substudy of heat shock proteins [24]. Ninety-one respondents were excluded from these analyses because they were taking psychotropic medication or had a history of coronary heart disease or stroke, leaving 736 participants.

2.2. Measures

Sleep problems were assessed using the Jenkins Sleep Problems Scale [25], a widely used brief self-report instrument [26]. This contains items assessing number of times waking up in the night, difficulty staying asleep, trouble falling asleep, etc. The Cronbach $\alpha$ in this population was .84. Scores were scaled from 0 to 100, with higher scores indicating greater sleep problems.

Positive affect was measured using ecological momentary assessment methods rather than a measure administered at a single time point [6]. Four ratings were requested for 2.5, 8, and 12 h after waking, and at bedtime. Actual times of assessment averaged 9:18 a.m.±60 min, 2:45 p.m.±67 min, 6:54 p.m.±67 min, and 11:09 p.m.±58 min. On each occasion, participants were asked "how happy, excited or content do you feel at this moment", with four response options: 'not at all', 'somewhat', 'very much', and 'extremely'.

Eudaimonic well-being was measured with three scales from the CASP-19 [27]. The CASP-19 was devised as a needs satisfaction quality of life measure for people in early old age and consists of four scales: control, autonomy, pleasure, and self-realization. The control, autonomy, and self-realization scales correspond to the concepts of environmental mastery, autonomy, self-acceptance, and purpose in life that make up psychological well-being in Ryff's taxonomy [11,16]. Each item is scored on a four-point scale from 'never' to 'often'. Control was assessed by six items (e.g., "I feel that what happens to me is out of my control"), autonomy with five items (e.g., "I feel that I can please myself in what I do"), and self-realization with four items (e.g., "I feel satisfied with the way my life has turned out"). The Cronbach $\alpha$ for these three scales ranged from 0.60 to 0.85. Scores on the three scales were averaged and scaled from 0 (lowest) to 100 (highest).

Household income was assessed as a measure of SES. Participants were asked to estimate their total household income and were categorized into low (<£25,000), medium (£25–50,000), and higher (>£50,000) income groups. Self-rated health was measured with the item "In general, would you say your health is: excellent, very good, good, fair, or poor". Participants were also classified on whether they were currently in paid employment.

The psychosocial risk factors tested in these analyses were indicators of chronic life stress, social relationships, and psychological distress. Two aspects of chronic life stress were assessed. Financial strain was measured with the items:


Table 1

<table>
<thead>
<tr>
<th>Characteristics of study participants</th>
<th>Mean (n=486)</th>
<th>Mean (n=250)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>61.0±5.9</td>
<td>60.4±5.7</td>
<td>.19</td>
</tr>
<tr>
<td>Currently employed (n=730)</td>
<td>272 (56.3%)</td>
<td>132 (53.4%)</td>
<td>.38</td>
</tr>
<tr>
<td>Household income (n=707)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; £25,000</td>
<td>155 (32.7%)</td>
<td>106 (45.5%)</td>
<td>.001</td>
</tr>
<tr>
<td>£25–50,000</td>
<td>179 (37.8%)</td>
<td>85 (36.5%)</td>
<td></td>
</tr>
<tr>
<td>≥50,000</td>
<td>140 (29.5%)</td>
<td>42 (18.0%)</td>
<td></td>
</tr>
<tr>
<td>Self-rated health (n=734)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>64 (13.2%)</td>
<td>20 (8.0%)</td>
<td>.001</td>
</tr>
<tr>
<td>Very good</td>
<td>197 (40.6%)</td>
<td>87 (34.9%)</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>180 (37.1%)</td>
<td>102 (41.0%)</td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>40 (8.2%)</td>
<td>37 (14.9%)</td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>4 (0.8%)</td>
<td>3 (1.2%)</td>
<td></td>
</tr>
<tr>
<td>Current smoker (n=718)</td>
<td>46 (9.7%)</td>
<td>20 (8.2%)</td>
<td>.59</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>26.3±3.7</td>
<td>26.3±4.9</td>
<td>.99</td>
</tr>
<tr>
<td>Financial strain (0–100)</td>
<td>6.1±12.0</td>
<td>7.5±13.0</td>
<td>.13</td>
</tr>
<tr>
<td>Neighborhood crime (0–3)</td>
<td>0.8±0.56</td>
<td>1.07±0.65</td>
<td>.001</td>
</tr>
<tr>
<td>Psychological distress (0–30)</td>
<td>2.2±4.9</td>
<td>3.65±6.4</td>
<td>.001</td>
</tr>
<tr>
<td>Social isolation (0–24)</td>
<td>10.8±4.3</td>
<td>10.8±4.2</td>
<td>.94</td>
</tr>
<tr>
<td>Emotional support (0–100)</td>
<td>66.5±19.3</td>
<td>64.5±18.0</td>
<td>.18</td>
</tr>
<tr>
<td>Negative social interaction (0–100)</td>
<td>19.3±16.9</td>
<td>22.2±19.1</td>
<td>.35</td>
</tr>
<tr>
<td>Sleep problems (0–100)</td>
<td>25.4±21.9</td>
<td>33.5±24.8</td>
<td>.001</td>
</tr>
<tr>
<td>Positive affect (0–100)</td>
<td>34.2±38.8</td>
<td>30.7±37.9</td>
<td>.024</td>
</tr>
<tr>
<td>Eudaimonic well-being</td>
<td>73.8±13.6</td>
<td>71.2±15.4</td>
<td>.019</td>
</tr>
</tbody>
</table>

“how often does it happen that you do not have enough money to afford the kind of food or clothing that you and your family should have?” and “how much difficulty do you have in meeting the payment of bills?” Each was scored on five-point scales from no problem to very great problem. Responses were skewed, with 66.8% reporting no problem with either item. Responses were therefore categorized into no financial strain, and some financial strain. Neighborhood crime was measured with three questions concerning the likelihood of the participant’s home being broken into, being mugged or robbed, or having their car being broken into or stolen. Each item was rated on a four-point scale from not at all to very worried. Ratings were averaged and could range from 0 to 3. The Cronbach α for this scale was 0.81.

Social isolation was assessed with an adaptation of Berkman and Syme’s [28] social network measure, with three items about relatives outside the household and three questions about friends or acquaintances. Participants were asked whether there were any relatives or friends with whom they had regular contact by visit, telephone, email, or letters; the frequency of visits; and the number of times per month they saw these relatives or friends. Responses were rated from almost daily to never/almost never. Summed scores could range from 0 to 24, with higher scores indicating greater social isolation (α=0.72). Emotional support and negative social interactions were assessed using the Close Persons Questionnaire [29]. Participants designated the single individual to whom they had felt closest over the previous 12 months and rated a series of statements concerning the support provided by this relationship. Eight items contributed to the emotional support scale (e.g., “how much in the past 12 months did this person make you feel good about yourself”, α=.87), while negative social interactions were measured with four items (e.g., “how much in the last twelve months did talking to this person make things worse?” α=.68). Responses were scaled from 0=lowest to 100=highest. Finally, psychological distress was measured with the General Health Questionnaire (GHQ) 30, a widely used screening questionnaire for psychiatric disorder suitable for population studies. Scores could range from 0 to 30, and the Cronbach α was .95.

2.3. Procedure

Participants attended a medical assessment during which clinical and cognitive measures were obtained. Height and weight were measured, from which body mass index (BMI) was calculated. The questionnaire containing the socio-economic and demographic measures, and assessments of sleep problems, psychological well-being, financial strain, neighborhood crime, the GHQ, social isolation, emotional support, and negative social interactions was completed. Participants were instructed in the method of affect sampling which was carried out in the context of salivary cortisol assessments that are described elsewhere [30] and recorded their ratings in a booklet along with the timing of measures. These were returned by post.

2.4. Statistical analysis

The proportion of positive affect measures over the day that were rated as ‘very much’ or ‘extremely’ was computed. With four ratings, each individual could be categorized as being in a positive affective state on 0%, 25%, 50%, 75%, or 100% of occasions. Assessments of eudaimonic well-being were divided into quintiles to make them comparable with positive affect measures. Men and women were compared on all measures using χ² tests for categorical and t-tests for continuous variables. The relationships between good sleep and positive affect and eudaimonic well-being were analysed with separate linear regression analyses on sleep problem scores. Age, gender, household income, and employment status were included in the models. Results are presented as standardized regression coefficients (β), with negative coefficients indicating that positive states are associated with fewer sleep problems. Effects are illustrated by plotting mean sleep problem scores associated with the five levels of positive affect and the quintiles of eudaimonic well-being, after adjustment for covariates. The associations between psychosocial risk factors, positive affect, and eudaimonic well-being were analysed with separate regressions for each psychosocial factor on these variables, again with age, gender, household income, employment status, and self-rated health as covariates. Finally, we determined whether associations between psychosocial risk factors and good sleep were modified by positive affect and eudaimonic well-being by adding these factors to the regression models. The change in β associated with adding psychosocial factors to
women reported more exposure to neighborhood crime and psychological distress on the GHQ. Scores on the sleep problem scale were significantly higher in women than in men. Positive affect over the day and eudaimonic well-being were higher in men than in women, and the two measures were moderately intercorrelated ($r=0.33$, $P<.001$).

As expected, sleep problems were associated with poor self-rated health ($r=0.31$, $P<.001$). Both positive affect and eudaimonic well-being were positively related to age ($r=0.15$, $P<.001$ and $r=0.09$, $P=.011$, respectively) and were inversely associated with self-rated health ($r=-0.24$ and $-0.40$ respectively, $P<.001$). Positive affect was also lower in respondents in paid employment ($r=-0.11$, $P=.002$), but this association was no longer significant after controlling for age. Eudaimonic well-being was positively related to household income ($r=0.07$, $P=.05$), and this remained significant after controlling for age ($r=0.13$, $P<.001$).

Regression analyses confirmed that positive affect was associated with good sleep after controlling for age, gender, household income, work status, and self-rated health ($\beta=-0.17$, $P<.001$). Results are illustrated in the solid bars in Fig. 1. Sleep problem scores were 47% higher in participants experiencing no positive affect over the day, compared with those reporting positive affect on all samples. Similarly, eudaimonic well-being was related to good sleep after adjusting for covariates ($\beta=-0.36$, $P<.001$). Adjusted mean sleep problem scores were 141% greater in the lowest compared with the highest eudaimonic well-being quintile. The regression coefficients were similar for the three scales contributing to eudaimonic well-being and did not differ from one another ($\beta=-0.33$, $-0.32$, and $-0.25$ for control, autonomy, and self-realization scales). When the two positive well-being measures were included in the same regression, both remained independent predictors of good sleep. There was no association between disturbed sleep and smoking or BMI.

3. Results

The study sample is detailed in Table 1. There were no significant differences between men and women in age, current employment, smoking, or BMI. Men tended to have greater household incomes than women, while more described their health as excellent or very good. Men and women did not differ in financial strain, social isolation, emotional support, or negative social interaction, but

![Figure 1](image-url)  

Fig. 1. Mean scores on the Jenkins Sleep Problems Scale in relation to positive affect (upper panel) and eudaimonic well-being (lower panel). Values in the solid bars are adjusted for age, gender, household income, employment status, and self-rated health. Values in the hatched bars are in addition adjusted for financial strain, neighborhood crime, psychological distress, social isolation, emotional support, and negative social interaction. Error bars are S.E.M.

3.1. Positive psychological states and psychosocial risk factors

The associations between psychosocial adversity, positive affect, and eudaimonic well-being are summarized in Table 2.

<table>
<thead>
<tr>
<th>Psychosocial factor</th>
<th>Positive affect</th>
<th>Eudaimonic well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression coefficient $\beta^*$</td>
<td>$P$</td>
</tr>
<tr>
<td>Financial strain</td>
<td>$-.032$</td>
<td>.40</td>
</tr>
<tr>
<td>Neighborhood crime</td>
<td>$-.044$</td>
<td>.24</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>$-.129$</td>
<td>.001</td>
</tr>
<tr>
<td>Social isolation</td>
<td>$-.143$</td>
<td>.001</td>
</tr>
<tr>
<td>Emotional support</td>
<td>$.171$</td>
<td>.001</td>
</tr>
<tr>
<td>Negative social interaction</td>
<td>$-.074$</td>
<td>.047</td>
</tr>
</tbody>
</table>

* Adjusted for age, gender, household income, employment status, and self-rated health.
Table 2. Positive affect was associated with lower psychological distress, less social isolation, greater emotional support, and fewer negative social interactions, but was unrelated to chronic stress experience (financial strain or neighborhood crime). Eudaimonic well-being was not only unrelated to chronic stress experience (financial strain or neighborhood crime). Linear effects across conditions were attenuated, but remained highly significant ($P<.001$). Additional control for smoking and BMI did not alter these results.

3.2. Psychosocial risk factors, positive well-being, and good sleep

Sleep problems were more commonly reported by participants experiencing high financial strain, high psychological distress, and more negative social interactions (Table 3). People reporting greater neighborhood crime and lower emotional support also reported more sleep problems ($\beta=0.115$ and $-0.087$, respectively, $P=.02$), but these effects were no longer significant after self-rated health had been taken into account. Table 3 shows the regression coefficients for psychosocial risk factors after positive affect and eudaimonic well-being had been included as independent variables in the regression models, along with age, gender, household income, employment status, and self-rated health. In all cases, there was evidence of effect modification. In the case of financial strain, the regression on sleep problems was no longer significant ($P=.47$), and $\beta$ was reduced by 73.5%. The regression of psychological distress on sleep problems remained significant ($P<.001$), but $\beta$ was reduced by 20.5%. The regression coefficient for negative social interactions was reduced by 39.6% after positive psychological states had been taken into account. In all models, both positive affect and eudaimonic well-being remained significant independent predictors of good sleep. This is illustrated in Fig. 1 (hatched bars) showing the mean sleep problem score for respondents in each category of positive affect or eudaimonic well-being, adjusted not only for the basic covariates (age, gender, household income, employment status, and self-rated health), but also the six psychosocial factors (financial strain, neighborhood crime, psychological distress, social isolation, emotional support, and negative social interaction). Linear effects across conditions were attenuated, but remained highly significant ($P<.001$). Additional control for smoking and BMI did not alter these results.

4. Discussion

The main findings of this study are that both positive affect and eudaimonic well-being are associated with fewer sleep problems independently of age, gender, household income, employment status, and self-rated health. Self-rated sleep problems and the two aspects of positive psychological state are also related to chronic life stress, psychological distress, and measures of unsatisfactory social relationships. Positive psychological states buffer the association between psychosocial risk factors and poor sleep, accounting for 20–74% of the variance. Finally, the two aspects of positive psychological states are independently associated with good sleep.

The measures of hedonic and eudaimonic well-being were only moderately correlated ($r=0.33$). This confirms previous literature indicating that they are distinct constructs [12]. People who described their lives as satisfying and fulfilling are not necessarily happy, and vice versa. Positive affect was assessed using experience sampling methods, rather than a single measure of how happy the person had been feeling. The limitations of single measures of affective states are well established and include the predominant influence of current mood, and retrospective bias [32,33]. We and others have previously shown that measures of positive affect based on repeated assessments of mood within or between days are reliably associated with health-related biological responses [6,10]. The positive affect measure in this study was based on only four ratings obtained over a single day, but nevertheless generated substantial between-subject variance. In a separate analysis of a larger sample from the Whitehall II study, this measure of positive affect was inversely associated with cortisol output over the day and inversely related to plasma C-reactive protein and interleukin 6 concentrations in women [30].

The positive association between eudaimonic well-being and good sleep confirms the findings from a sample of 135 volunteers aged 61–90 years reported by Ryff et al. [16]. They observed that the environmental mastery of component of eudaimonic well-being was positively associated with sleep duration and the amount of rapid eye movement (REM) sleep, and negatively with delay to first REM onset. Purpose in life was negatively associated with body

Table 3

<table>
<thead>
<tr>
<th>Psychosocial factor</th>
<th>Sleep problems controlling for age, gender, household income, and self-rated health</th>
<th>Sleep problems additionally controlling for positive affect and eudaimonic well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression coefficient $\beta$</td>
<td>$P$</td>
</tr>
<tr>
<td>Financial strain</td>
<td>.098</td>
<td>.008</td>
</tr>
<tr>
<td>Neighborhood crime</td>
<td>.063</td>
<td>.086</td>
</tr>
<tr>
<td>Psychological distress</td>
<td>.418</td>
<td>.001</td>
</tr>
<tr>
<td>Social isolation</td>
<td>.040</td>
<td>.29</td>
</tr>
<tr>
<td>Emotional support</td>
<td>-.067</td>
<td>.065</td>
</tr>
<tr>
<td>Negative social interaction</td>
<td>.222</td>
<td>.001</td>
</tr>
</tbody>
</table>
movement during sleep. Our measure of eudaimonic well-being included scales pertaining to environmental mastery, autonomy, self-acceptance, and purpose in life.

It is notable that the associations with sleep problems were stronger for eudaimonic well-being than positive affect. One explanation may be that the measurement of positive affect was less robust, since it was based on ratings over a single day. Measurement of positive affect over several days with repeated measures might provide a more representative index [34]. Alternatively, the broader multidimensional concept of eudaimonic well-being may be more fundamental, so have a stronger association with sleep.

There is little evidence relating positive affect with low levels of disturbed sleep in adults free of chronic illness or diagnosed sleep disorders. Bardwell et al. [35] found no levels of disturbed sleep in adults free of chronic illness or mental, so have a stronger association with sleep. The concept of eudaimonic well-being may be more fundamental, so have a stronger association with sleep.

The associations of poor sleep with neighborhood crime and psychological distress was related to poor sleep (Table 3).

There are also independent of self-rated health, age, and gender, all of which have been associated with sleep problems in previous research [2,3,17].

The second aim of this study was to discover whether positive psychological states and good sleep was independent of factors that potentially influence both. Lower SES has been related to greater reports of sleep problems in a number of studies [17,18], but the correlation was not significant in this population. Nevertheless, lower SES was moderately associated with reduced positive affect and eudaimonic well-being, as previously observed [36,37]. The relationships between positive psychological states and sleep were also independent of self-rated health, age, and gender, all of which have been associated with sleep problems in previous research [2,3,17].

The second aim of this study was to discover whether the relationship between positive psychological states and good sleep was independent of factors that potentially influence both. Lower SES has been related to greater reports of sleep problems in a number of studies [17,18], but the correlation was not significant in this population. Nevertheless, lower SES was moderately associated with reduced positive affect and eudaimonic well-being, as previously observed [36,37]. The relationships between positive psychological states and sleep were also independent of self-rated health, age, and gender, all of which have been associated with sleep problems in previous research [2,3,17].

The second aim of this study was to discover whether positive psychological states modify the association between psychosocial risk factors and poor sleep, attenuating the strength of effects. We have previously shown that positive affect is associated with greater social connectedness and emotional support [38], and the present analyses indicate that eudaimonic well-being is also related to a favorable psychosocial risk profile (Table 2). As expected, chronic life stress in the form of financial strain, poor social relationships, and psychological distress was related to poor sleep (Table 3). The associations of poor sleep with neighborhood crime and lack of emotional support were weaker and did not survive adjustment for self-rated health. But it is notable that the strength of all effects was substantially reduced after positive affect and eudaimonic well-being were included in the regression models. The regression coefficients for the significant effects were reduced by 20.8–73.5%, suggesting that associations were influenced by positive psychological states. Happier individuals with a greater sense of purpose and positive orientation may be protected in part from the adverse impact of stress and adversity.

It should be emphasized that this study was cross-sectional, and no causal influences can be drawn between positive psychological states and good sleep. It is likely that poor sleep both engenders lower positive affect and reduced eudaimonic well-being, and that positive psychological states lead to better sleep. Intervention research modifying either psychological states or sleep patterns would help delineate the relative importance of these two processes.

This study has a number of limitations. The most important is that we had no objective measures of sleep disturbance, and findings were based on self-report. Self-reported sleep problems may be influenced by plaintive set and negative affectivity [39], although it is notable that associations between positive psychological states and good sleep remained significant after psychological distress had been included as a covariate. These results may not generalize to individuals with severe levels of affective disturbance and clinical psychiatric conditions. Although the sample is relatively large, the members of the Whitehall II cohort are British civil servants, and the results may not generalize to other populations. Data were collected during the seventh phase of assessment of the cohort, and there has been some attrition from the sample since it was first recruited in 1985–1988 [23]. More than half of SES participants have dropped out of the cohort, and this may have had a differential impact on the characteristics of SES groups in this analysis. The CASP-19 does not capture all the facets of eudaimonic well-being, missing out the personal growth and positive relationships domains. The ecological momentary assessment positive affect data were collected only on a single day. Nevertheless, the results indicate that self-reported sleep disturbances are associated with reduced positive affect and reduced eudaimonic well-being even after psychological distress, demographic, and medical factors are taken into account, and may partly explain associations between poor sleep and psychosocial risk factors. A better understanding of these relationships may benefit individuals with sleep problems, while extending the health-related ramifications of positive psychological states.

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References


