Review article

Happiness and health in psychiatry: what are their implications?

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Received: 7/4/2015 – **Accepted:** 4/29/2015
DOI: 10.1590/0101-60830000000058

Abstract

Background: Happiness is a lasting state and is associated with the absence of negative emotions, the presence of positive emotions, life satisfaction, social engagement and objectives in life. Researchers have demonstrated the benefits of happiness in many aspects of life, but few studies have been conducted within psychiatry. **Objectives:** To develop a critical literature review of studies on happiness and health in order to bring some further and useful information to psychiatry updating the article "Happiness: a review" published in 2007 in *Revista de Psiquiatria Clínica*. **Methods:** Computational searching was undertaken of digital data basis (PubMed and SciELO) using the keywords "happiness" and "health". One hundred twenty-seven papers published between 2004 and 2014 were found, but only 76 had the keywords in the title or abstract and with this were selected. **Results:** Personality traits, such as self-direction; being married; being involved in physical and leisure activities; higher educational backgrounds and intelligence quotient; religiosity, volunteering and altruism; good physical and mental health; were positively related to happiness. **Discussion:** Analysis of the concept of happiness and its associated emotions may be more complex than describing the symptoms of psychiatric disorders. Despite this, the study of happiness brings several positive implications for psychiatry.

Machado L et al. / Arch Clin Psychiatry. 2015;42(4):100-10

Keywords: Happiness and health, subjective well-being, happiness, mental health.

Introduction

Happiness is the main objective of human existence[1]. According to many authorities including Greek philosopher Aristotle, all human behavior aims to achieve happiness[2,3]. However, Seneca pointed out that reaching happiness is a challenging task, since it is difficult to find what makes life happy; and, many times, the more happiness is searched for, more elusive it becomes[4]. In this sense, Socrates explained to Fedro that reflection about the truth would nourish the soul; whereas philosophy would be the adequate tool to achieve this goal[5].

Happiness was first investigated as an object of philosophical study. Only in the middle of the last century some empirical studies within the health and associated fields of knowledge started to appear[6,7]. For this reason, the World Health Organization (WHO) has included and emphasized happiness as an important factor within the concept of health[1,8,9]. Most studies on happiness are in the field of psychology[10] and economics[10,11]. In psychology, for example, the concept of positive psychology has emerged[12,13]; according to Seligman (2011), this is an area that studies what is *right* in humans as their positive attributes, that is, their active psychological characteristics and strengths. Positive psychology advocates that promoting mental health involves the promotion of psychological resources, improving the quality of life and preventing mental disorders, especially those disorders that have a strong environmental burden, thereby promoting happiness. Thus, the contributions of positive psychology can and should be considered by psychiatric clinicians and those in general medicine[15,16].

In this context, happiness can be defined as a fundamental emotion characterized as a lasting state which is combined with: (i) the absence of negative emotions; (ii) the presence of positive emotions; (iii) life satisfaction; (iv) social engagement and (v) objectives in life[8,17-19]. Another concept that has been largely used for defining happiness within the specialized literature is *subjective well-being*[6,8,13,19]. It is relevant to mention that the concept of *quality of life* is a broader terminology, also involving happiness itself[19].

In order to use a holistic approach to promote health (i.e., taking into account all factors that influence health), it is important to understand how a healthy person behaves and how positive emotions can contribute to this process. In this sense, as proposed by Seligman (2011), treatment is not just fixing what is broken; rather, it involves nurturing what is best within ourselves[19]. Undoubtedly, the actual psychiatric medical model that mainly focuses on the diagnosis and treatment of mental disorders, has been immensely helpful to many patients; nevertheless, it is believed that it is necessary to move forwards, and this will bring benefits to all, including those with a psychiatric diagnosis[15].

Based on this, the main goal of this paper is to conduct a critical literature review concerning happiness and health which may be useful for the expansion of psychiatric practice, and also to update the article published in 2007 in the *Revista de Psiquiatria Clínica* titled "Happiness: a review"[18].

Methods

Computer searches were carried out within the PubMed data basis, using the keywords "happiness" and "health", during August, 2014; and in the SciELO data basis with the same keywords during November, 2014. Filters were applied, requiring that the keywords appeared in the title or abstract and that the articles had been published between September 2004 and February 2014. From the PubMed, initially 80 papers were related to this topic. After a preliminary analysis, ten papers were excluded from this sample because of the following reasons: (i) four did not cite the word happiness either in their titles or in their abstracts; (ii) two concerned topics only related to, but did not directly concern, happiness and health; (iii) four were informative articles (Figure 1). Regarding the SciELO data basis, 47 papers were found; however, only six contained the word happiness in their titles and/or abstracts.

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In addition to these searches, another was performed using the reference lists of the papers already selected. This was rewarding in allowing us to identify the classic work provided by significant authors in this field, such as Martin Seligman, Robert Clonniger anda Ruut Veenhoven, as well as the importance in this context of the WHO (Table 1).

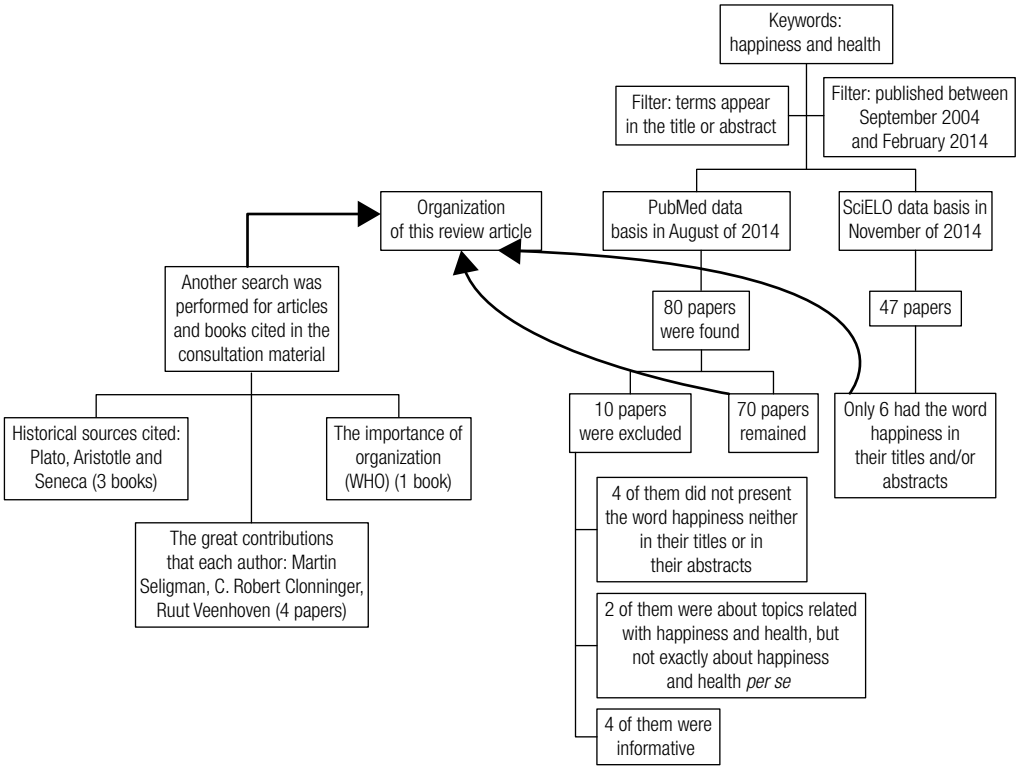

Figure 1. Flowchart of search data.

Table 1. Papers from 2013 to 2014 selected for this review

Author	Title	Year	Sample	Main findings	Main limitations	Conclusion
Ali A, Ambler G, Strydom A, Rai D, Cooper C, McManus S, *et al*.	The relationship between happiness and intelligent quotient: the contribution of socio-economic and clinical factors	2013	The authors analysed data from the 2007 Adult Psychiatric Morbidity Survey in England (6870 participantes aged 16 years or over and living in private households were included in the study)	Those in the lowest IQ range (70-99) reported the lowest levels of happiness compared with the highest IQ group (120-129)	The use of a single question to measure happiness. It is easier for people with lower IQ to understand compared with using a detailed inventory, however the subjective nature of the happiness measure may affect its validity and the use of a single-item question may be less valid in those with higher IQ	Those with lower IQ are less happy than those with higher IQ. Interventions that target modifiable variables such as income and neurotic symptoms may improve levels of happiness in the lower IQ groups
Baruch Y, Swartz M, Sirkis S, Mirecki I, Barak Y	Staff happiness and work satisfaction in a tertiary psychiatric centre	2013	209 staff (185 nurses, 110 administrative staff, 61 psychiatrists, 35 psychologists, 20 social workers and 39 others) at a large university-affiliated tertiary care psychiatric centre	Highest levels of happiness were reported by psychologists and social workers and the lowest by nursing staff. Work orientations as a "job", "career" and a "calling" also differed between sectors with the highest levels of work as a "calling" reported by psychiatrists and the lowest by administrative staff	Less than half of all staff participated, the questionnaires chosen were brief and designed for survey purposes rather than in-depth evaluations	Satisfaction with life is not "driven" by work orientation. Psychiatrists perceive their work as a calling but do not seem to benefit from this in their satisfaction with life Improving staff happiness may contribute to increase in moral and counter burnout

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Author	Title	Year	Sample	Main findings	Main limitations	Conclusion
Binder M, Coad A	"I'm afraid I have bad news for you…" Estimating the impact of different health impairments on subjective well-being	2013	100,265 observations from the British Household Panel Survey (BHPS) database (1996-2006)	The strongest negative effect in happiness is for alcohol and drug abuse, followed by anxiety, depression and other mental illnesses, stroke and cancer A puzzling asymmetry was detected: strong adverse reactions to deteriorations in health appear alongside weak increases in well-being after health improvements	The measure of life satisfaction was made from a single question. Subjective well-being questions were elicited via self-completion, while health condition answers by an interviewer. Bias could result if individuals systematically answer health questions differently in the interviewer's presence	Bad health decreases individuals' happiness differently
Brasseur S, Grégoire J, Bourdu R, Mikolajczak M	The Profile of Emotional Competence (PEC): development and validation of a self-reported measure that fits dimensions of emotional competence theory	2013	Five samples for a total of 5676 subjects (4753 women and 923 men, aged 15 to 84 years) in USA	The authors developed and validated in four steps a complete (albeit short: 50 items) self-reported measure of EC: the Profile of Emotional Competence	----	Analyses performed on a representative sample of 5676 subjects revealed promising psychometric properties. The internal consistency of scales and subscales alike was satisfying, factorial structure was as expected, and concurrent/discriminant validity was good
Chen H, Pine DS, Ernst M, Gorodetsky E, Kasen S, Gordon K, *et al.*	The MAOA gene predicts happiness in women	2013	Data (The Children in the Community-CIC) for this study were drawn from the 345 Caucasian subjects include 193 women and 152 men who were assessed for MAOA genotype in 2010 at mean age of 38 and happiness in 2004 at mean age of 33	In women, low expression of MAOA (MAOA-L) was related significantly to greater happiness after adjusting for the potential effects of age, education, household income, marital status, employment status, mental disorder, physical health, relationship quality, religiosity, abuse history, recent negative life events and self-esteem use in linear regression models. In contrast, no such association was found in men	There is no single "happiness" gene and likely to be a set of genes whose expression influences subjective well-being. Future work should attempt to identify other genes that are associated with human happiness	This new finding may help explain the gender difference on happiness and provide a link between MAOA and human happiness
Christakis NA, Fowler JH	Social contagion theory: examining dynamic social networks and human behavior	2013	The authors describe the methods we have employed (and the assumptions they have entailed) to examine several datasets with complementary strengths and weaknesses, including the Framingham Heart Study, the National Longitudinal Study of Adolescent Health, and other observational and experimental datasets that we and others have collected	The authors describe the regularities that led them to propose that human social networks may exhibit a "three degrees of influence" property, and they review statistical approaches we have used to characterize interpersonal influence with respect to phenomena as diverse as obesity, smoking, cooperation, and happiness	---	The authors do not claim that this work is the final word, but they do believe that it provides some novel, informative, and stimulating evidence regarding social contagion in longitudinally followed networks. Along with other scholars, they are working to develop new methods for identifying causal effects using social network data, and they believe that this area is ripe for statistical development as current methods have known and often unavoidable limitations

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Author	Title	Year	Sample	Main findings	Main limitations	Conclusion
Doherty M, Kelly BD	When Irish eyes are smiling: income and happiness in Ireland, 2003-2009	2013	Data from the European Social Survey (ESS) relating to self-rated happiness and social and psychological correlates of happiness in Ireland in 2003 (n = 2,046), 2005 (n = 2,274), 2007 (n = 1,794) and 2009 (n = 1,764)	There was a slight decline in happiness between 2005 and 2009, as mean self-rated happiness score changed from 7.94 (2005) to 7.55 (2009). Satisfaction with health had the strongest association with happiness in 2003, 2005 and 2007. Satisfaction with income, relative to other variables, increased over time and in 2009 had the strongest association with happiness	Absence of data relating to certain variables that have been associated with happiness in previous studies. This study was also limited in its ability to assess religiosity in people of no religion, but this is due to the limitations of the ESS	Despite dramatic changes in economic circumstances and a slight decline in happiness, the Irish continued an historic tradition of rating ourselves as generally very happy
Eisenberg D, Golberstein E, Whitlock J L, Downs MF	Social contagion of mental health: evidence from college roommates	2013	Data come from online surveys of first-year college students. The authors conducted the surveys at two large and academically competitive universities: one public school with approximately 6000 first-year students (hereafter "university A"), and one private school with approximately 4000 first-year students ("university B"). The authors fielded the baseline survey in August 2009, shortly before students arrived at college, and the follow-up survey in March–April 2010, shortly before the end of the academic year	Findings are consistent with no significant overall contagion of mental health and no more than small contagion effects for specific mental health measures, with no evidence for happiness contagion and modest evidence for anxiety and depression contagion. The similarity of baseline mental health predicts the closeness of roommate relationships, which highlights the potential for selection biases in studies of peer effects that do not have a clearly exogenous source of variation	Perhaps the most important question about the results of this study is how they generalize to other social contexts. Contagion may be quite different across other social ties, particularly more intimate relationships such as spouses, siblings, and longtime friends. Contagion may also vary considerably by age group, considering how people's social relationships and networks evolve during their lifetime	Thes results suggest that mental health contagion is lower, or at least more context specific, than implied by the recent studies in the medical literature
Gana K, Bailly N, Saada Y, Joulain M, Trouillet R, Hervé C, Alaphilippe D	Relationship between life satisfaction and physical health in older adults: a longitudinal test of cross-lagged and simultaneous effects	2013	The study included 899 participants aged 64 to 97 years and assessed 5 times over an 8-year period	Both cross-lagged and simultaneous coefficients indicated that poor health significantly predicted subsequent levels of life dissatisfaction, but life satisfaction did not predict subsequent levels of health	Cross-lagged and simultaneous structural models provide tests of reciprocal influences between constructs over time, not of causality. The assessment of self-perceived health with a one-item question is also disputed	These findings contradict, at least in this older sample, the postulates of positive psychology, and support the bottom-up approach to well-being as well as the popular adage, "As long as you've got your health"
Gruber J, Kogan A, Quoidbach J, Mauss IB	Happiness is best kept stable: positive emotion variability is associated with poorer psychological health	2013	Study 1 included a sample of 244 adult participants from the Denver, Colorado, community. Study 2 consisted of 2,391 francophone adults recruited through a large online study mentioned during the French TV show Leurs Secrets du Bonheur	Greater macro- and microlevel variability in positive emotion was associated with worse psychological health, including lower well-being and life satisfaction and greater depression and anxiety (Study 1), and lower daily satisfaction, life satisfaction, and happiness (Study 2)	Cross-sectional study	Taken together, these findings support the notion that positive emotion variability plays an important and incremental role in psychological health above and beyond overall levels of happiness, and that too much variability might be maladaptive

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Author	Title	Year	Sample	Main findings	Main limitations	Conclusion
Kang Y, Gruber J	Harnessing happiness? Uncontrollable positive emotion in bipolar disorder, major depression, and healthy adults	2013	Participants included adults with bipolar I disorder (BD; n = 32), major depression (MDD; n = 32), and or nonpsychiatric controls (CTLs; n = 31)	Across all participants, reliving a controllable positive emotion experience was associated with exhibited increased respiratory sinus arrhythmia, an autonomic marker of regulatory control. Interestingly, only the MDD group reported increased positive emotion and decreased cardiovascular arousal when reliving an event involving uncontrollable positive emotion, compared to the BD and CTL groups	Emotion control was self-defined by the participants in this study, so we cannot know precisely how successful people actually were in controlling their emotions in the recalled events	These findings suggest that although controllable positive emotion experiences may be adaptive for most, individuals with a history of restricted affect and depressed mood may actually derive more pleasure from times of unharnessed happiness
Lehmann BA, Bos AER, Rijken M, Cardol M, Peters GJY, Kok G, Curfs LMG	Ageing with an intellectual disability: the impact of personal resources on well-being	2013	Longitudinal survey data on 667 people with a mild or moderate intellectual disabilities (ID) were acquired via interviews in 2006 and 2010	Age is positively related to decreased mobility and auditory disabilities and negatively related to independent living, autonomy in how one spends one's leisure time and autonomy in decision-making. Longitudinal analyses demonstrated that, with the exception of health that deteriorated, and social satisfaction that improved, almost all variables remained stable over the 4-year period. Further, good physical health in 2006 predicted happiness in 2010	Most of the items were dichotomous as asking people with ID to answer questions is not always easy Some associations were barely significant and had weak effect sizes and should therefore be interpreted with caution	Despite the fact that age is associated with poorer physical and mental health and a smaller social network, this study showed that older people with ID have relatively high levels of well-being
Mitchell L, Frank MR, Harris KD, Dodds PS, Danforth CM	The geography of happiness: connecting twitter sentiment and expression, demographics, and objective characteristics of place	2013	This article combining (1) a massive, geo-tagged data set comprising over 80 million words generated in 2011 on the social network service Twitter and (2) annually-surveyed characteristics of all 50 states and close to 400 urban populations	Happiness within the US was found to correlate strongly with wealth, showing large positive correlation with increasing house- hold income and strong negative correlation with increasing poverty. Happiness anticorrelates significantly with obesity	There are a number of legitimate concerns to be raised about how well the Twitter data set can be said to represent the happiness of the greater population. Furthermore, the fact that the authors collected only around 10% of all tweets during the calendar year 2011 means that their data set is a non-uniform subsample of statements made by a non-representative portion of the population	The results show how social media may potentially be used to estimate real-time levels and changes in population-scale measures such as obesity rates
Proulx CM, Snyder-Rivas LA	The longitudinal associations between marital happiness, problems, and self-rated health	2013	The sample included 707 continuously married adults who participated in all six waves of the Marital Instability Over the Life Course panel study. Participants averaged 35 years in age at the first wave and were continuously married to the same spouse over the 20-year period	Unidirectional coupling existed for marital happiness and self-rated health only, such that higher levels of marital happiness predicted subsequent elevations in self-rated health over time. No evidence was found for bidirectional coupling between marital problems and self-rated health	Findings cannot be generalized to all married individuals, a focus on people who were married continuously across 20 years provides evidence of the associations between marital happiness and self-rated health in long-term marriages. All health and marital quality variables were self-reports, and objective and observa- tional measures, respectively, may yield different results	Similar to human development scholars' asser- tion that aging adults are survivors of conditions and events related to an increased risk of mortality, individuals in long-term marriages may be considered survivors of relationship problems and other challenges that could have contributed to marital dissolution

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Author	Title	Year	Sample	Main findings	Main limitations	Conclusion
Ruseski JE, Humphreys BR, Hallman K, Wicker P, Breuer C	Sport participation and subjective well-being: instrumental variable results from German survey data	2014	The sample used in the empirical analysis contains 1238 adults between the ages of 18–70 who responded to the question about happiness	Individuals who participate in sport have higher life happiness. The results suggest a U-shaped relationship between age and self-reported happiness. Higher income is associated with greater self-reported happiness, males are less happy than females, and single individuals are less happy than nonsingles	Cross-sectional study Telephone interview	This broader impact of sport participation on general happiness lends support to the policy priority of many governments to increase sport participation at all levels of the general population
Sahraian A, Gholami A, Javadpour A, Omivadir B	Association between religiosity and happiness among a group of Muslim undergraduate students	2013	271 undergraduates medical students attending Shiraz University of Medical Sciences in Iran	It was found that higher score on religious belief was significantly linked to the level of happiness	Cross-sectional study	The result confirms that individuals with a more religious attitude experience more happiness. The result of this study should be considered in programs designed to improve overall well-being of university students
Tay L, Kuykendall L	Promoting happiness: the malleability of individual and societal subjective wellbeing	2013	Literature review on subjective wellbeing	Research now shows that although subjective wellbeing is heritable and stable, it can change substantially over time. Long-term changes can be affected by positive or negative life events; subjective wellbeing interventions have also proved to be effective for boosting wellbeing for as long as six months. At the societal level, economic factors matter for the subjective wellbeing of citizens. Economic wealth is shown to be a predictor of societal wellbeing across countries and over time. Also, high unemployment severely lowers the wellbeing of individuals and has spillover effects on other societal members, such as the employed	Is not a systematic review article	For practitioners, policy makers, and economists interested in the wellbeing of individuals, this article propose that these findings have implications for mental health practice and economic policies
Van Campen C, de Boer AH, Iedema J	Are informal caregivers less happy than noncaregivers? Happiness and the intensity of caregiving in combination with paid and voluntary work	2013	The sample consisted of 336 informal caregivers and 1765 noncaregivers in the Dutch population	Caregivers are happier than noncaregivers when they provide care for < 6 hours a week; and in line with the burden assumption, the results show that providing care for more than 11 hours a week is associated with lower levels of happiness. Other results contradicted the burden assumption that combining caregiving with paid or voluntary work is associated with more time burden and less happiness. The result that combining caregiving with paid employment or volunteering is related to higher rates of happiness confirms the subjective well-being assumption	The variables of burden and happiness were measured with single items. Cross-sectional study	It is concluded that these cross-sectional results open ways to longitudinal research that can inform governments in the development of policies to support informal caregivers

Based on the results from these searches, it was possible to identify six core aspects related to the keywords "happiness" and "health", namely:

1. Aspects of happiness;
2. Biology of happiness;
3. Psychology of happiness;
4. Sociodemography of happiness;
5. Health, mental health and happiness;
6. Positive implications for psychiatry.

Each of these aspects is described further in the following section.

Results

Aspects of happiness

The scientific literature often refers to two types of happiness: psychological well-being and hedonic well-being. The term psychological well-being, or eudaimonia, has been used to refer to a combination of character strengths involving self-direction (*e.g.*, autonomy, purpose of life, environmental and self-acceptance), cooperatives (i.e., positive relationships with others) and self-transcendence (i.e., personal growth and self-realization)[8,12]. Hedonic well-being, or hedonia, is associated with: (i) a pleasurable life; (ii) life satisfaction; (iii) presence of positive feelings and (iv) absence of negative feelings[20]. It can be said, therefore, that psychological well-being is connected to the personal fulfillment of one's own potential, while hedonic well-being is linked to the experience of satisfaction.

Although these are two different ways to experience happiness, they are strongly related[8,12,20]. However, from a historical point of view, they have different origins. Aristotle postulated that every human being had unique capabilities, called *daimon,* that should be recognized and developed[3]. Similar to this idea are the concepts/theories of: (i) self-actualization, described by Maslow; (ii) the individualization theory developed by Jung; and (iii) Antonovsky's theory of existential coherence; all are related to the concept of eudaimonia[20,21]. It is relevant to note that Epicurus provided the basis for the later development of hedonism[20]. The biological differences between each type are discussed further below.

Besides these two types of happiness, it is important to distinguish two types of emotions or affects that are connected to the understanding of happiness: positive affect and negative affect. These are independent variables and may or may not be in opposition[18]; it is possible to feel positive and negative emotions at the same time, as well as being in a neutral state. These emotions/affects might seem to have different determinants, consequences and correlations[14], and it is relevant to note that happiness itself is related to the frequency of positive emotions and not to their intensity[14,18]. Negative emotions, such as fear and anger, are recognizably beneficial as they help people to ensure their survival and safety. Nevertheless, these are short-term benefits; the Broaden and Build Theory states that positive emotions amplify cognition and behavior, providing intellectual, social and physical resources for optimum performance. Thus, the long term benefits of positive emotions contribute to the individual's ability to continue his/her development[14].

Biology of happiness

Trying to understand the complex link between psychological factors and biological change, scientists have studied the effects on health of negative emotions. For example, it is known that stress, depression and anxiety generate changes in the hypothalamic-pituitary-adrenal axis, with a consequent increase of cortisol, sympathetic stimulation and elevation of proinflammatory markers. If these negative stimuli persist, the risk increases of developing cardiovascular disease, cancer and/or infections[22,23]. However, only recently has scientific interest focused on verifying that positive emotions could also induce biological changes. Some studies have demonstrated that the two types of happiness (eudaimonia and hedonia) can cause biological changes that promote positive emotions[24]; however, most of this research has shown that only eudaimonia is statistically related to biological changes[12,20,22]. In general, the changes found in the neuroendocrine, immune and cardiovascular systems secondary to positive emotions are beneficial and protective effect[12,23].

First, positive emotions can quickly cancel the adverse effects of body stress reaction, and thus return the body to a steady state[14]. It may be interesting to see how this biological characteristic of positive emotions corresponds to the observation that many people say they feel good, even through times of suffering, if adverse events are interpreted as having a purpose or meaning[8]. Perhaps this search for meaning is a psychic attempt to maintain an emotional balance.

Second, higher levels of eudaimonia are related to lower levels of salivary cortisol and proinflammatory cytokines, a lower cardiovascular disease risk, longer duration of REM sleep[20,23], higher levels of immunoglobulin A, and higher HDL cholesterol levels[12] compared to those with low levels of eudaimonia. There are, however, differences between men and women in this regard; for example, inflammatory markers such as C-reactive protein and fibrinogen are lower in happy women than in happy men[24].

These alterations have been found regardless of the presence of negative emotions, suggesting that happiness has a direct effect on the body, regardless of the absence of negative affect[23]. On the other hand, in the same manner as tobacco and some physical leisure activities are found in stressed individuals, depression and anxiety and their associated behaviors contribute to increased rates of diseases and adverse biological changes; part of the positive biological findings in happy individuals is also due to their tendency towards healthier habits and more prudent lifestyles[23].

Another important point is that studies of monozygotic twins, separated and raised in different environments, have shown that happiness has a genetic component of 35%-50% in humans[6,14,25]. In this regard, it is suggested that the long allele of the promoter region of the 5-HTT gene (5-HTTLPR long) could be associated with optimism. The 5-HTT gene encodes serotonin transporters; this type of polymorphism in the promoter region is called a functional polymorphism[26]. De Neve found that individuals satisfied or very satisfied with life have a statistically significant higher percentage of this genotype (long 5-HTTLPR homozygous), compared to people dissatisfied with life. Recently, it was discovered that, in women, a low MAO gene expression is significantly associated with increased levels of happiness. This finding, however, was not present in men[26].

It is important to consider that many of these studies have some limitations such as small sample sizes, cross-sectional designs or bivariate analyses. Still, the studies are promising and already point us in several directions.

Psychology of happiness

If 35%-50% of happiness depends on a genetic influence, at least 30%-40% are represented other variables, suggesting that the environment and life events also have a large influence on subjective well-being. However, this influence varies from event to event; personal interpretations may be the key to understanding the link between life events and subjective well-being[6]. In this sense, character has a strong impact on the perception of all aspects of health, including physical, social and emotional well-being. For example, self-direction is measured by levels of responsibility, ingenuity and ability to find meaning, and has a strong connection with all aspects of health. Changes in self-direction explain about 32% of the variations in the risk of disease and about 45% of the variations in subjective well-being.

The way in which an individual sees life can predict his/her health outcomes. For example, pessimists need to visit four times as many doctors in one year than optimists[17]. Similarly, the link between success and happiness exists not only because success makes people happy, but because positive attitudes engender success[27]. A concept that may explain these relationships is emotional competence (EC),

also known as emotional intelligence. This concept relates to how the individual deals with emotional information, intrapersonally and interpersonally. High EC is associated with greater happiness, and higher mental and physical health, greater professional success and greater satisfaction in social relationships and marriage[28].

Christakis and Fowler used the Framingham study to try to answer the following question: can the happiness of others influence personal happiness? The study was based on the theory that emotional states can be transferred interpersonally through mimicry, by copying emotionally relevant bodily actions, especially facial expressions, and it concluded positively. The authors suggested that happiness may be seen as a network phenomenon; happiness clusters resulted from the spread of happiness and not only by the tendency of people to associate with similar individuals[29]. Although this theory of social contagion has also been replicated in disorders such as depression, a study involving roommates in college resulted in different findings, arguing that happiness and mental disorders have low social contagion[30]. Perhaps the last word on the subject has not yet been given, but there is no doubt that this is an exciting area.

Sociodemography of happiness

Several factors associated with happiness have been studied. Below we describe some that appear in more recent studies and have not been reported in other review articles on happiness.

Economic factors

The first modern economist to study happiness found a paradox (i.e., the Easterlin paradox) in which groups of richer countries are happier than groups of poorer countries, but this difference is not so clear between rich and Latin American countries where there are larger social differences. Even in poor countries, the relationship between money and happiness is not linear. Deprivation and poverty are less associated with happiness[31] however, after reaching a level of care that meets basic needs, other factors, such as people's increased aspirations and concerns about their own heritage come into play[10,32]. Indeed, despite the economic changes, happiness levels have remained relatively stable in countries such as Ireland and the United States[17,33]; a study linking retirement and welfare showed that monetary gain increased financial well-being, but the benefits of retirement on health and subjective and social welfare were transient[34]. Another binding factor between economic issues and happiness seems to be social inequality, since individuals living in areas of great social inequality tend to describe themselves as unhappy and unhealthy[35]. From the individual point of view, however, people who are paid by the hour appear to be happier[36]. In addition, informal workers tend to report higher levels of happiness related to their professional activity[37]. Another factor that may explain this lack of linearity between economic issues and subjective well-being levels is that happy people tend to focus more on social ideals and moral goals than just monetary achievement[7].

Age

With increasing age, happiness tends to decrease in the population as a whole[38,39]. However, from the individual point of view, centenarians who have high levels of satisfaction with their lives in the past tend in their old age to make the best personal assessments of their own health, economic security and happiness[40]. Therefore, there is a protective relationship between happiness and physical decline that occurs in old age[41,42]. In this age group, contentment related to the children and the health of the family is associated with a higher level of happiness[43]. Moreover, happiness is related to longevity, independent of family genetic and environmental issues[44]. Finally, a rather curious result was obtained from a longitudinal study that found a positive association between chocolate consumption, optimism, better health and greater psychological well-being[45].

Interpersonal relationships

People living in minority groups tend to report less happiness than those who belong to majority groups[7]. For example, after the tragic events of September 11, 2001 in the United States, Arab Americans reported a greater perception of abuse and discrimination; this perception was related to higher levels of psychological stress, worse health outcomes and a lower sense of happiness[46].

Married people tend to experience better health and happiness than unmarried people. This relationship has been found in various countries, within various health parameters and in both men and women[47]. This association, however, extends beyond marital status, because the quality of marriage also has a great influence on it[47-49]. There is also a positive relationship between happiness and sexual satisfaction in women and men, although that relationship is stronger in women[50].

Religiosity and volunteering

It is well established that people who identify themselves as religious tend to report better health and more happiness, regardless of their religious affiliation, performance of the religious activities, work, family, social support or financial situation[51]. The studies that have reached these conclusions were mostly carried out in the western population. However, research on Islamic and Egyptian students also found a positive relationship between religious affiliation and happiness[52-54]. Seen as human dimensions by many researchers, these aspects tend to be increasingly taken into consideration in the treatment and development of people[15,55], especially considering that the humans are religious beings, since they spend more time praying than having sex[15].

Another related aspect is the issue of volunteering and altruism. People who engage in volunteer work and altruistic behaviors tend to be healthier, live longer, and to be happier[56-58]. However, when this type of activity becomes too arduous, occupying more than 11 hours per week, the happiness levels tend to decrease[56,58].

Educational level, sports and leisure

The positive relationship has long been recognized between education levels, intelligence quotient (IQ) and health levels. More recently, a positive relationship has also been found between educational levels, IQ and the happiness index[10,59,60].

Other factors studied in recent years include physical leisure activities that have been shown to increase subjective well being, both in the short and long term[61]. Involvement in sport also appears to have a causal relationship with higher levels of happiness[62].

Finally, it is worth remembering the psychological theory of the set point of happiness, according to which people have a basal level of happiness that they tend to return to over time, even after major events such as winning the lottery or divorce. However, unemployment is one of the events that has a negative impact on happiness that people tend not to adapt to[10].

Health, mental health and happiness

Happiness and health are closely related, both on an individual and population basis; happier people and communities tend to be healthier, and the inverse relationship is also true[63]. This relationship was also found in adolescents[64], the young[65,66] and the elderly[67]. However, in the elderly, a study found that health predicted subjective well-being, but the reverse was not true[68], perhaps because, in this population, other factors previously listed in the sociodemography of happiness subsection[3,4] came into play. As examples, the happiest nations tend to have lower levels of blood pressure[69]; a study of coronary artery disease (CAD) found that optimistic men had a lower risk of developing CAD[17]; and happier people recovered better from sickness[70].

It is well known that chronic diseases are associated with negative impacts on various aspects of the quality of life, including happiness, and increase the risk of depression[71]. However, different chronic diseases seem to impact differently on subjective well-being[71]. In the elderly, for example, the physical diseases that impose decreased happiness were disabling pain and urinary incontinence; these disturb the activities of daily living and are associated with social stigmas[67].

Furthermore, mental disorders in general, and specifically depression, alcohol and drug abuse[72] and anxiety[72,73] more negatively affect happiness than does physical illness. Similarly, there is an inverse relationship between suicide and the subjective well-being index, and also between the presence of mental disorders and happiness[74]. For this reason, it has been proposed that happiness indices could be used as population markers for mental disorders[74]. In this sense, the ability to exercise control over adaptive negative emotions is associated with beneficial results in mental health[75]. However, excessively large or small variations in positive emotions are associated with poorer mental health, particularly depression and anxiety disorders, lower life satisfaction and more unhappiness[76]. Perhaps this issue of emotional control can also explain the association between mental disorders and unhappiness, and the large presence of negative emotions that mental disorders cause.

Positive implications for psychiatry

Given all of the above, a question must be raised: is possible and is it desirable to promote happiness? The evidence appears to say yes. Happiness does not cure the disease but makes people less sick and the size of this effect appears to be comparable to smoking or not[77]. In mental health, in particular, the study of factors that lead to happiness can be particularly beneficial in those at higher risk of developing mental disorders[18]. In fact, positive psychological interventions have already been successfully tested in patients with depressive disorders[78]. Furthermore, investment in approaches that increase subjective well-being may be cheaper for the public purse. For example, a study comparing psychotherapy versus paying monetary damages in legal compensation cases showed that psychological approaches may be up to 32 times cheaper than financial compensation, as well as being more effective in promoting health and happiness in patients potentially involved in litigation[79]. The understanding of what promotes happiness in people can also be useful for mental health professionals themselves since they are at risk of decreased life satisfaction and burnout syndrome; this can have negative consequences for psychiatric patients, since high levels of stress in these professionals predict therapeutic problems in general[80].

Positive psychology contains the concept of *flourish*. This concept suggests five features found in happy people (*PERMA*) that should be promoted to increase levels of subjective well-being in people in general:

1. Positive emotions (P)
2. Engagement (E; being in the flow)
3. Relationships (R; having healthy relationships)
4. Meaning (M; purpose in life)
5. Accomplishment (A)

Investment in any of these areas promotes the others and helps develop happiness[81,82].

In addition to increasing happiness, feeding positive emotions such as gratitude, kindness, perseverance, optimism and creativity, contributes to increased resilience, buffers psychological stress and promotes mental health. Programs such as the Penn Resiliency Program (PRP), developed for this purpose, have been successfully implemented in the United States, the United Kingdom, Australia, Portugal and China. In this program, participants learn to adopt more optimistic explanatory styles, detecting inaccurate thoughts, challenging negative beliefs and considering alternative interpretations. In addition, a task force made up of several positive psychology professionals developed an inventory to help people identify their character strengths; this is called the Values in Action Inventory of Strengths (VIA-IS). Despite its limitation of being based on self-report, the simple application of this instrument has been shown to be therapeutic in itself and has brought positive results. The VIA -IS and the PRP are intended for use by adults and children. There is also a tool named Appreciative Inquiry, used in institutions, that aligns with positive psychology. By means of this instrument, groups are helped to refocus problems towards the identification of existing strengths in group members, thus providing a starting point for positive change[14].

Discussion

We have critically reviewed the literature on the relationship between happiness and health in order to identify the most relevant information for psychiatry. We especially considered data that were also being studied in the latest research, and not only the findings of classical studies. Studies are numerous; nevertheless, we realize that many studies on the topic of happiness are transversal; this, despite the use of large samples, diminishes the robustness of some conclusions. In addition, the measurement scales are often limited by being of the self-report variety. In a sense, we already find this difficulty in psychiatry itself in its use of subjective medical measurements, such as pain. However, analysis of the concept of happiness and its associated emotions may be more complex than describing the symptoms of psychiatric disorders, which can expose us to some difficult biases that are difficult to bypass. Another limitation of some studies seems to lie in their contained psychotherapeutic interventions. Although there are well-established interventions within positive psychology (some have been reported in this article) as well an interesting proposal for psychoeducation made by Clonniger (2006), progress in the expansion of clinical approaches seems to be necessary. In addition, most therapeutic interventions proposed have comprised a more psychoeducative approach. Certainly, some of these limitations exist because the interest of the health sciences in this topic is relatively recent. Moreover, is an area that is more linked to the formulation of psychotherapeutic approaches and this tends to discourage investment in the development of new psychoactive drugs.

The study of happiness from a scientific perspective, together with a realization of its implications for health is promising and fascinating, especially if we believe our medical indices of good health are not always in agreement with the perceptions of the patient or society. For example, consider the population of Matsigenka in the Peruvian Amazon; over the past 30 years health indicators have improved greatly, but during the same time period this population reported itself as sicker and unhappier[83]. Perhaps for similar reasons psychiatry has failed to increase subjective well-being in the general population, despite extensive pharmacological advances and new psychotherapeutic techniques. Probably, the focus has been almost exclusively pathological[15].

The immediate goal of all medicine is to alleviate suffering. To achieve this in psychiatry, accurate diagnostic, psychopharmacological advances and psychotherapeutic techniques are fundamental. However, identify what makes life happy can be useful in various types of health prevention (primary, secondary and tertiary)[84]. This particularly applies to promoting mental health as specified in the WHO parameters: a state of well-being in which people can understand and use their own skills, deal with the stresses of life, work and love, and may contribute to their communities[8,9]. Furthermore, the promotion of mental health may contribute to reducing the stigma towards psychiatry and psychiatric patients[15].

Conclusion

Positive emotions related to happiness generate beneficial alterations in the neuroendocrine, immune and cardiovascular systems. Aspects of character, such as self-direction, are strongly linked to higher levels of happiness. According to the Easterlin paradox, the relationship between money and happiness is not linear. Levels of

happiness tend to fall with increasing age; however, the previous level of subjective well-being is a major predictor of happiness in this age group. Religious people who practice physical leisure activities, who have high educational levels or higher IQs, who are married, who are involved in sports, or do up to 11 hours of volunteer work per week tend to report higher levels of happiness. In addition, higher levels of happiness are related to lower physical and mental illness, as well better coping abilities in adversity For this reason, the study of happiness brings several positive implications for psychiatry that should be considered in clinical practice and in future research.

Acknowledgements

The corresponding author thanks Dr. Rodrigo Tavares, Ph.D., for the academic tips.

Conflicts of interest

Dr. Amaury Cantilino received lecture fees from Abbott Brazil. Dr. Hermano Tavares is a research productivity fellow from the National Council on Research (CNPq).

References

1. Fowler JH, Christakis NA. Dynamic spread of happiness in a large social network: longitudinal analysis over 20 years in the Framingham Heart Study. BMJ. 2008;337:a2338.
2. Allmark P. Health, happiness and health promotion. J Appl Philos 2005;22(1):1-15.
3. Aristóteles. Ética à Nicômaco. 1ª ed. Tradução do grego: Antonio de Castro Caeiro. São Paulo: Atlas; 2009. 280p.
4. Sêneca. Da vida retirada, da tranquilidade da alma e da felicidade. 1ª ed. Tradução: Lúcia Sá Rebello. Porto Alegre: L&PM Pocket; 2009.
5. Platão. Fedro. 3ª ed. Tradução: Carlos Alberto Nunes. Belém: EDUFPA; 2011.
6. Tay L, Kuykendall L. Promoting happiness: the malleability of individual and societal subjective wellbeing. Int J Psychol. 2013;48(3):159-76.
7. Veenhoven R. Questions on happiness: classical topics, modern answers, blind spots. In: Strack F, Argyle M, Schwarz N, editors. Subjective well-being, an interdisciplinary perspective. London: Pergamon Press; 1991. p. 7-26.
8. Cloninger CR, Zohar AH. Personality and the perception of health and happiness. J Affect Disord. 2011;128(1-2):24-32.
9. WHO. The world health report 2001. Mental health: new understanding, new hope. Geneva: World Health Organization; 2001. 5p.
10. Graham C. Happiness and health: lessons – and questions – for public policy. Health Aff (Millwood). 2008;27(1):72-87.
11. Karlsson M, Lyttkens CH, Nilsson T. Health. Happiness. Inequality. Expert Rev Pharmacoecon Outcomes Res. 2010;10(5):497-500.
12. Barak Y, Achiron A. Happiness and neurological diseases. Expert Rev Neurother. 2009;9(4):445-59.
13. Scorsolini-Comin F, Santos MA. O estudo científico da felicidade e a promoção da saúde: revisão integrativa da literatura. Rev Latino-Am Enfermagem. 2010;18(3):188-95.
14. Kobau R, Seligman MEP, Peterson C, Diener E, Zack MM, Chapman D, et al. Mental health promotion in public health: perspectives and strategies from positive psychology. Am J Public Health. 2011;101(8):e1-9.
15. Cloninger CR. The science of well-being: an integrated approach to mental health and its disorders. World Psychiatry. 2006;5(2):71-6.
16. Hershberger PJ. Prescribing happiness: positive psychology and family medicine. Fam Med. 2005;37(9):630-4.
17. Allen D, Carlson D, Ham C. Well-being: new paradigms of wellness – inspiring positive health outcomes and renewing hope. Am J Health Promot. 2007;21(3):1-9, iii.
18. Ferraz RB, Tavares H, Zilberman ML. Happiness: a review. Rev Psiquiatr Clin. 2007;34(5):234-42.
19. Bekhet AK, Zauszniewski JA, Nakhla WE. Happiness: theoretical and empirical considerations. Nurs Forum. 2008;43(1):12-23.
20. Ryff CD, Singer BH, Love GD. Positive health: connecting well-being with biology. Philos Trans R Soc Lond B Biol Sci. 2004;359(1449):1383-94.
21. Ventegodt S, Flensborg-Madsen T, Andersen NJ, Merrick J. The life mission theory VII. Theory of existential (Antonovsky) coherence: a theory of quality of life, health, and ability for use in holistic medicine. ScientificWorldJournal. 2005;5:377-89.
22. Barak Y. The immune system and happiness. Autoimmun Rev. 2006;5(8):523-7.
23. Steptoe A, Wardle J, Marmot M. Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. Proc Natl Acad Sci U S A. 2005;102(18):6508-12.
24. Steptoe A, Demakakos P, de Oliveira C, Wardle J. Distinctive biological correlates of positive psychological well-being in older men and women. Psychosom Med. 2012;74(5):501-8.
25. Chen H, Pine DS, Ernst M, Gorodetsky E, Kasen S, Gordon K, et al. The The MAOA gene predicts happiness in women. Prog Neuropsychopharmacol Biol Psychiatry. 2013;40:122-5.
26. De Neve JE. Functional polymorphism (5-HTTLPR) in the serotonin transporter gene is associated with subjective well-being: evidence from a US nationally representative sample. J Hum Genet. 2011;56(6):456-9.
27. Lyubomirsky S, King L, Diener E. The benefits of frequent positive affect: does happiness lead to success? Psychol Bull. 2005;131(6):803-55.
28. Brasseur S, Grégoire J, Bourdu R, Mikolajczak M. The Profile of Emotional Competence (PEC): development and validation of a self-reported measure that fits dimensions of emotional competence theory. PLoS One. 2013;8(5):e62635.
29. Christakis NA, Fowler JH. Social contagion theory: examining dynamic social networks and human behavior. Stat Med. 2013;32(4):556-77.
30. Eisenberg D, Golberstein E, Whitlock JL, Downs MF. Social contagion of mental health: evidence from college roommates. Health Econ. 2013;22(8):965-86.
31. Mitchell L, Frank MR, Harris KD, Dodds PS, Danforth CM. The geography of happiness: connecting twitter sentiment and expression, demographics, and objective characteristics of place. PLoS One. 2013;8(5):e64417.
32. Smith DM, Langa KM, Kabeto MU, Ubel PA. Health, wealth, and happiness: financial resources buffer subjective well-being after the onset of a disability. Psychol Sci. 2005;16(9):663-6.
33. Doherty AM, Kelly BD. When Irish eyes are smiling: income and happiness in Ireland, 2003-2009. Ir J Med Sci. 2013;182(1):113-9.
34. Schatz E, Gómez-Olivé X, Ralston M, Menken J, Tollman S. The impact of pensions on health and wellbeing in rural South Africa: does gender matter? Soc Sci Med. 2012;75(10):1864-73.
35. Oshio T, Kobayashi M. Income inequality, perceived happiness, and self-rated health: evidence from nationwide surveys in Japan. Soc Sci Med. 2010;70(9):1358-66.
36. DeVoe SE, Pfeffer J. When is happiness about how much you earn? The effect of hourly payment on the money – happiness connection. Pers Soc Psychol Bull. 2009;35(12):1602-18.
37. Diaz E, Guevara R, Lizana J. Trabajo informal: motivos, bienestar subjetivo, salud, y felicidad en vendedores ambulantes. Psicol Estud. 2008;13(4):693-701.
38. Bjørnskov C. Healthy and happy in Europe? On the association between happiness and life expectancy over time. Soc Sci Med. 2008;66(8):1750-9.
39. Lehmann BA, Bos AE, Rijken M, Cardol M, Peters GJ, Kok G, et al. Ageing with an intellectual disability: the impact of personal resources on well-being. J Intellect Disabil Res. 2013;57(11):1068-78.
40. Bishop AJ, Martin P, MacDonald M, Poon L; Georgia Centenarian Study. Predicting happiness among centenarians. Gerontology. 2010;56(1):88-92.
41. Collins AL, Goldmán N, Rodríguez G. Is positive well-being protective of mobility limitations among older adults? J Gerontol B Psychol Sci Soc Sci. 2008;63(6):P321-7.
42. Lima MG, Barros MBA, Alves MCGP. Sentimento de felicidade em idosos: uma abordagem epidemiológica, ISA-Camp 2008. Cad Saude Publica. 2012;28(12):2280-92.
43. Llobet MP, Ávila NR, Farràs J, Canut MTL. Qualidade de vida, felicidade e satisfação com a vida em anciãos com 75 anos ou mais, atendidos num programa de atenção domiciliária. Rev Latino-Am Enfermagem. 2011;19(3).
44. Sadler ME, Miller CJ, Christensen K, McGue M. Subjective well-being and longevity: a cotwin control study. Twin Res Hum Genet. 2011;14(3):249-56.
45. Strandberg TE, Strandberg AY, Pitkälä K, Salomaa VV, Tilvis RS, Miettinen TA. Chocolate, well-being and health among elderly men. Eur J Clin Nutr. 2008;62(2):247-53.

46. Padela AI, Heisler M. The association of perceived abuse and discrimination after September 11, 2001, with psychological distress, level of happiness, and health status among Arab Americans. Am J Public Health. 2010;100(2):284-91.
47. Proulx CM, Snyder-Rivas LA. The longitudinal associations between marital happiness, problems, and self-rated health. J Fam Psychol. 2013;27(2):194-202.
48. Lam WW, Fielding R, McDowell I, Johnston J, Chan S, Leung GM, et al. Perspectives on family health, happiness and harmony (3H) among Hong Kong Chinese people: a qualitative study. Health Educ Res. 2012;27(5):767-79.
49. Chan SS, Viswanath K, Au DW, Ma CM, Lam WW, Fielding R, et al. Hong Kong Chinese community leaders' perspectives on family health, happiness and harmony: a qualitative study. Health Educ Res. 2011;26(4):664-74.
50. Rosen RC, Bachmann GA. Sexual well-being, happiness, and satisfaction, in women: the case for a new conceptual paradigm. J Sex Marital Ther. 2008;34(4):291-7.
51. Green M, Elliott M. Religion, health, and psychological well-being. J Relig Health. 2010;49(2):149-63.
52. Abdel-Khalek AM. Quality of life, subjective well-being, and religiosity in Muslim college students. Qual Life Res. 2010;19(8):1133-43.
53. Sahraian A, Gholami A, Javadpour A, Omidvar B. Association between religiosity and happiness among a group of Muslim undergraduate students. J Relig Health. 2013;52(2):450-3.
54. Abdel-Khalek AM. Subjective well-being and religiosity in Egyptian college students. Psychol Rep. 2011;108(1):54-8.
55. Vayalilkarottu J. Holistic health and well-being: a psycho-spiritual/religious and theological perspective. Asian J Psychiatr. 2012;5(4):347-50.
56. Post SG. Altuism, happiness, and health: it's good to be good. Int J Behav Med. 2005;12(2):66-77.
57. Borgonovi F. Doing well by doing good. The relationship between formal volunteering and self-reported health and happiness. Soc Sci Med. 2008;66(11):2321-34.
58. van Campen C, de Boer AH, Iedema J. Are informal caregivers less happy than noncaregivers? Happiness and the intensity of caregiving in combination with paid and voluntary work. Scand J Caring Sci. 2013;27(1):44-50.
59. Ali A, Ambler G, Strydom A, Rai D, Cooper C, McManus S, et al. The relationship between happiness and intelligent quotient: the contribution of socio-economic and clinical factors. Psychol Med. 2013;43(6):1303-12.
60. Judge TA, Ilies R, Dimotakis N. Are health and happiness the product of wisdom? The relationship of general mental ability to educational and occupational attainment, health, and well-being. J Appl Psychol. 2010;95(3):454-68.
61. Wang F, Orpana HM, Morrison H, de Groh M, Dai S, Luo W. Long-term association between leisure-time physical activity and changes in happiness: analysis of the Prospective National Population Health Survey. Am J Epidemiol. 2012;176(12):1095-100.
62. Ruseski JE, Humphreys BR, Hallman K, Wicker P, Breuer C. Sport participation and subjective well-being: instrumental variable results from German survey data. J Phys Act Health. 2014;11(2):396-403.
63. Subramanian S, Kim D, Kawachi I. Covariation in the socioeconomic determinants of self rated health and happiness: a multivariate multilevel analysis of individuals and communities in the USA. J Epidemiol Community Health. 2005;59(8):664-9.
64. Mahon NE, Yarcheski A, Yarcheski TJ. Happiness as related to gender and health in early adolescents. Clin Nurs Res. 2005;14(2):175-90.
65. Piqueras JA, Kuhne W, Vera-Villarroel P, van Straten A, Cuijpers P. Happiness and health behaviours in Chilean college students: a cross-sectional survey. BMC Public Health. 2011;11:443.
66. Silva RA, Horta BL, Pontes LM, Faria AD, Souza LDM, Cruzeiro ALS, et al. Bem-estar psicológico e adolescência: fatores associados. Cad Saude Publica. 2007;23(5):1113-8.
67. Angner E, Ray MN, Saag KG, Allison JJ. Health and happiness among older adults: a community-based study. J Health Psychol. 2009;14(4):503-12.
68. Gana K, Bailly N, Saada Y, Joulain M, Trouillet R, Hervé C, et al. Relationship between life satisfaction and physical health in older adults: a longitudinal test of cross-lagged and simultaneous effects. Health Psychol. 2013;32(8):896-904.
69. Blanchflower DG, Oswald AJ. Hypertension and happiness across nations. J Health Econ. 2008;27(2):218-33.
70. Cooper C, Bebbington P, King M, Jenkins R, Farrell M, Brugha T, et al. Happiness across age groups: results from the 2007 National Psychiatric Morbidity Survey. Int J Geriatr Psychiatry. 2011;26(6):608-14.
71. Wikman A, Wardle J, Steptoe A. Quality of life and affective well-being in middle-aged and older people with chronic medical illnesses: a cross-sectional population based study. PLoS One. 2011;6(4):e18952.
72. Binder M, Coad A. "I'm afraid I have bad news for you…" Estimating the impact of different health impairments on subjective well-being. Soc Sci Med. 2013;87:155-67.
73. Graham C, Higuera L, Lora E. Wich health conditions cause the most unhappiness? Health Econ. 2011;1447:1431-47.
74. Bray I, Gunnell D. Suicide rates, life satisfaction and happiness as markers for population mental health. Soc Psychiatry Psychiatr Epidemiol. 2006;41(5):333-7.
75. Kang Y, Gruber J. Harnessing happiness? Uncontrollable positive emotion in bipolar disorder, major depression, and healthy adults. Emotion. 2013;13(2):290-301.
76. Gruber J, Kogan A, Quoidbach J, Mauss IB. Happiness is best kept stable: positive emotion variability is associated with poorer psychological health. Emotion. 2013;13(1):1-6.
77. Veenhoven R. Healthy happiness: effects of happiness on physical health and the consequences for preventive health care. J Happiness Stud. 2007;9(3):449-69.
78. Layous K, Chancellor J, Lyubomirsky S, Wang L, Doraiswamy PM. Delivering happiness: translating positive psychology intervention research for treating major and minor depressive disorders. J Altern Complement Med. 2011;17(8):675-83.
79. Boyce CJ, Wood AM. Money or mental health: the cost of alleviating psychological distress with monetary compensation versus psychological therapy. Health Econ Policy Law. 2010;5(4):509-16.
80. Baruch Y, Swartz M, Sirkis S, Mirecki I, Barak Y. Staff happiness and work satisfaction in a tertiary psychiatric centre. Occup Med (Lond). 2013;63(6):442-4.
81. Croom AM. Music, neuroscience, and the psychology of well-being: a précis. Front Psychol. 2012;2:393.
82. Seligman MEP. Flourish: a visionary new understanding of happiness and well-being. Policy. 2011;27(3):60-1.
83. Izquierdo C. When "health" is not enough: societal, individual and biomedical assessments of well-being among the Matsigenka of the Peruvian Amazon. Soc Sci Med. 2005;61(4):767-83.
84. Tessier P, Lelorain S, Bonnaud-Antignac A. A comparison of the clinical determinants of health-related quality of life and subjective well-being in long-term breast cancer survivors. Eur J Cancer Care (Engl). 2012;21(5):692-700.