



# “I’m afraid I have bad news for you...” Estimating the impact of different health impairments on subjective well-being

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## ABSTRACT

Bad health decreases individuals' happiness, but few studies measure the impact of specific illnesses. We apply matching estimators to examine how changes in different (objective) conditions of bad health affect subjective well-being for a sample of 100,265 observations from the British Household Panel Survey (BHPS) database (1996–2006). The strongest effect is for alcohol and drug abuse, followed by anxiety, depression and other mental illnesses, stroke and cancer. Adaptation to health impairments varies across health impairments. There is also a puzzling asymmetry: strong adverse reactions to deteriorations in health appear alongside weak increases in well-being after health improvements. In conclusion, our analysis offers a more detailed account of how bad health influences happiness than accounts focusing on how bad self-assessed health affects individual well-being.

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## Introduction

Our health determines many facets of our life. It affects our employment opportunities and our incomes (Arrow, 1996), influences social activities (Gardner & Oswald, 2004) and impacts our mood and well-being more generally (Easterlin, 2003; Graham, 2008). Being in good health increases subjective well-being, just as illness or bad health decreases it (Graham, Higuera, & Lora, 2011; Veenhoven, 2008).

An individual's subjective well-being (synonymously called “happiness” here) depends on a complex interacting web of factors, comprising economic (such as income, status or employment), situational (health, social relations), socio-demographic (gender, age, education), personal (personality and genes) and institutional factors (such as the extent of direct democratic participation), and the literature examining these relationships has vastly increased over the last few years (for overviews, see Dolan, Peasegood, & White, 2008; Easterlin, 2003; Frey & Stutzer, 2000). As one can consider subjective well-being to be a broad aspect of an

individual's mental health, it is no wonder that many determinants of subjective well-being also determine health more generally (see, e.g., Contoyannis & Jones, 2004; Fuchs, 2004; Gardner & Oswald, 2004).

In subjective well-being research, the relationship between subjective well-being and (mostly: self-assessed) health is well-researched and “studies consistently reveal a strong relationship between health and happiness” (Graham, 2008, p. 73). This is less surprising, for instance, for broad “mental well-being” measures (such as the GHQ-12) that incorporate some (mental) health aspects (Dolan et al., 2008, p. 100). But the positive relationship also holds when using life satisfaction as the dependent variable in regressions (Dolan & Kahneman, 2008; Dolan et al., 2008; Easterlin, 2003). It seems that causality runs in both directions: a high level of well-being certainly seems relevant for subsequent good health, with significant positive effects of well-being on health being observed two or three years later (Binder & Coad, 2010; Lyubomirsky, King, & Diener, 2005).

The stronger relationship, however, seems to run from health to happiness. Numerous studies show that healthier individuals tend to be happier. Most studies here analyze the relationship between individuals' subjective health ratings and subjective well-being (Dolan et al., 2008; Easterlin, 2003) or the impact of disability on subjective well-being (Brickman, Coates, & Janoff-Bulman, 1978; Oswald & Powdthavee, 2008; Uppal, 2006), mostly for lack of more

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detailed data on objective health impairments. Very few studies also extend the analysis to more detailed health conditions (Dolan, 2011; Graham et al., 2011; Mukuria & Brazier, 2013; Shields & Wheatley Price, 2005). Even if large panel studies incorporate questions on individuals' health impairments, many of these illnesses are comparatively rare and typical multivariate regressions are ill-suited to deal with small numbers of observations in such cases (as well as lack of variation). In a cross-sectional analysis of Health Survey for England (HSE) data, Shields and Wheatley Price (2005) report significantly decreased psychological well-being for individuals with problems with muscular-arthritis-rheumatism, stomach problems and respiratory problems. For males, heart attack or stroke problems and migraine and epilepsy are associated with depressed psychological well-being, while hypertension and blood pressure problems seem associated with decreased psychological well-being in females (p. 529). Problems like cancer or diabetes are not related to psychological well-being in their sample. A similar cross-sectional study has been conducted by Graham et al. (2011) for a number of Latin American countries, where an EQ5D measure of health problems is related to health satisfaction and life satisfaction. Pain, anxiety and difficulties with usual activities are strongly negatively related to health satisfaction and, to a lesser degree, also to life satisfaction. Problems with mobility and self-care are not as clearly related to life satisfaction, which the authors interpret as evidence of a higher impact of acute and chronic mental illnesses over physical conditions (compare also Mukuria & Brazier, 2013). An explanation for this finding might include the uncertainty associated with some health problems, where the next anxiety or epilepsy attack cannot be anticipated (thus hindering adaptation). Similarly, Dolan (2011) finds that mental health has stronger effects on subjective well-being than physical health problems, while in preference elicitation, individuals value physical health more than mental health, probably due to focusing effects and faulty affective forecasting (Wilson & Gilbert, 2005).

In the cases discussed, the cross-sectional data structure hinders investigation of self-selection, duration of the health condition, and the role of personality traits mediating the happiness–health relationship; so these estimates should be taken with care. While panel data regression techniques might offer valuable insights into the variation within individuals over time and thus help alleviate concerns about selection effects, as well as account for individual-specific (fixed) effects that capture the trait-like properties of subjective well-being (Diener & Lucas, 1999; Ferrer-i-Carbonell & Frijters, 2004), these techniques are ill-suited to deal with dummy variables that exhibit little variation, as in the case of specific illnesses. We therefore seek to obtain improved estimates of the causal impact of such illnesses on subjective well-being by applying matching estimators (Caliendo & Kopeinig, 2008; Imbens, 2004; Rubin, 1974).

This allows us to address many of the above-mentioned shortcomings and estimate the impact of different health impairments on subjective well-being, at an improved level of detail. Similarly, we provide novel results concerning specific adaptation and recovery patterns for different health conditions. Indeed, the dynamics of illness conditions and their impact on subjective well-being need to be better understood, since it remains unclear to what extent subjective well-being can be permanently influenced by life events in general and health conditions in particular (Headey, 2010). This time dimension is also important in our context, as there is some evidence that individuals adapt differently to different health conditions. While some hedonic adaptation occurs, the level of adaptation seems far from complete: Oswald and Powdthavee (2008) find a rate of hedonic adaptation between 30% and 50% in their fixed-effects framework, depending on the degree of disability. As opposed to disability, patients who suffer from

chronic diseases and chronic pain have difficulties adapting (Oswald & Powdthavee, 2008; Smith & Wallston, 1992). There are few studies in this field, and their results are complicated by the progressive nature of some of the diseases (Dolan & Kahneman, 2008, pp. 218–9). In sum, hedonic adaptation to adverse health conditions seems limited and domain-specific (Frederick and Loewenstein, 1999; Oswald & Powdthavee, 2008). The dynamic properties of subjective well-being and the extent of hedonic adaptation to adverse (but also to beneficial) life events motivates our later analysis of the causal effect of different health conditions on individuals' life satisfaction with different time lags.

The paper is structured as follows: we present the dataset in Section 2. Our analysis is detailed in Section 3, and we conclude with a discussion in Section 4.

## Dataset

The British Household Panel Survey (BHPS), comprising about 10,000 individual interviews in 1991 and growing in subsequent years, is a well-known longitudinal survey of private households in Great Britain, containing rich information on diverse areas of respondents' lives. We use unbalanced panel data from 1996 to 2006 (waves f to n) – a total of 100,265 observations after cleaning the panel (ethical approval was not necessary for our secondary analysis of anonymized data). During the time period, two waves were deleted due to missing variables (one did not feature the life satisfaction variable, the other had different coding of subjectively-reported health status, finally the most recent waves do not provide net annualized household incomes), leaving us with 9 waves in total. Table 1 presents our variables.

From the 1996 wave onwards, the BHPS offers a life satisfaction question (our main dependent variable). It records an individual's answer to the question “How dissatisfied or satisfied are you with your life overall?” It measures an individual's life satisfaction ordinally on a seven-point Likert scale ranging from “not satisfied at all” (1) to “completely satisfied” (7). We cannot completely exclude measurement bias in this variable, e.g. resulting from demand effects when an interviewer is present (Conti & Pudney, 2011; Pudney, 2011), but measures of subjective well-being appear to be surprisingly valid and reliable despite their deceptive simplicity (Helliwell and Wang, 2012; Krueger & Schkade, 2008).

Our main explanatory variables are an individual's self-reported subjective health status as well as a number of objective health indicators and a list of health impairments. There is debate on whether objective health is sufficiently well-measured by a person's subjective health assessments (Johnston, Propper, & Shields, 2009). In the BHPS, an individual's subjective assessment of health (during the last 12 months) is ordinally scaled on a five-point Likert scale, reverse-coded to range from “excellent” (five) to “very poor” (one). In order to account for more objective aspects of individual health, we included the number of days spent in hospital (i.e.,  $\log(\text{days} + 1)$ ), the number of visits to a general practitioner, and the number of serious accidents in the previous year (Table 1).

The BHPS includes several more specific health conditions (or impairments). These include so-called “health problems” grouped into categories. Individuals are asked: “Do you have any of the health problems or disabilities listed on this card?” The categories listed are “Problems or disability connected with: arms, legs, hands, feet, back, or neck (including arthritis and rheumatism)” (hereafter often referred to as “arms problems”), “Difficulty in seeing (other than needing glasses to read normal size print)”, “Difficulty in hearing”, “Skin conditions/allergies”, “Chest/breathing problems, asthma, bronchitis”, “Heart/blood pressure or blood circulation problems”, “Stomach/liver/kidneys”, “Diabetes”, “Anxiety, depression or bad nerves, psychiatric problems”, “Alcohol or drug related

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