

## Well-Being and Health: Probing the Connections

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Mental health is typically defined in terms of psychological disorders, such as anxiety and depression, but a large and growing literature focuses on positive psychological functioning. I will provide an overview of this work, noting its philosophical and theoretical foundations as well as describing leading approaches in current empirical research. On the one hand are “eudaimonic approaches” focused on individuals’ meaningful engagement in life and their self-realization (Ryan & Deci, 2001; Ryff & Singer, 2008). Six distinct dimensions comprise our model of eudaimonia: *autonomy*, which emphasizes the individual’s capacity to be self-determining and independent, even if it means going against conventional wisdom; *environmental mastery*, which refers to the capacity to manage everyday life and create a surrounding context that fits with personal needs and values; *personal growth*, which involves seeing oneself as developing through time, and thereby, realizing personal potential; *positive relations with others*, which pertains to interpersonal well-being – having close, satisfying ties to others; *purpose in life*, wherein one has a sense of direction in life and seeing meaning in one’s present and past life; and *self-acceptance*, which involves positive self-regard that includes awareness of both personal strengths and limitations. On the other hand, are “hedonic approaches” that focus on feelings of contentment with life (Diener, Suh, Lucas, & Smith, 1999; Kahneman, Diener, & Schwarz, 1999). These are frequently operationalized with multi-item scales of *positive and negative affect* as well as brief questions about individuals’ overall *life satisfaction* and *happiness*.

I will use data from a national longitudinal study of Americans, known as MIDUS (Midlife in the U.S., [www.midus.wisc.edu](http://www.midus.wisc.edu)) to show how these various aspects of well-

being vary by one's age and educational standing. Hedonic well-being generally shows gains with aging – that is older adults, on average, show increments in positive affect and decrements in negative affect, at least until very old age. Eudaimonic well-being, in contrast, especially assessments of purpose in life and personal growth, shows decrements in the later years. More troublesome in recent findings is evidence that young adults in the U.S. also show notable decline in these existential aspects of well-being over time. Those with less education also show substantially lower levels of purpose and growth than those with a college education, although there is also greater variability in distributions of well-being at the low end of the educational hierarchy.

Both hedonic and eudaimonic well-being have been linked to self-report health. A recent review (Pressman & Cohen, 2005) showed that high positive affect (measured in terms of general feelings of happiness, joy, contentment, excitement, enthusiasm) predicts reduced health symptoms and pain as well as lower morbidity and increased longevity. Recent findings from MIDUS show that among the educationally disadvantaged, those who have persistently high eudaimonic well-being report better health, measured in terms of in terms of subjective health, chronic conditions, and health symptoms.

What has exploded in the last decade is scientific research linking psychological well-being to multiple physiological systems, and I will briefly review findings therein. Positive emotional style (e.g., calm, happiness, vigor) over one month was associated with better endocrine function (lower levels of cortisol, epinephrine and norepinephrine) (Cohen et al., 2003; Polk et al., 2005). With regard to immune measures, higher trait positive affect has been linked with higher levels of antibody production (Marsland et al.,

2006), and positive emotional style was found to predict resistance to illness after experimental exposure to rhinovirus or influenza A virus (Cohen et al., 2006). Positive affect, assessed by aggregating momentary experiences of happiness over a working day, was inversely related to cortisol output and heart rate (Steptoe, Wardle, & Marmot, 2005), while happier individuals were also found to have lower inflammatory response (plasma fibrinogen) and lower blood pressure when exposed to mental stress in the laboratory (Steptoe, Gibson, Hamer, & Wardle, 2006).

With regard to eudaimonic well-being, older women with higher levels of purpose in life, personal growth, and positive relations with others, showed lower cardiovascular risk (lower glycosylated hemoglobin, lower weight, lower waist-hip ratios, higher “good” HDL cholesterol) and better neuroendocrine regulation (lower salivary cortisol throughout the day) (Ryff, Love, Urry et al., 2006; Ryff, Singer, & Love, 2004). The link between lower cortisol and eudaimonic well-being was also evident in a Swedish study (Lindfors & Lundberg (2002). With regard to inflammatory factors, those with higher levels of interpersonal well-being (positive relations with others) and purpose in life were shown to have lower levels of interleukin 6 (IL-6) and its soluble receptor (sIL-6r) (Friedman, Hayney, Love, et al., 2005, 2007). The link between relational well-being and better biological regulation converges with growing evidence that quality ties to significant others and related emotions are prominent in understanding variations in health (Ryff & Singer, 2000, 2001).

Psychological well-being has also been connected to research on the brain, and more specifically, research on affective neuroscience (Davidson, 2003, 2004). Well-being has been linked with asymmetric activation of the prefrontal cortex, for example,

with greater left than right prefrontal activation associated with higher levels of both hedonic and eudaimonic well-being (Urry, Nitschke, Dolski et al., 2004). Only eudaimonic well-being, however, revealed a link to EEG asymmetry that persisted after adjusting for hedonic well-being. The hedonic link, in contrast, was no longer evident after adjusting for eudaimonic well-being. Using functional magnetic resonance imaging, van Reekum, Urry, Johnstone et al. (2007) further documented that those with higher eudaimonic well-being had slower response to aversive stimuli and reduced amygdala activation as well as greater activation of the ventral anterior cingulate cortex. The latter possibly helps explain what parts of the brain are recruited to minimize the impact of negative stimuli, thereby constituting beginning strides in delineating mechanistic underpinnings of well-being.

Of particular importance is how well-being may serve as a buffer or protective factor against the negative effects of adverse experience on biology and health. Prior inquiries have pointed to the importance of optimism, hope and positive expectations in the face of health challenges (Leedham et al., 1995; Scheier & Carver, 1992; Reed et al., 1994; Taylor et al., 2000). At the level of biological processes, our work has shown that older women with poor sleep efficiency (i.e., defined as time asleep divided by time in bed) had higher levels of interleukin-6 (IL-6) (Friedman, Hayney, Love et al., 2005). However, if they had the compensating influence of good social relationships, their levels of IL-6 were comparable to those with high sleep efficiency. We also found that those with poor social relationships had lower IL-6 if they have the compensating benefits of good sleep, suggesting that each variable might serve to protect against low levels of the other. In predicting glycosylated hemoglobin (HbA1c), a marker of glycemic control

pertinent to diabetes and cardiovascular disease, we also found that older women with lower levels of income showed greater increments in HbA1c across time (Tsenkova, Love, Singer, & Ryff, 2007) after controlling for sociodemographic and health factors. These effects were moderated by purpose in life, personal growth, and positive affect. The pattern of effects underscored amplification of the negative: i.e., those showing the greatest cross-time negative increments in HbA1c had the combined disadvantage of low income and low well-being. Importantly, for those with high well-being, levels of HbA1c did not differ depending on economic status. In a related study, we have also documented that low positive affect also magnifies the negative effect of low problem-focused coping on cross-time levels of HbA1c (Tsenkova, Love, Singer, & Ryff, 2008).

Turning to the question of intervention, a key question is whether well-being can be promoted among those who do not naturally possess such life outlooks. Research on prevention of relapse among those who suffer from recurrent depression or anxiety disorders (Fava, 1996; Fava, Rafanelli, Grandi, Conti, & Bellardo, 1998; Fava, & Ruini, 2003) involves “well-being therapy,” based on connections to the above formulation of eudaimonic well-being. Fava, Ruini, Rafanelli, Finos, Conti & Grandi (2006) assessed such therapy in a randomized trial of forty patients with recurrent depression. Patients were randomly assigned to either cognitive behavioral treatment of residual symptoms supplemented by well-being therapy and life-style modification, or clinical management. A 6-year follow-up showed a significantly lower relapse rate among the former group (40%) compared to clinical management (90%) group. These findings are all the more important in light of the growing literature linking well-being to better biological regulation, as described above.

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