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Jobless, Friendless, and Broke: What Happens to Different Areas of Life Before and After Unemployment?

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What Happens to Different Areas of Life Before and After Unemployment?

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Abstract

Using a nationally representative longitudinal data of the British people, this paper explores how different areas of a person's life are affected by unemployment. We find evidence that unemployment is preceded, on average, by a year of dissatisfaction with one's finance and job. Once unemployed, the individuals go through a period of financial worries, social isolation, and health loss, as well as fluctuations in marital quality. While the unemployed fully adapt to the drop in health satisfaction, adaptation in other areas of life is less complete. We also find that it makes virtually no difference to the life satisfaction-path before and after unemployment whether one assumes unemployment to affect life satisfaction directly or indirectly via its impacts on different life domains. Finally, the paper discusses the use of instrumented income to estimate the sums required to compensate individuals for each year that they spend in unemployment.

JEL: I31, J6.

Keywords: Domain satisfaction; Life satisfaction; Adaptation; Unemployment; Happiness

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1. Introduction

A long-standing issue in economics has been to understand why the unemployed are so persistently unhappy with their lives. Despite the extensive research on this topic (see, e.g., Darity and Goldsmith, 1996; Winkelmann and Winkelmann, 1998), many questions remain unanswered. What do unemployed persons think about when they are prompted to answer an overall judgment question such as "How satisfied are you with your life these days?" Which aspects of a person's life are most and least affected by unemployment? What explains why there is so little evidence of long-term adaptation to unemployment? How much extra real income is required to compensate people for unemployment? Notwithstanding the importance of these questions, the underlying mechanisms that explain why unemployment starts off bad and stays bad continue to be imperfectly understood by economists and policy makers alike.

Using a long-run panel of nationally representative sample of the British workforce, this paper is the first of its kind to investigate what happens to different areas of a person's life in the periods before and after unemployment, and their implications on the dynamics of overall life satisfaction before and after unemployment. It documents evidence that people go through a period of significant dissatisfaction with finance, job, health, and social life, as well as fluctuations in marital satisfaction in the years that followed unemployment. The effects of unemployment upon a number of domain satisfactions, particularly financial satisfaction, are large and time-persistent. In addition to this, the paper also finds evidence of a significant lead effect to becoming unemployed in both measures of job and financial satisfaction. We also find that it makes virtually no difference to the life satisfaction-path before and after unemployment whether one assumes unemployment to affect life satisfaction directly or indirectly via its impacts on different life domains.

There are similarities between this paper and the earlier work by Bernard Van Praag and co-authors (Ferrer-i-Carbonell and Van Praag, 2002; Van Praag et al, 2003). Van Praag, Ada

Ferrer-i-Carbonell, and Paul Frijters used longitudinal data from Britain and Germany to study the indirect effects of chronic health problems on life satisfaction via their impacts on people's domain satisfactions. Van Praag et al's seminal research does not incorporate the dynamics of different areas of life, nor focus in detail on the different effects of unemployment. The paper is not the first to use longitudinal data to study *both* lead and lag effects to unemployment. Our two closest antecedents are Frijters et al (2008) and Clark et al (2008). Nonetheless, both papers assume that life satisfaction is directly explained by unemployment rather than indirectly through its effects on different areas of life as we do.

2. Background

Previous literature on unemployment and subjective well-being is clear on one point: Unemployed persons are significantly less satisfied with life than those who are in full-time employment. For instance, Clark and Oswald (1994, p. 655), using the first wave of the British Household Panel Survey, conclude that "Joblessness depresses well-being more than any other single characteristic, including important negative ones such as divorce and separation." Based on German panel data, Winkelmann and Winkelmann (1998) report estimates from conditional logit models in which life satisfaction is regressed on a set of personal characteristics, including the unemployment status of the individual. They find the effect of unemployment on life satisfaction to be negative, statistically significant, and large: It would require a sevenfold increase in income to compensate for the drop in life satisfaction after the onset of unemployment. They also find that any selection effects due to unemployment, e.g., unhappy people are more likely to enter unemployment, are minimal[1]. Powdthavee (2008), using the British panel data, found that the negative effect of unemployment on life satisfaction would require an increase in the annual income of approximately £143,000 (US$282,000) to compensate. This negative association between measures of life satisfaction and unemployment has also been replicated across a variety of countries, including the USA (Blanchflower and Oswald, 2004), the Latin Americas (Graham

and Pettinato, 2001), South Africa (Kingdon and Knight, 2004; Powdthavee, 2007), Russia (Eggers et al, 2006), Switzerland (Frey and Stutzer, 2000), and many other European countries (Di Tella, MacCulloch, and Oswald, 2001).

While the picture is not always consistent, many studies find the negative unemployment effect to be larger for men than for women (see, e.g., Clark, 2003; Blanchflower and Oswald, 2004) and non-linear in age (Gerlach and Stephan, 1996; Winkelmann and Winkelmann, 1998). More importantly, it should be noted that the above results represent the "non-pecuniary" effect of personal unemployment upon subjective well-being. Income loss, as well as other indirect effects, which may or may not occur alongside personally being unemployed, are controlled for[2].

According to Frey and Stutzer (2002), the negative effect of unemployment on life satisfaction can be attributed to psychological and social factors. The first is the psychic cost: Unemployment can lead to a loss of self-esteem and personal control as well as produce depression and anxiety. This is reflected in numerous studies which find that the unemployed have worse mental health records and a higher suicide rate than those in work (for two excellent reviews of the psychic cost of unemployment, see Feather, 1990, and Darity and Goldsmith, 1996).

The psychic cost is significantly higher for those entering unemployment for the first time. In contrast, unemployment is less detrimental for those who have been unemployed longer or more often in the past (see Clark et al, 2001; Clark, 2006). Lucas et al (2004), using hierarchical linear modeling techniques applied to the German Socio-Economic Panel, found that adaptation to unemployment is, however, far from complete, i.e., happiness does not bounce back to the level that was experienced by the individual before he or she became unemployed. More recently, Frijters et al, (2008) and Clark et al (2008) used fixed-effects

regressions on the same data set for Germany, to conclude that unemployment starts off bad and stays bad for both men and women.

The second factor negatively affecting life satisfaction is the social cost: Being unemployed has a stigma attached to it, especially in a world in which the norm is to have a job. The social cost of unemployment is thus smaller when there are more unemployed people in society (Clark, 2003; Powdthavee, 2007; see also Stutzer and Lalive, 2004, for the role of social work norms on the subjective well-being of the unemployed).

While the above interpretations of the non-pecuniary costs of unemployment appear credible, they provide only a broad picture of the complex relationship between life satisfaction and unemployment. There may well be other more narrowly defined explanations as to why the unemployed are extremely unhappy with their lives. Little is known, for instance, about how unemployment affects the way we respond to a global judgment question such as "How satisfied are you with your life these days?" We do not know, for instance, which areas of a person's life are most and least affected by becoming unemployed. Do the unemployed focus more of their attention on their material standards of living than on any other areas of their lives when they think about their happiness? How will changes in satisfaction with different domains of life shape the overall impact of unemployment on global life satisfaction? These are important questions that have never previously been explored.

Perhaps what is even less understood is why there is little overall adaptation to unemployment over time. Two questions of interest are (a) whether adaptation occurs in all of the affected life domains and (b) how does this shape the extent and speed of overall adaptation on the global life-satisfaction scale? One could hypothesize that the evidence found in previous studies of little adaptation to unemployment is merely a reflection of a weighted average between zero adaptation in the income domain and complete adaptation in other areas of life. An unemployed person may still attend to his status when prompted with a question about his

overall satisfaction with finance, leading to zero or little adaptation in the income domain, even some several years after having been made unemployed for the first time. However, the focus on his loss of, say, social contacts as a result of becoming unemployed may have shifted away from what it was a few years ago. The idea that the speed and extent of overall hedonic adaptation is a function of the speed and extent of adaptation in different domain-specific areas of life satisfaction has never previously been considered in the economics literature[3].

3. Implementing a Test

3.1 Data

The data in this study comes from Waves 6–17 of the British Household Panel Survey (BHPS). Note, however, that Wave 11 is omitted from the analysis as it does not contain a set of questions on domain-specific and global life satisfaction. The data is nationally representative of British households, contains over 10,000 adult individuals, and has been conducted between September and Christmas each year since 1991 (Taylor et al, 2002).

The dependent variables used in the current study come from the responses to the seven domain satisfaction questions "*How dissatisfied or satisfied are you with your… (a) health; (b) finance; (c) house; (d) partner; (e) job; (f) social life; (g) amount of leisure time; (h) use of leisure time?*" as well as the response to the global life-satisfaction question "*How dissatisfied or satisfied are you with your life overall*?". Responses are on a seven-point scale from 1 "*very dissatisfied*" to 7 "*very satisfied*." Note that participants are asked first about their satisfaction domains before they are asked about their satisfaction with life overall. Only those who answer the domain satisfaction questions, including life satisfaction, are used in the analysis. This includes all unmarried individuals who report some values when prompted to answer the partner satisfaction question. Note that participants are also asked to indicate how dissatisfied or satisfied they are with their jobs. However, because only 13% of the

unemployed report some values for job satisfaction, we are not able to estimate the adaptation effects to unemployment with job satisfaction as the dependent variable.

This paper focuses on respondents who are between 16 and 65 years of age; this produces a sample of 81,163 observations (16,613 persons). Of those, 2,472 observations (1,726 persons) fall in the unemployed category. The data is unbalanced, in that not every person is presented in all eleven waves. Numbers of leads and lags to unemployment and average satisfaction scores are reported in Table 1. Because the vast majority of individuals can be tracked for far shorter periods of time than the available nine BHPS waves, we concentrate on five years before and four years after unemployment, in order to identify any lead and lag effects in the satisfaction domains.

3.2 Empirical Strategy

3.2.1. Domain Satisfaction Equations

A common assumption of a well-being function with unemployment as a determinant in the current well-being literature is that life satisfaction, *LS*, is a function of past, present, and future employment status:

$$LS_{it} = LS(\sum_{n}^{N} U_{it-n}, \sum_{k}^{K} U_{it+k}, ...), \quad (1)$$

where $n = 0, \ldots, N$; $k = 1, \ldots, K$; $i = 1 \ldots N$; $t = 1 \ldots T$. LS_{it} represents overall life satisfaction of individual i at time t. Employment status in this case is represented by a set of dummy variables denoting unemployment, U, at different time periods. Whilst research has shown that there are leads and lags in *LS* to different life events (Clark et al, 2008; Frijters et al, 2008), relatively little is known about the mechanisms behind such dynamics.

To make better understandings of the mechanisms behind the lead and lag effects of unemployment, this paper explores the lead effects of unemployment on eight domain satisfactions, and lag effects on seven domain satisfactions (all except for job satisfaction) in the BHPS. Assuming instead that *LS* is a function of different domain satisfactions, *DS*, rather than past, present, and future unemployment as portrayed in Eq.1,

$$LS_{it} = f(DS_{1it}, DS_{2it}, ..., DS_{jit}), \tag{2}$$

and that *DS* is a function of past, present, and future unemployment,

$$DS_{jit} = (\sum_{n}^{N} U_{it-n}, \sum_{k}^{K} U_{it+k}, ...), \tag{3}$$

where $j = 1 \ldots J$. The empirical counterpart to Eq.3, which is analogous to the lead and lagged life satisfaction equations estimated in Frijters et al (2008), can be written as followed:

$$\begin{aligned} DS_{jit} &= \alpha_j + X'_{jit}\delta + \beta_{-5j}U_{-5,jit} + \beta_{-4j}U_{-4,jit} + \beta_{-3j}U_{-3,jit} + \beta_{-2j}U_{-2,jit} \\ &+ \beta_{-1j}U_{-1,jit} + \beta_{0j}U_{0,jit} + \beta_{1j}U_{1,jit} + \beta_{2j}U_{2,jit} + \beta_{3j}U_{3,jit} + \beta_{4j}U_{4,jit} + \varepsilon_{jit}, \end{aligned} \tag{4}$$

The dependent variable, DS_{jit}, is recorded on the 1 to 7 scale. There are seven *DS* variables which we can be estimated using Eq.4, namely satisfactions with health, finance, housing, partner, social life, amount of leisure time, and use of leisure time, i.e. $J = 7$. Because only a small fraction of the unemployed continue to report some values for job satisfaction, we decide to ignore the adaptation effects to unemployment altogether and only estimate the lead effects to becoming unemployed in the equation where job satisfaction is the dependent

variable. In other words, we only examine the dynamics of job satisfaction before but *not* after the person became unemployed. Here, Eq.4 can be re-written to:

$$DS_{JOBit} = \alpha_{JOB} + X'_{JOBit}\delta + \beta_{-5JOB}U_{-5,JOBit} + \beta_{-4JOB}U_{-4,JOBit} + \beta_{-3JOB}U_{-3,JOBit} + \beta_{-2JOB}U_{-2,JOBit} + \beta_{-1JOB}U_{-1,JOBit} + \varepsilon_{JOBit}, \quad (4a)$$

which will be used to estimate the leads to unemployment in job satisfaction. The variable X_{jit} denotes a vector of standard personal and household controls, including age dummies, log of real equivalent income, marital status, other employment status dummies which include dummies representing self-employed, retired, disabled, inactive in the labor market (e.g. student and those looking after home), and reemployment (which takes a value of 1 if the individual is in full-time employment today but unemployed in the previous interview), education, household size, the number of dependent children (age<16), and year dummies (see, e.g., Ferrer-i-Carbonell and Frijters, 2004). Here, $U_{-5,jit}$ represents a dummy variable that takes a value of 1 if the individual will be unemployed in the following 4 to 5 years. The other leading *U* dummies are defined similarly. If there is a lead effect to becoming unemployed, then we would expect to see the lead coefficients to be zero or negative, and to be more negative the closer the periods of unemployment become.

The adaptation effects to being unemployed are captured by four dummy variables: Unemployed 1-2 years, Unemployed 2-3 years, Unemployed 3-4 years, Unemployed 4 years or more. Unemployed of less than one year duration – i.e., current unemployment – is identified by being unemployed today but not in the previous interview. Unemployment of one to two years' duration is identified by $U_t = 1,\ U_{t-1} = 1,$ and $U_{t-2} = 0.$ Longer lags are defined analogously. If there is no adaptation to unemployment, then we would expect all of the later values β to be negative and statistically significant. However, if there is adaptation then the later values of β to be less negative – we will observe individuals "bounce back"

from being jobless. If adaptation is complete then later values of β will be statistically insignificant, i.e. being unemployed for a long time is the same as not being unemployed at all.

Each domain satisfaction equation is estimated separately using fixed effects estimator, which allows us to compare, for example, the satisfaction of those who have been unemployed for 1-2 years to the satisfaction scores reported by the same individuals who have been unemployed for one year.

Because unemployment can also have an indirect effect on *DS* through its direct effects on income (net household income will be lower during the unemployed period), we account for both effects by following the methodology outlined in Oswald and Powdthavee (2008a) and Powdthavee (2009a) and use information on the proportion of people showing payslips in the household to instrument for income in each *DS* equation. In every wave, the BHPS asks their interviewers to try and see the actual payslip of the respondent. The payslip is usually issued by the respondent's employer, and typically contains information on gross income and all taxes and any other deductions such as retirement plan contributions, insurances, garnishments, or charitable contribution taken out of the gross amount to derive at the final net amount of pay. Where the payslip is shown to the interviewer, the information about income is likely to be more accurate.

In the BHPS, 32% did not show the interviewer their payslip, 14% showed their latest payslip, i.e. a payslip that was issued to them in the most recent month, 1% showed their earlier payslip, i.e. a payslip that was issued to them earlier in the year, and 54% either did not receive a payslip from their employer in that year or payslip was inapplicable to them5. Of those in full-time employment, 59% did not show their payslip, 26% showed their latest payslip, 2% showed their earlier payslip, and 12% did not receive a payslip. I use the

proportions of household member with early and latest payslip seen by the interviewer and the proportion of those who have payslip but did not show it to the interviewer to instrument for log of real equivalent household income.

The idea is that there is a direct correlation between the proportion of household members showing and not showing their payslip to the interviewer and that of household income as household income is bound to have been measured more accurately where the proportion of household member who showed payslip is high. However, there is no reason to expect *DS* to be affected by whether or not the interviewer sees the payslip. This is only the case if employment of other household members, which is highly correlated to the proportion of household members with payslip (correlation of 0.85), does not have a direct impact on LS. Nonetheless, given that unemployment and disability of other household members have been shown in the literature to have a direct impact on the respondent's self-reported well-being even if household income is not affected (see, e.g., Clark, 2003; Powdthavee, 2009b), it is unlikely that the instrument will pass the exclusion restriction of no direct impact on *DS if* employment of other household members is not conditioned for in the estimation. Therefore, in order to satisfy the exclusion restriction conditions, the control variables used in both income (first-stage) and *DS* (second-stage) regressions will also include, alongside standard control variables, proportions of other unemployed members, other disabled members, other retired members, and other members who are inactive in the labor market such as students and those looking after home. Any unobserved correlation between individual fixed effects and the probability of whether or not to show the payslip when asked is also purged out using the fixed effects estimator.

3.2.2. Two-layer Life Satisfaction Model

In order to explain life satisfaction, we follow Ferrer-i-Carbonell and Van Praag (2002) and Van Praag et al's (2003) description of a two-layer model, which is illustrated in Figure 1, and

estimate a fixed-effects life satisfaction, *LS*, equation with *DS* as explanatory variables. To allow for the possibility that the weights individuals put on different aspects of their lives may change with the duration of unemployment (e.g. the long-term unemployed may not value financial satisfaction as much as they used to when they were still in full-time employment), we incorporate an interaction between *DS* and the lead and lag unemployment variables described in Eq.4, denoted here as $U^{'}_{jit}$, as followed:

$$LS_{it} = DS^{'}_{jit}\beta + U^{'}_{it}\gamma + (DS^{'}_{jit} \times U^{'}_{it})\phi + \lambda Z_{it} + \eta_{it}, \quad (5)$$

which allows the weight attached to each *DS* to vary according to the duration of unemployment. Like the *DS* variables, the dependent variable *LS* is also measured on the 1 to 7 scale. The main effects of *DS* on *LS* are captured by the coefficients β. The coefficient γ represents the main effects of the lead and lag unemployment variables on *LS* which are over and above that of *DS*, whilst the parameter θ captures how these effects are moderated by the duration of unemployment. Again, because the majority of people stop responding to the job satisfaction question once they became unemployed, we only interact job satisfaction with the lead (and not lag) unemployment variables in the *LS* equation. This will become more apparent when we present our results in the next section.

As with Ferrer-i-Carbonell and Van Praag (2002) and Van Praag et al (2003), we introduce an auxiliary variable Z into the *LS* equation. This is because, despite our ability to control for unobserved heterogeneity in the standard fixed-effects estimation, there may still be time-varying elements that influence both *DS* and *LS*, which will result in an endogeneity bias. To address this problem, we can construct an additional variable, Z, which represents the latent time-varying shocks. More precisely, we may assume:

$$\eta_{it} = \theta_j \hat{Z}_{jit} + \varepsilon_{jit}, \quad (6)$$

where the variable $\hat{Z}_{jit}$ is present in each domain error term with a domain-specific effect θ_j. To construct this variable Z_{it}, which varies proportionately with the latent $\hat{Z}_{jit}$, we adopt the following method. After estimating the *DS* equations, we calculate the residuals in order to estimate the part of *Z* that is common to all the residuals. This is defined as the first principal component of the error covariance matrix obtained from estimating each *DS* equations separately. By adding this *Z* as an additional explanatory variable to the *LS* equation, we may assume that the remaining *LS* error is no longer correlated with the *DS* errors and that the estimators of the coefficients in Eq.5 do not suffer from endogeneity bias. This approach is similar to the error-correction model proposed by Heckman (1976). In addition, because the introduction of the *Z* variable eliminates the covariance between the *LS* error and the *DS* errors, we may deal with the recursive system under the assumption that the error covariance matrix is diagonal (see, e.g., Greene, 2000, p. 675).

Using the estimates obtained from Eq.5, we can calculate how the leads and lags to unemployment in different life domains ultimately determine the dynamics of life satisfaction before and after unemployment. For instance, imagine no adaptation to unemployment in the income domain even after 4 years of being unemployed (i.e., change in financial satisfaction<0). However, there is a continuing increase in the individual's satisfaction with the amount of leisure time during that 4 years (i.e., change in satisfaction with the amount of leisure time>0). The shape of adaptation will therefore depend on the relative weight between financial satisfaction and satisfaction with the amount of leisure time in the *LS* equation. Eq.5 thus gives a more complete picture of the complex phenomenon of overall lead and lag effects to unemployment.

Finally, as a pedagogical device and for ease of reading, I will treat both *DS* and *LS* as a cardinal construct in all of the regressions: the fixed effects analysis (i.e. Eq.4 and 5) is carried out via 'within' regressions.

4. Results

4.1. Lead and Lag Effects in Different Areas of Life

Results from the lead and lag *DS* equations are reported in Tables 2. Given that Table 2 has a large number of coefficients, for ease of interpretation we have also produced graphs in Figures 2a-2g displaying the dynamics of *DS* (all except for job satisfaction). The horizontal line represents the average satisfaction for those who remained in full-time employment throughout the sampled periods. Note that only the lead effects are reported in the equation where job satisfaction is the dependent variable (see Figure 2h). For comparative purposes, the last column of Table 2 presents the estimates obtained from a reduced form *LS* equation with lead and lag unemployment variables as independent variables. The dynamics of predicted *LS* taken from the reduced form equation is illustrated in Figure 2i.

Looking across the table, we can see that lead effects to becoming unemployed in the financial satisfaction and job satisfaction equations are negative and statistically significant at the 1% level: the coefficients on "Unemployed within next year" are -0.104** and -0.317** in the financial satisfaction and job satisfaction equations, respectively. What this implies is that, on average, individuals go through a period of dissatisfaction with their job and income one year before entering unemployment. This is consistent with the evidence that self-reported dissatisfaction at the workplace is a good predictor of future quits (see Clark, 2001). With respect to the financial satisfaction domain, individuals who became dissatisfied with their income at their current job may believe that they could earn higher incomes elsewhere and therefore decide to quit in the following year. Another plausible explanation could also be that the stress of working for a failing company – in terms of prospects of getting lesser pay in

the future – can certainly weigh heavily on a person before they are actually unemployed. Regarding other possible lead effects, there is also a noticeable drop in health satisfaction two years before the year of unemployment, although the lead coefficients are not statistically significant at conventional levels.

In short, the above results seem to suggest that there is reverse causality to unemployment in more than one areas of life, and that regressions based on the effect of unemployment in the year of occurrence would grossly underestimate the detrimental effects of unemployment.

Table 2's other results contain a number of findings which might have been more difficult to predict. The unemployed report significantly lower levels of satisfaction in both health and income domains at the year of unemployment. The drop in financial satisfaction of 0.657-point is particularly large: this negative effect of current unemployment is more than twice the size of the negative effects of becoming either disabled or a widower in the financial satisfaction equation. Because income is held constant in the financial satisfaction equation, our results imply that the unemployed spend a significant period of time worrying about future incomes and not just about their current financial status.

Looking across the columns at other life domains, we can see that unemployment is followed by a period of fluctuations in the quality of marriage or romantic relationship: partner satisfaction fluctuates around 0.2-satisfaction-point above and below the mean for two years after unemployment. There is also a drop in the level of satisfaction with social life which comes at the second year of unemployment: the coefficient on "Unemployed for 1-2 years" in the social life equation is -0.187, with a statistically well-determined standard error of 0.070. This is followed by a further drop in social life satisfaction in the third year of being unemployed: the coefficient on "Unemployed for 2-3 years" in the social life equation is -0.322, with a standard error of 0.104. Whilst there is evidence that the unemployed completely "bounce back" from a drop in health satisfaction within the first three years of

being unemployed, there is little evidence to suggest that the unemployed also adapt completely to the loss of satisfaction in their income and social life domains. By contrast, there is strong evidence that unemployment increases satisfaction with the amount of leisure time, which remains positive and statistically significant at conventional levels throughout the duration of the unemployment.

It is worth noting that the sets of the coefficients on lead and lag unemployment variables in the *DS* equations do not exactly replicate that of those obtained in the reduced form *LS* equation. In other words, *LS* does not seem to have a one-to-one relationship with a particular life domain, and that unemployment does not have the same welfare impact upon *LS* as it has on, say, financial satisfaction. This is more apparent when we compare the dynamics of predicted *DS* (Figures 2a-2h) to the predicted *LS* taken from the reduced form *LS* equation (Figure 2i).

The essential findings of Table 2 can be replicated with ordered estimators (see, e.g., Ferrer-i-Carbonell and Frijters, 2004). But as in Oswald and Powdthavee (2008a), as a pedagogical device and for ease of reading, the cardinal methods are preferred here.

To be sure that such results are not being driven by individuals who are in the panel only briefly, we redo the estimations on a smaller balanced panel. Despite some notable increases in the standard errors, the size of the estimated coefficients remains virtually unchanged. A qualitatively similar conclusion can also be made with regard to the speed and extent of leads and lags to unemployment, which suggests that it makes virtually no difference whether a balanced or an unbalanced panel is used in this paper's analysis.

4.3. Implied Life Satisfaction Before and After Unemployment

What are the implications of the above findings on the dynamics of life satisfaction before and after unemployment? To address this question, Table 3 adopts van Praag et al's (2003) two-layer model and reports the main effects of *DS* on *LS* (Eq.5). Here, we assume that unemployment enters the life satisfaction function indirectly via its effects on satisfaction with eight different areas of life. Because the effects of *DS* on *LS* may vary according to the duration of unemployment, the lead and lag unemployment variables and their interactions with the *DS* variables, together with other employment status dummies, are also included as additional controls in the *LS* equation. Note that job satisfaction is included as one of the independent variables in the first column of Table 3. By contrast, the second column is estimated without the job satisfaction variable, thus allowing the weight attached to each remaining *DS* to vary by the duration of unemployment rather than just the periods that preceded it.

The results are consistent with van Praag et al's (2003) findings. Allowing the weights of *DS* on *LS* to vary by the duration of unemployment, we find all of the coefficients on the main effects of *DS* on *LS* to be positive and statistically significant at the 1% level. The order of the *DS* effects on *LS* obtained in the first column of Table 3 is as follows: partner satisfaction (0.179), social life satisfaction (0.114), satisfaction with the use of leisure time (0.112), job satisfaction (0.109), health satisfaction (0.100), financial satisfaction (0.068), housing satisfaction (0.048), and satisfaction with the amount of leisure time (0.033). The order of the *DS* effects continues to be the same in the second column where job satisfaction is excluded from the regression. It may also be that there are other determinants of life satisfaction, such as neighborhood satisfaction and health of children, but information on those aspects are not available in the BHPS. The error-correction variable, *Z*, is positive and statistically significant at conventional levels, which suggests that there is a statistically important underlying correlation between satisfaction domains and the error term.

It is also worth noting that, although not shown in the table but readily available upon request, some of the coefficients on the interactions between *DS* and the lead and lag unemployment variables are statistically significant at conventional levels. For example, the interaction between financial satisfaction and being unemployed for 3-4 years is negative and significant at the 5% level: income means less to *LS* the longer we spent in unemployment. What this implies is that people's view on what matters to life may varies according to the duration of unemployment.

Figure 3 plots the predicted *LS* path before and after unemployment, taking into account each indirect effect of unemployment (unemployment $\rightarrow DS \rightarrow LS$) taken from Table 2 and the flexible weights of *DS* in the *LS* equation in Table 3. Note that the numbers obtained in the first column of Table 3 (with job satisfaction) are used to generate the first half of the *LS*-path – i.e., the periods *before* unemployment – whilst the second half of the *LS*-path – i.e., the periods *after* unemployment – is based on the numbers obtained in the second column of Table 3 (without job satisfaction). For comparative purposes, the raw *LS* scores in the periods before and after unemployment are also superimposed into Figure 3.

We can see from Figure 3 that there is a negative and monotonic lead effect to becoming unemployed in *LS* starting at year *T*-3. This decline in *LS* can be explained by the drop in health satisfaction, financial satisfaction, and job satisfaction during that period. The predicted *LS* continues to follow a steady path downward until it reaches the second year of unemployment before starting to rise again. Part of the reason for this is that there is a combination of declines in health satisfaction, financial satisfaction, and social life satisfaction until the second year of unemployment, i.e. *T*+2. Although there is a sharp drop in financial satisfaction at the year of unemployment (at *T*), we are not able to replicate this sudden decline in the predicted *LS*-path. One reason for this is because there is also a significant rise in the level of satisfaction with amount of leisure time at the first year of unemployment. However, because individuals care more, on average, about income than the

amount of leisure time available to them (see Table 3), the offsetting effect on *LS* is only partial.

Evidence on adaptation in *LS*, which starts at the third year of unemployment, can also be explained by (a) the complete mean-reversal in the health domain, (b) partial adaptation in both income and social life, and (c) positive lag effects in satisfactions with housing, partner and the amount of leisure time. Conversely, any evidence of adaptation found in a model where unemployment is assumed to enter the life-satisfaction function directly (see, e.g., Clark et al, 2008; Gerlach and Stephan, 1996; Lucas et al, 2004) would be much more difficult to interpret as the different effects of unemployment on satisfaction with different areas of life are not factored into the estimation process. Note also that the predicted *LS* obtained from the two-layer model shares a similar trend as that of the raw *LS* which implies that unemployment may not have a significant influence on any other missing *DS* that varies over time.

Finally, there is little evidence of a statistical significant difference, in terms of the average satisfaction scores, between the predicted *LS* obtained from the two-layer model (Figure 3) and the predicted *LS* obtained from the reduced form model (Figure 2i). What this implies is that it makes virtually no difference to the final *LS* estimates whether a direct or an indirect effect of unemployment is assumed in the model.

5. Unemployment and Compensation

Like Clark and Oswald (2002), Ferrer-i-Carbonell and Van Praag (2002), and Powdthavee (2008), we can ask the conceptual question: how much extra real income would be required per annum to compensate some one for a change in another influence on well-being (in this particular case, unemployment)?

To address this question, it is possible to follow the methodology outlined in Ferrer-i-Carbonell and Van Praag (2002) and use the two-layer model to calculate the monetary values required to compensate individuals for unemployment. Yet given that it makes virtually no difference whether one assumes unemployment to affect life satisfaction directly or indirectly, it is perhaps more parsimonious to follow Clark and Oswald (2002)'s method in which a kind of compensation variation is calculated directly from the reduced form *LS* equation (the last column of Table 2). Hence, the contribution of this paper is that we are able to purge most (if not all) endogeneity from the income variable, which previous studies have not been able to do.

In Table 2, the instrumented income is positive and statistically significant in the reduced form *LS* equation: richer people are more satisfied with life. Using this coefficient, compensation figures[4] can be calculated using the following compensation variation equation:

$$CV = Y(\exp\frac{\beta_E - \beta_U}{\lambda_{lnY}} - 1), \tag{7}$$

where *CV* is compensating income variations, i.e. income required to compensate for the drop in well-being resulting from unemployment; *Y* is real equivalent household income; β_E is the reference coefficient for the full-time employed; β_U is the coefficient on being unemployed; λ_{lnY} is the coefficient on instrumented log real equivalent household income. The results are reported in Table 5. Because there is a one-year lead effect to becoming unemployed, we also present the compensation variation for the one year before unemployment takes place and for all the years that followed it.

For an average individual with a household income of £15k, we need £5k per annum to compensate for the drop in *LS* which is experienced one year prior to entering unemployment.

The compensation figure increases to approximately £20k per annum at the first year of unemployment, which continues to rise until the third year of unemployment where the figure peaks at £44k per annum. Consistent with the idea of partial adaptation to unemployment (Lucas et al, 2004; Clark et al, 2008), the figure drops to around £15k-£27k for those individuals who have been unemployed for 3 years or more, which is almost twice the size of what they usually receive on average.

6. Conclusions

This paper is the first of its kind to explore the underlying mechanisms behind why unemployed persons are so persistently unhappy with their lives. It uses a nationally representative longitudinal sample of British people to study the dynamics of satisfaction with different areas of life, including health, income, housing, partner, job, social life, the amount and the use of leisure time, in the periods before and after unemployment. It also examines how changes in different life domains shape the extent and speed of leads and lags to unemployment in life satisfaction.

Among the key findings is the evidence of a significant lead effect to becoming unemployed in income and job domains, both of which take place one year before the year of unemployment. This suggests that, on average, unemployment occurs after individuals became significantly dissatisfied with their finance and job. In other words, unemployment may not be viewed as completely exogenous, which is consistent with the findings reported in Clark et al (2009) and Frijters et al (2008). There is little evidence of a long-term adaptation to unemployment in both income and social life domains, which implies that the unemployed continue to worry about their future incomes and feel socially isolated even after spending up to 4 years or more in unemployment. Unemployment also affects the stability of marital quality, which is reflected in the fluctuation of partner satisfaction above and below the mean in the periods that followed unemployment.

This paper also offers a new way to think about the trend of life satisfaction following unemployment. By allowing a variety of satisfaction domains to explain life satisfaction, we are now able to explain what happens in the individual's thought process at each stage of unemployment. It also offers a more narrowly defined explanation as to why there is little overall adaptation to unemployment, which is a common finding in the literature (Clark et al, 2008; Lucas et al, 2004).

Why does this matter? First, if we are better able to identify the different sources of adverse psychological effects of unemployment through the inclusion of domain-specific life satisfaction in analysis of the unemployed, we can build better, in the sense of more realistic and accurate, economic models of the hysteresis and duration dependence of unemployment (see, e.g., Darity and Goldsmith, 1996). Second, given the large sums of money required to compensate for being unemployed – even after allowing for hedonic adaptation, a consideration of the range of non-pecuniary routes of how unemployment can lower our overall well-being may provide more options for policymakers when thinking of how best to compensate someone for personal unemployment other than just simply handing out income compensations.

Finally, as in any study, there are limitations and potential weaknesses to these results. First, we are unable to study in more detail the reasons behind the lead effects to becoming unemployed, clearly an area of great policy interest and an important subject for future study. Second, while we are able to control for the common unobserved components to life and domain satisfaction, we are unable to address the potential endogeneity problem entering domain satisfaction variables in the life satisfaction equation. Future studies should address the problem of reverse causality that can run from life satisfaction to domain satisfaction.

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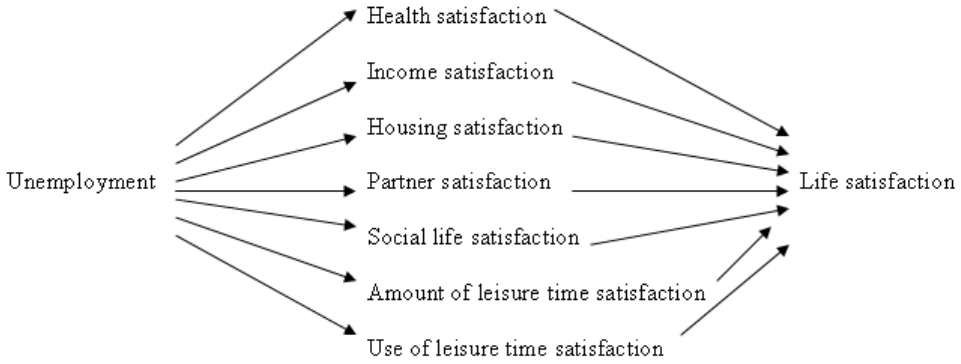
Table 1: Leads and lags to unemployment and average satisfaction scores, BHPS 1996-2007

Leads and lags to unemployment	Health	Income	Housing	Partner	Job	Social life	Amount of leisure time	Use of leisure time	Life overall	N
Unemployed in 4-5 years	4.90 (0.09)	4.45 (0.09)	5.22 (0.09)	5.94 (0.08)	4.75 (0.10)	4.82 (0.09)	4.40 (0.09)	4.65 (0.09)	5.15 (0.07)	305
Unemployed in 3-4 years	4.91 (0.08)	4.47 (0.08)	5.15 (0.07)	5.99 (0.07)	4.75 (0.09)	4.79 (0.07)	4.44 (0.08)	4.73 (0.07)	5.03 (0.06)	434
Unemployed in 2-3 years	4.89 (0.06)	4.34 (0.07)	5.19 (0.06)	5.94 (0.06)	4.64 (0.08)	4.74 (0.07)	4.36 (0.07)	4.67 (0.07)	5.00 (0.05)	564
Unemployed in 1-2 years	4.80 (0.06)	4.22 (0.06)	5.11 (0.05)	5.96 (0.05)	4.66 (0.07)	4.72 (0.05)	4.38 (0.06)	4.61 (0.06)	4.98 (0.05)	776
Unemployed in 0-1 year	4.70 (0.05)	4.09 (0.05)	5.02 (0.05)	5.97 (0.04)	4.42 (0.06)	4.69 (0.05)	4.43 (0.05)	4.50 (0.05)	4.90 (0.04)	1,188
Unemployed 0-1 year	4.75 (0.04)	3.51 (0.04)	4.90 (0.04)	5.93 (0.04)	-	4.63 (0.04)	4.83 (0.04)	4.58 (0.04)	4.77 (0.04)	1,692
Unemployed 1-2 years	4.66 (0.09)	3.31 (0.09)	4.75 (0.09)	5.96 (0.08)	-	4.45 (0.09)	4.72 (0.09)	4.52 (0.09)	4.68 (0.08)	398
Unemployed 2-3 years	4.58 (0.14)	3.39 (0.14)	4.49 (0.15)	5.83 (0.13)	-	4.49 (0.14)	4.78 (0.16)	4.47 (0.16)	4.67 (0.13)	139
Unemployed 3-4 years	5.03 (0.17)	3.18 (0.19)	4.86 (0.19)	6.08 (0.16)	-	4.38 (0.18)	4.57 (0.19)	4.22 (0.19)	4.70 (0.17)	79
Unemployed 4 years or more	5.27 (0.12)	3.71 (0.14)	4.88 (0.14)	5.98 (0.12)	-	4.73 (0.12)	4.88 (0.14)	4.86 (0.14)	4.98 (0.12)	164
Employed full-time	5.20 (0.01)	4.69 (0.01)	5.35 (0.01)	6.24 (0.01)	5.04 (0.01)	4.95 (0.01)	4.41 (0.01)	4.76 (0.01)	5.31 (0.01)	50,662

Note: The domain satisfaction questions are phrased as follows: *How dissatisfied or satisfied are you with your…(a) health; (b) finance; (c) house; (d) partner; (e) job; (f) social life; (g) amount of leisure time; (h) use of leisure time?* The global life satisfaction question is phrased *How dissatisfied or satisfied are you with your life overall?* Standard errors are in parentheses.

Figure 1: The two-layer model



Note: Adapted from Van Praag et al, (2003).

Table 2: Fixed effects domain satisfaction equations with leads and lags to unemployment, BHPS 1996-2007

Dependent variable: Domain satisfaction *j* and life satisfaction	**Health**	**Finance**	**Housing**	**Partner**	**Job**	**Social life**	**Leisure (amount)**	**Leisure (use of)**	**Life**
Unemployed 4-5 years hence	0.039	0.029	0.077	-0.028	0.018	0.094	0.094	0.071	0.123
	[0.066]	[0.067]	[0.066]	[0.053]	[0.082]	[0.063]	[0.072]	[0.068]	[0.054]*
Unemployed 3-4 years hence	0.090	0.162	0.079	-0.019	-0.014	0.022	0.027	0.099	-0.011
	[0.057]	[0.058]**	[0.057]	[0.046]	[0.073]	[0.054]	[0.062]	[0.058]+	[0.047]
Unemployed 2-3 years hence	0.142	0.133	0.103	-0.002	-0.052	0.099	0.007	0.115	0.059
	[0.052]**	[0.052]*	[0.052]*	[0.042]	[0.068]	[0.049]*	[0.056]	[0.053]*	[0.042]
Unemployed 1-2 years hence	0.078	0.042	0.109	0.024	-0.104	0.117	0.037	0.086	0.032
	[0.045]+	[0.046]	[0.045]*	[0.036]	[0.062]+	[0.043]**	[0.049]	[0.046]+	[0.037]
Unemployed within next year	-0.016	-0.104	0.063	0.016	-0.317	0.076	0.026	-0.042	-0.067
	[0.039]	[0.039]**	[0.038]	[0.031]	[0.056]**	[0.036]*	[0.042]	[0.039]	[0.031]*
Year became Unemployed	-0.078	-0.657	0.019	-0.003	-	-0.054	0.496	0.014	-0.179
	[0.038]*	[0.038]**	[0.038]	[0.031]		[0.036]	[0.041]**	[0.039]	[0.031]**
Unemployed for 1-2 year	-0.141	-0.678	0.049	0.083	-	-0.187	0.300	-0.053	-0.226
	[0.074]+	[0.075]**	[0.074]	[0.060]		[0.070]**	[0.081]**	[0.076]	[0.060]**
Unemployed for 2-3 years	-0.170	-0.641	-0.070	-0.188	-	-0.322	0.235	-0.185	-0.294
	[0.110]	[0.111]**	[0.110]	[0.089]*		[0.104]**	[0.120]*	[0.112]+	[0.090]**
Unemployed for 3-4 years	0.119	-0.784	0.401	0.238	-	-0.247	0.448	-0.263	-0.146
	[0.139]	[0.140]**	[0.139]**	[0.112]*		[0.131]+	[0.151]**	[0.142]+	[0.113]
Unemployed for 4 years or more	0.128	-0.552	0.188	-0.089	-	-0.354	0.277	-0.156	-0.220
	[0.129]	[0.130]**	[0.128]	[0.103]		[0.122]**	[0.140]*	[0.131]	[0.104]*
Self-employed	0.053	0.048	-0.006	0.002	0.259	-0.016	-0.027	-0.066	0.014
	[0.028]+	[0.028]+	[0.028]	[0.023]	[0.034]**	[0.027]	[0.030]	[0.029]*	[0.023]
Retired	-0.067	-0.069	0.122	0.067	-0.022	0.000	0.650	0.153	0.104
	[0.043]	[0.043]	[0.043]**	[0.034]+	[0.130]	[0.041]	[0.047]**	[0.044]**	[0.035]**
Disabled	-0.100	-0.161	0.071	0.037	-0.159	-0.128	0.142	-0.028	0.020
	[0.028]**	[0.028]**	[0.028]*	[0.023]+	[0.040]**	[0.027]**	[0.030]**	[0.029]	[0.023]

Non-labor force (e.g. students, housewives)	-0.879	-0.418	-0.011	-0.022	-1.076	-0.371	0.326	-0.226	-0.416
	[0.041]**	[0.041]**	[0.041]	[0.033]	[0.097]**	[0.039]**	[0.044]**	[0.042]**	[0.033]**
Reemployed, i.e. unemployed at *T*-1; employed at *T*	0.013	-0.017	0.042	0.071	0.085	0.081	0.000	0.026	0.096
	[0.049]	[0.049]	[0.049]	[0.039]+	[0.059]	[0.046]+	[0.053]	[0.050]	[0.040]*
IV log of real equivalent income	0.012	0.645	0.304	0.137	0.059	0.126	-0.440	-0.069	0.216
	[0.118]	[0.119]**	[0.118]**	[0.095]	[0.168]	[0.112]	[0.128]**	[0.120]	[0.096]*
Age: 25-34	0.074	-0.014	-0.079	0.018	-0.042	0.028	0.053	-0.001	0.002
	[0.031]*	[0.031]	[0.031]*	[0.025]	[0.039]	[0.029]	[0.034]	[0.032]	[0.025]
Age: 35-44	0.037	-0.024	-0.055	-0.052	-0.044	0.097	0.118	0.022	-0.044
	[0.040]	[0.040]	[0.040]	[0.032]	[0.050]	[0.038]*	[0.044]**	[0.041]	[0.033]
Age: 45-54	-0.009	-0.057	-0.077	-0.064	-0.096	0.062	0.028	-0.012	-0.073
	[0.050]	[0.050]	[0.049]	[0.040]	[0.060]	[0.047]	[0.054]	[0.050]	[0.040]+
Age: 55-65	0.019	0.036	-0.078	0.007	-0.046	0.146	0.061	0.073	0.009
	[0.058]	[0.058]	[0.058]	[0.046]	[0.070]	[0.055]**	[0.063]	[0.059]	[0.047]
Living as a couple	-0.036	0.018	-0.033	-0.005	0.044	0.095	0.102	0.073	0.015
	[0.023]	[0.023]	[0.022]	[0.018]	[0.027]+	[0.021]**	[0.024]**	[0.023]**	[0.018]
Widowed	-0.293	-0.425	-0.249	0.280	0.113	0.277	-0.376	0.280	0.225
	[0.220]	[0.221]+	[0.219]	[0.177]	[0.272]	[0.208]	[0.239]	[0.224]	[0.178]
Divorced	-0.257	-0.273	-0.320	-0.227	0.004	0.023	-0.091	-0.051	-0.019
	[0.093]**	[0.093]**	[0.092]**	[0.074]**	[0.112]	[0.087]	[0.100]	[0.094]	[0.075]
Separated	-0.126	-0.286	-0.345	-1.738	-0.125	-0.004	-0.202	-0.079	-0.653
	[0.107]	[0.107]**	[0.106]**	[0.086]**	[0.134]	[0.101]	[0.116]+	[0.109]	[0.086]**
Never married	-0.079	0.288	0.177	-0.341	-0.015	0.458	0.365	0.359	0.020
	[0.042]+	[0.042]**	[0.042]**	[0.034]**	[0.051]	[0.040]**	[0.046]**	[0.043]**	[0.034]
Completed first degree	0.025	0.055	-0.013	0.033	-0.031	-0.173	-0.009	-0.127	-0.041
	[0.054]	[0.054]	[0.054]	[0.043]	[0.066]	[0.051]**	[0.058]	[0.055]*	[0.044]
Completed higher degree	0.108	-0.022	-0.085	0.117	-0.132	-0.210	0.156	0.043	0.018
	[0.101]	[0.101]	[0.100]	[0.081]	[0.116]	[0.095]*	[0.109]	[0.103]	[0.082]
Household size	-0.008	-0.080	-0.089	-0.071	-0.013	-0.062	-0.056	-0.065	-0.062
	[0.013]	[0.013]**	[0.013]**	[0.010]**	[0.015]	[0.012]**	[0.014]**	[0.013]**	[0.011]**
Number of dependent children (age < 16)	0.015	0.090	0.079	0.025	0.044	-0.058	-0.161	-0.057	0.063

	[0.024]	[0.024]**	[0.024]**	[0.019]	[0.032]	[0.023]**	[0.026]**	[0.024]*	[0.019]**
Proportion of disabled people in the household	0.015	-0.111	0.028	-0.017	-0.078	-0.068	-0.055	-0.038	-0.034
	[0.046]	[0.046]*	[0.046]	[0.037]	[0.060]	[0.043]	[0.050]	[0.047]	[0.037]
Proportion of unemployed people in the household	-0.029	-0.429	-0.004	-0.032	-0.029	-0.043	-0.114	-0.090	-0.056
	[0.040]	[0.040]**	[0.040]	[0.032]	[0.052]	[0.038]	[0.043]**	[0.041]*	[0.032]+
Proportion of retired people in the household	0.028	0.111	0.057	0.038	-0.021	0.056	0.003	0.020	0.088
	[0.047]	[0.047]*	[0.047]	[0.037]	[0.060]	[0.044]	[0.051]	[0.048]	[0.038]*
Proportion of not 'active in the labor market' in the household	-0.031	-0.030	0.073	0.027	-0.016	-0.038	-0.160	-0.087	0.033
	[0.034]	[0.034]	[0.034]*	[0.027]	[0.040]	[0.032]	[0.037]**	[0.035]*	[0.028]
Constant	5.072	-1.447	2.599	5.265	3.774	4.017	8.844	5.741	3.271
	[1.109]**	[1.113]	[1.104]*	[0.889]**	[1.579]*	[1.047]**	[1.201]**	[1.128]**	[0.926]**
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	81163	81163	81163	81163	62350	81163	81163	81163	80966
Number of person	16618	16618	16618	16618	13777	16618	16618	16618	16615
R-squared	0.0893	0.1088	0.0162	0.0252	0.014	0.053	0.046	0.0391	0.0412

Note: +<10%, *< 5%, ** < 1%. Standard errors are in parentheses. Reference groups are employed full-time; married; and did not complete university.

Figure 2: The dynamic effects of unemployment on domain satisfactions

Fig 2a: Effects on satisfaction with health

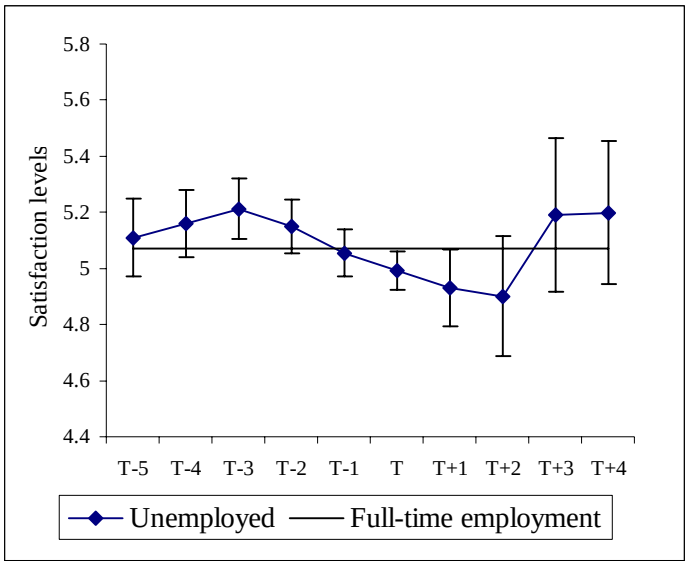


Fig 2b: Effects on satisfaction with finance

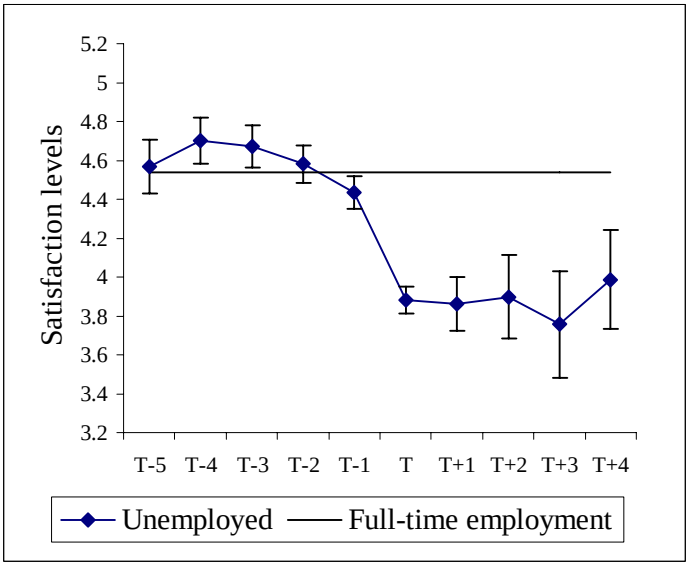


Fig 2c: Effects on satisfaction with housing

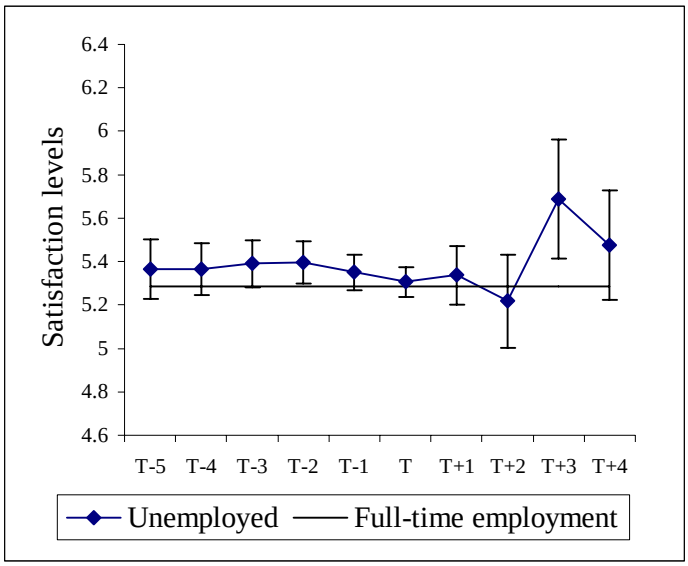


Fig 2d: Effects on satisfaction with partner

Fig 2e: Effects on satisfaction with social life

Fig 2f: Effects on satisfaction with amount of leisure time

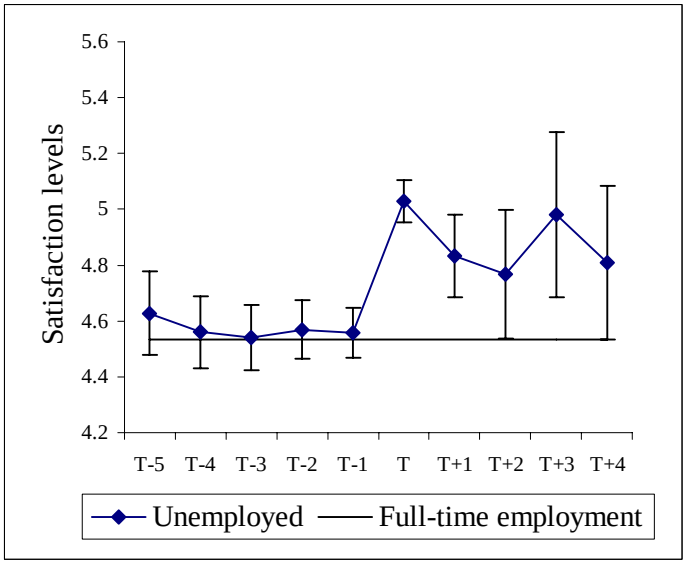


Fig 2g: Effects on satisfaction with use of leisure time

Fig 2h: Effects on job satisfaction (lead effects only)

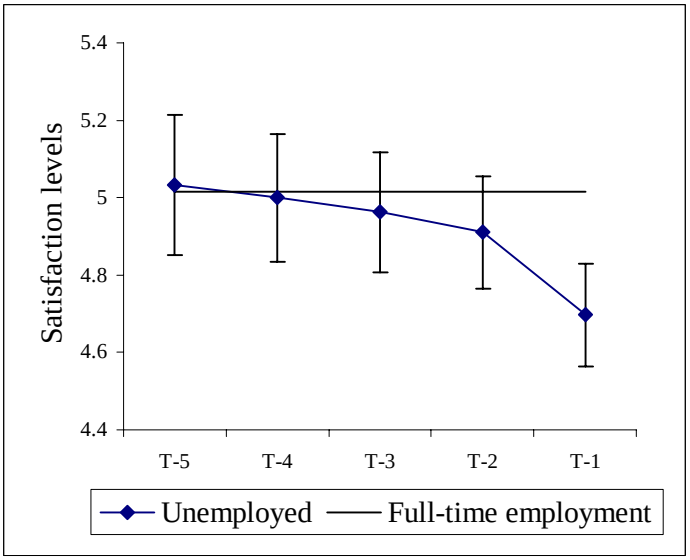
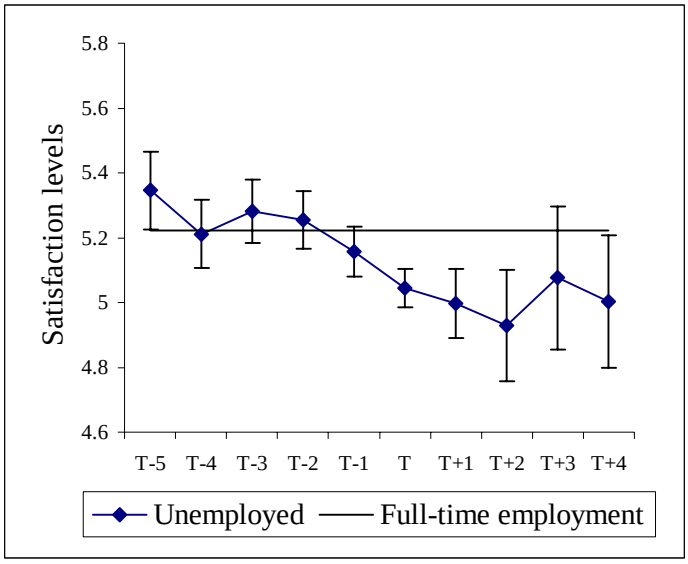


Fig 2i: Effects on life satisfaction



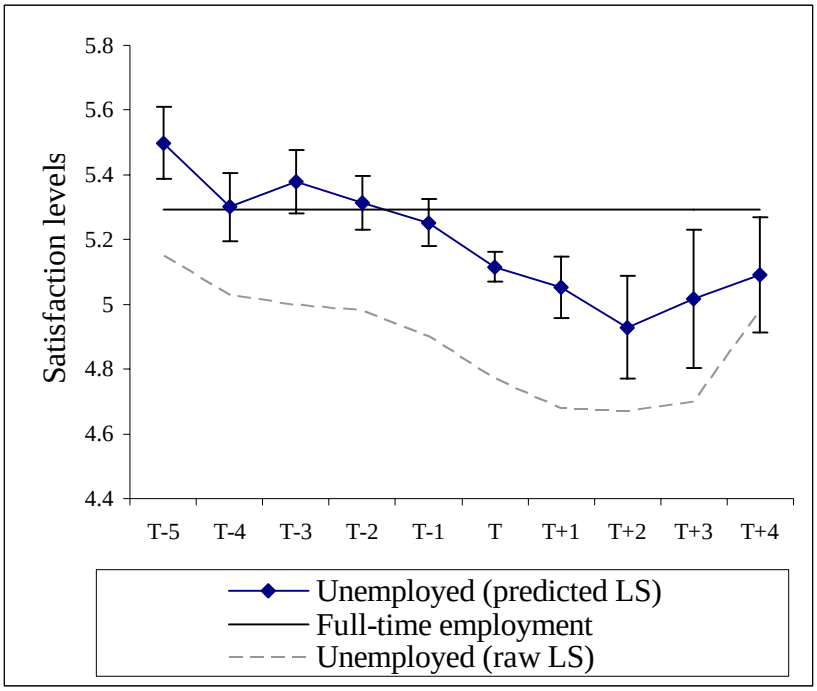
Note: Year T is the year of unemployment. 4-standard-error bands (95% C.I.) are reported: two s.e. above and two below. The horizontal lines represent the average satisfaction levels for those who remained in full-time employment throughout the panel.

Table 4: Fixed effects life satisfaction regression, BHPS 1996-2007

Dependent variable: Life satisfaction	**With job satisfaction**	**Without job satisfaction**
Main effects of DS on LS		
Health satisfaction	0.100	0.118
	[0.005]**	[0.005]**
Financial satisfaction	0.068	0.084
	[0.005]**	[0.005]**
Housing satisfaction	0.048	0.048
	[0.005]**	[0.005]**
Partner satisfaction	0.179	0.174
	[0.006]**	[0.005]**
Social life satisfaction	0.114	0.135
	[0.008]**	[0.007]**
Leisure time (amount) satisfaction	0.033	0.042
	[0.007]**	[0.006]**
Leisure time (use of) satisfaction	0.112	0.119
	[0.007]**	[0.007]**
Job satisfaction	0.109	-
	[0.003]**	
Z	0.020	0.026
	[0.012]+	[0.012]*
Constant	1.309	1.530
	[0.177]**	[0.167]**
Observations	62,211	80,966
Number of person	13,774	16615
R-squared	0.5576	0.5535

Note: + < 10%; ** < 1%. Standard errors are in parentheses. The Z variable comes from the principal component of the unexplained satisfactions scores obtained from Tables 2 and 3's estimates. Other controls include the lead and lag unemployment variables and the interaction terms between *DS* and the lead and lag unemployment variables.

Figure 3: Predicted life satisfaction before and after unemployment



Note: Year T is the year of unemployment. 4-standard-error bands (95% C.I.) are reported: two s.e. above and two below. The broken lines represent the raw data on *LS*. The horizontal lines represent the average satisfaction levels for those who remained in full-time employment throughout the panel.

Table 5: Compensation figures

Employment status	Compensation-path for an average household	As % of the average equivalent household income
Unemployed within next year	£5k*	36%
Year became Unemployed	£20k**	129%
Unemployed for 1-2 year	£28k**	185%
Unemployed for 2-3 years	£44k**	290%
Unemployed for 3-4 years	£15k	97%
Unemployed for 4 years or more	£27k*	177%

Note: *<5%; ** < 1%. The estimates are taken from the last column of Table 2 (reduced form LS equation). The valuations are annually figures, and are measured in real equivalent income. Average real equivalent household income in the cross-section (in 1996 Pounds) is around £15k. At the time of writing, the value of one pound sterling is around 1.5 US dollars.

[1] For further evidence on minimal selection effects due to unemployment, see Korpi (1997) and Lucas et al, (2004).

[2] For a more exhaustive list of work on the relationship between measures of subjective well-being and unemployment, see the review by Dolan, Peasgood, and White (2008).

[3] The idea that life satisfaction, as well as the speed and extent of overall hedonic adaptation, is a function of an individual's attention has nevertheless been considered before in psychology. Kahneman and Schkade (1998) present simple cross-sectional evidence that the individual's judgment of life satisfaction depends largely upon what the person is focusing his or her attention on at the time of answering the life-satisfaction question. For instance, the unemployed are likely at the beginning to think about their new circumstances many times each

day. Adaptation is simply a reduction of attention from the new circumstances over time (for a review, see Wilson & Gilbert, 2008). Dolan and Kahneman (2008) present a review written for economists.

[4] The figures are in real equivalent income, i.e. real household income/square-root of household size, and in £ sterling.