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A mental model of factors associated with subjective life expectancy

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ABSTRACT

The objective was to develop and test a framework based on a biopsychosocial model that can be used to identify factors associated with subjective (self-estimated) life expectancy (SLE). SLE predicts important work and retirement decisions so a better understanding of the factors that contribute to an individual's thoughts about their likely age at death is essential for late-career and financial planning and for developing interventions aimed at addressing inappropriate estimates. This is a sub-study of the Australian 45 and Up Study cohort. Survey data were collected at two time points (3 years apart) from 2579 participants aged over 55 years. Correlations and regression analyses tested the relationship of SLE with biomedical/genetic factors (age, health diagnoses, parental longevity), socioeconomic factors (income, education) health behaviors (exercise, smoking, alcohol use, diet), and psychosocial factors (optimism, distress, social connectedness). Variables within each set of factors except the socioeconomic set were significantly related to SLE. Healthy lifestyle behaviors significantly moderated the effect of parental longevity. The findings indicate that individuals construct an understanding of their personal life expectancy based on similar factors that predict actual life expectancy, but not all mortality risk factors appear to be weighted realistically. The findings imply that, at least to some extent, SLE is not a stable construct and might be amenable to intervention.

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Introduction

Time is a fundamental dimension of human experience, providing the structure that guides short- and long-term goals and evaluations (Carstensen, 2006; Freund, Nikitin, & Ritter, 2009). In particular, the way people perceive the future appears to be of importance to their current emotions, behavior, and plans (Zimbardo & Boyd, 1999). The future becomes even more salient to those in the late-midlife period, which heralds the onset of significant change such as retirement, increased health problems, and the unmistakable physical markers of aging (Cate & John, 2007). Indeed, at this stage of life *time remaining* starts to become more important than *time since birth* (Carstensen, 2006).

Subjective (or self-estimated) life expectancy (SLE) is a measure that quantifies the perceived extent of one's remaining years, providing a personalized timeframe that can act as a guide for apportioning work, leisure, and finances (Hesketh, Griffin, & Loh, 2011). Early research on SLE demonstrated that people do have an opinion as to their own likely life expectancy (e.g., Denes-Raj & Ehrlichman, 1991; Hamermesh, 1985; Robbins, 1988), with more recent evidence (e.g., Griffin, Hesketh, & Loh, 2012; van Solinge & Henkens, 2010) suggesting that SLE actually influences behavioral intentions and decision-making. The focus of this later research has been mainly on those aged over 50 who are in the late-career stage of their working life or even transitioning to retirement. SLE appears to impact important decisions in this period. For example, it predicts intended retirement age (van Solinge & Henkens, 2010) and the amount of retirement planning a late-career worker engages in (Griffin et al., 2012). Griffin et al. (2012) also demonstrated that 12 months after nominating their SLE, workers with high SLE were less likely to have actually retired and high SLE participants already retired were more likely to have returned to some form of paid work.

These late-career decisions have important consequences for individuals' financial circumstances and for their physical health and psychological well-being in retirement (Wang & Shultz, 2010). Given the importance of SLE in late-career decisions, the aim of the current study is to identify the factors that determine how long a person expects to live.

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Correlates of subjective life expectancy

Hesketh et al. (2011) suggest that individuals develop a mental model or internal representation of their likely age of death based on their understanding and interpretation of their personal experiences and context. However, there is scant empirical work on the factors that might contribute to an individual's mental model of their own longevity. Nevertheless, Hurd and McGarry (1995) suggest that because subjective estimates have been shown to be reasonably accurate (Kotter-Gruhn, Gruhn, & Smith, 2010; Siegel, Bradley, & Kasl, 2003) and correlate well with actuarial estimates (Hamermesh, 1985), it is possible that similar factors are associated with each.

One reason for the similarity is that people could develop an understanding of the factors that affect their life expectancy through media, public health campaigns, and observation. For example, reflecting actual statistics (Hurd & McGarry, 1995) it is generally believed that, on average, females live longer than males and that smoking can hasten death. One's personal mental model of life expectancy is also likely to be shaped by family context, in particular parental longevity. In contrast, there are some factors that affect actual life expectancy that are unlikely to be widely recognized or understood, such as optimism and social support. As discussed in more detail below, these factors may influence SLE via different mechanisms.

The current research therefore draws on a version (AIHW, 2010) of the biopsychosocial model (Strecher, Champion, & Rosenstock, 1997) of factors that predict actual health and longevity to develop a framework for identifying the determinants of SLE. The proposed framework includes four categories of predictors: 1) Biomedical and genetic factors; 2) Socioeconomic factors; 3) Health behaviors; and 4) Psychosocial factors.

Biomedical and genetic factors

Obviously genetic and existing biomedical conditions are important predictors of actual longevity (Sarafino, 2004), and there is some evidence that individuals incorporate these when forming a mental model of *life expectancy*. Four factors are examined in the current research, namely gender, age, parental longevity, and personal health history.

Females live longer, on average, than males, and this fact is apparently incorporated into 'mental models' of SLE, with females estimating longer life expectancies than males (Mirowsky, 1997; van Solinge & Henkens, 2010). As discussed, mean SLE mirrors actuarial projections of life expectancy for particular age groups. It is possible that individuals use their own age to map onto these actuarial estimates, but then adjust this taking health, family history and psychological factors into account. Although younger generations can be expected to live longer than older generations, in a more age-restricted sample actuarial estimates show that having survived earlier years, the older a person the more likely they will be to live to an older age (AIHW, 2012; Mirowsky, 1997).

Parental longevity is included as a broad indicator of personal genetic history, supported by population statistics showing that longevity increases with the longevity of one's parents (Feinstein, 1993). Several studies have found that one's parents' age at death has a significant influence on subjective life expectancy (Denes-Raj & Ehrlichman, 1991; Hurd & McGarry, 1995; Robbins, 1988; van Solinge & Henkens, 2010). In contrast, the findings related to the experience of significant health problems are inconclusive in terms of SLE, despite the association between such conditions and increased mortality (AIHW, 2012). For example, Hurd and McGarry (1995) found that the incidence or prevalence of diseases significantly reduced longevity expectations, whereas Ross and Mirowsky's (2002) study showed no effect.

Socioeconomic factors

Actuarial estimates of life expectancy are calculated using socioeconomic information such as current income and education, based on their relationship to mortality risk (Feinstein, 1993). Wardle and Steptoe (2003) suggest that this risk arises from the differences in healthy lifestyles that occur across socioeconomic levels.

The current study uses income and education as two indicators of socioeconomic status (SES). There is some empirical evidence that those with higher incomes and education not only live longer but also they expect to live longer (Hurd & McGarry, 1995; Mirowsky & Ross, 2000; Ross & Mirowsky, 2008). Mirowsky and Ross (2000) hypothesized that this expectation arises either because people of lower SES have more current health problems and disability or because they sense a greater projected risk of developing future life-threatening illnesses. They may also have lower confidence in successfully managing their future health needs. Ross and Mirowsky (2002) found that education but not income influenced SLE, although neither was significant in data from Holland (van Solinge & Henkens, 2010).

Health behaviors

People tend to live longer if they engage in activities that maintain health or improve recovery, such as physical activity, maintaining appropriate weight, eating 'healthy' food, not smoking, and abstaining from excessive alcohol intake (Sarafino, 2004). Extensive public health campaigns and media coverage have advertised the benefits of such health behaviors and we therefore expect that people take into account their practice of health behaviors when developing their mental model of SLE. Indeed, Ross and Mirowsky (2002) found that smoking, alcohol consumption, and poor nutrition reduced SLE after controlling for demographic factors. However, even though obese individuals appear to internalize information about the problem of excess weight, they still underestimate the risk to their mortality (Falba & Busch, 2005).

Psychosocial factors

Little attention has been given to the effect of psychosocial constructs on SLE. This study addresses the gap by examining the role of individual differences in trait, state, and psychological environment, choosing three factors that have been most frequently associated with actual longevity. The first is dispositional optimism, which is a generalized expectancy that good things will happen in the future and bad things will not (Scheier & Carver, 1985). Berg, Smith, Henry, and Pearce (2007) summarized the large body of research showing that optimism is associated with good immune functioning, low blood pressure, and reduced mortality in the face of conditions such as breast cancer and cardiovascular disease. Optimism is thought to affect longevity because those with high levels employ more effective coping strategies (Barefoot et al., 2011), experience better social support (Brissette, Scheier, & Carver, 2002), and participate in more effective health care (Strack, Carver, & Blaney, 1987). Although it is possible that optimists have a sense of these benefits, it is more likely that their positive view of the future drives the expected relationship between optimism and SLE.

Clinical depression and subclinical distress and anxiety predict decline in physical functioning and mortality (Gruenewald & Kemeny, 2007), partly because negative physiological responses such as heightened stress reactions and autonomic dysregulation increase the risk of cardiac events and mortality (Barefoot et al., 2011). Two studies (Joubert, 1992; Lester & Abdel-Khalek, 2007)

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