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**Working Paper**

## Lags and Leads in Life Satisfaction : A Test of the Baseline Hypothesis

DIW Discussion Papers, No. 371

**Provided in Cooperation with:**

German Institute for Economic Research (DIW Berlin)

*Suggested Citation:* Georgellis, Yannis; Diener, Ed; Clark, Andrew E.; Lucas, Richard E. (2003) : Lags and Leads in Life Satisfaction : A Test of the Baseline Hypothesis, DIW Discussion Papers, No. 371, Deutsches Institut für Wirtschaftsforschung (DIW), Berlin

This Version is available at:

<http://hdl.handle.net/10419/18128>

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Discussion Papers

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Berlin, September 2003



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German Institute  
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ISSN 1619-4535

# Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis\*

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August 2003

**Summary.** We use fourteen waves of the German panel data to ask whether individuals, after life and labour market events, return to some baseline wellbeing level. Although the strongest life satisfaction effect is often at the time of the event, significant lag and lead effects are present. Men are more affected by labour market events (unemployment and layoffs) and women by life events (marriage and divorce). Anticipation is an important component of individual wellbeing. Last, we show that happiness does not provide insurance against hard knocks: those with high baseline satisfaction are most adversely affected by negative events.

**Keywords:** Life Satisfaction; Anticipation; Habituation; Baseline Satisfaction; Labour Market and Family Events.

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\* We are grateful to seminar participants at the 4<sup>th</sup> Conference of German Socio-Economic Panel Users (Berlin), the 3<sup>rd</sup> ISQOLS Conference (Girona) and IZA (Bonn) for comments and suggestions. We have had useful conversations with Dick Easterlin, Dan Hamermesh, Bruce Headey, Hendrik Juerges, Danny Kahneman and Richard Layard. The data used in this publication were made available to us by the German Socio-Economic Panel Study (SOEP) at the German Institute for Economic Research (DIW), Berlin. We thank the ATIP programme of the CNRS for financial support.

# Lags and Leads in Life Satisfaction: A Test of the Baseline Hypothesis

Andrew E. Clark, Ed Diener, Yannis Georgellis and Richard E. Lucas

## 1. Introduction

One of the key questions in the analysis of subjective wellbeing (SWB) is whether people adapt to conditions. If so, then life is typified by a hedonic treadmill, in which conditions or circumstances do not, at least in the long-run, matter. This proposal, originally made by Brickman and Campbell (1971), has more recently been modified to reflect the idea that the level of adaptation or habituation might be influenced by the individual's personality (Headey and Wearing, 1989) and that the baseline set-point might be positive (Diener and Diener, 1995). However, in general the interest that the hedonic treadmill has inspired in the social sciences has not been matched by good evidence with which to test for its existence.

Many empirical studies are based on cross-sectional data and, as such, compare the experiences of different groups at the same point in time. An obvious shortcoming of such studies is that they can not shed light on whether any differences found between groups reflect initial differences in SWB, or pre-existing group differences with respect to the situation in question. For example, several studies have found that paraplegics are not that much less happy than comparison groups. It is, however, possible that paraplegics were more likely to have a high happiness level before their accidents (for example, because of a greater likelihood of extraverts and approach-oriented people being exposed to the kinds of activities that produce spinal cord injuries). Existing longitudinal data, such as Silver's (1982) study of paraplegics, have examined relatively short time spans (such as two months) and therefore may not have fully captured the development of adaptation.

The present study contributes to the existing literature on adaptation and habituation, but in the context of large-scale long-run panel data. By doing so, we advance from the standard literature which has very largely relied on contemporaneous correlations. Our sample of around 90 000 individuals in fourteen waves of German Socio-Economic Panel (GSOEP) data is large enough for us to be able to identify substantial numbers of people experiencing a range of significant life events.

The use of long-term panel data has other advantages, in addition to that of the sheer brute force of large sample size. A vexed question in social science concerns the causality

between SWB and various life events. For example, it is well-known that events such as unemployment and marriage have significant correlations with various measures of SWB. However, it seems likely that these events themselves are correlated with the individual's (past) levels of SWB: relatively unhappy people tend to become unemployed (Clark, 2003) whereas happiness increases the chances of marriage (Stutzer and Frey, 2003). The use of panel data allows us to tease out the causality between SWB and life or labour market events. In terms of theory, the above questions are absolutely central to understanding the influences on subjective wellbeing. In terms of policy, the above kinds of data are also essential for our understanding of the effects that policies (for example, with respect to unemployment or divorce) will have on people's experienced wellbeing over a long time period.

We consider six different events: marriage, divorce, birth of first child, unemployment, layoff, and quitting a job. Our proxy utility measure is overall life satisfaction, measured on a scale of zero to ten. A novel, and potentially important, part of our analysis is that we calculate all life satisfaction movements relative to a "baseline" level, defined here as the average level of life satisfaction reported by the same individual over the period seven to five years before the event in question occurred. This approach allows us to factor out individual idiosyncratic effects in reported life satisfaction.

We are particularly interested in the way in which wellbeing evolves around the time of marriage, entry into unemployment, et cetera. Both bivariate (graphical) and multivariate (regression) analyses reveal that the strongest life satisfaction effects often appear at the time that the events in question occur. However, there are both significant lag and lead effects. Our results suggest that men adapt less quickly than women to negative labour market events, in that past unemployment and layoffs continue to be important for men for a longer time than they are for women. There are also notable differences in time scales. For some events, there is rapid return to baseline satisfaction, while others have a lasting effect. Similarly, the anticipation of a pleasant or unpleasant event is often a very important explanatory factor of an individual's current level of wellbeing. Life satisfaction contains an important intertemporal dimension.

Last, we consider the question of whether happiness provides insurance against hard knocks. We find little evidence of this: those with high baseline satisfaction are most adversely affected by unemployment, quits and layoffs. On the contrary, it is the low baseline individuals who are most affected by marriage and the birth of first child, which are positive events. This egalitarian property of life satisfaction has been called "hedonic-levelling" by

Lucas *et al.* (2003).

The remainder of the paper is structured as follows. Section 2 briefly reviews some literature on subjective wellbeing, and section 3 discusses the methodology and data. Sections 4 and 5 focus on bivariate and multivariate evidence respectively, while section 6 concludes.

## **2. Previous Literature**

The relationship between subjective wellbeing and unemployment has recently inspired a lively literature. Examples include Agerbo *et al.* (1997), Björklund and Eriksson (1998), Clark (2003), Clark and Oswald (1994), Di Tella *et al.* (2001), Gerlach and Stephan (1996), Goldsmith *et al.* (1996), Korpi (1997), Namazie and Sanfey (2001), Whelan *et al.* (1998), Winkelmann and Winkelmann (1998), and Woittiez and Theeuwes (1998). A standard result in this literature is that unemployment is associated with lower levels of satisfaction or wellbeing, echoing the findings in the psychological and sociological literature showing that unemployment causes mental illness, depression, lower self-esteem or even suicide. An earlier review of the psychological and sociological literature can be found in Fryer and Payne (1986).

More recently, studies have attempted to uncover the dynamic processes underlying the link between unemployment and subjective measures of wellbeing by focusing on whether individual behaviour in the labour market exhibits evidence of adaptation and/or habituation. Clark *et al.* (2001) find that the negative wellbeing effect of current unemployment is attenuated for those who have experienced more unemployment in the past. The psychological basis for this finding is that judgements of current situations depend on the experience of similar situations in the past, and that higher levels of past consumption or experience may offset higher current levels of these phenomena by changing expectations (see Kahneman and Tversky, 1979, and Ariely and Carmon, 2003). As Myers (1992, p.63) notes, “if superhigh points are rare, we’re better off without them”.

A substantial amount of theoretical work has looked at addiction, whereby past consumption of some good affects the utility of current consumption (see Becker and Murphy, 1988). Addiction has typically been tested for using data on consumption of psychotropes, for example Becker *et al.* (1994). Although the keystone of Becker and Murphy’s theory is utility, only little research has combined consumption data with measures

of subjective wellbeing (two recent examples are Gruber and Mullainathan, 2002, and Juerges, 2001).

Most evidence of adaptation in the psychology literature comes from single cross-sectional studies (see Frederick and Loewenstein, 1999, for a review). In the context of movements with respect to baseline wellbeing, large-scale panel data is essential. Headey and Wearing (1989) followed individuals in the Australian Panel Study over an eight-year period. After an initial strong reaction to bad and good events, individuals tended to return to baseline SWB levels. These results are important, but still leave some questions unanswered. First, do some individuals differ in the extent of their adaptation? Second, is the degree of adaptation different for different well-defined major events? Headey and Wearing considered aggregation of a number of events, some of which were arguably not particularly important.

Two recent papers have used GSOEP data to answer some of these questions. Lucas *et al.* (2003) examine adaptation to changes in marital status, finding evidence of some adaptation, although not necessarily complete, to both marriage and widowhood. Using the same approach, Lucas *et al.* (2004) also find (perhaps weaker) evidence of adaptation to unemployment. Using European Community Household Panel, Clark (2002) concludes that there is little adaptation to unemployment: the raw data finding that the long-duration unemployed have somewhat higher SWB than the short-duration unemployed being due to a shift-share phenomenon (those for whom unemployment is a catastrophic experience tending to leave it sooner).

The use of subjective wellbeing measures attracts some scepticism among economists, although they are well-received by many researchers in other social science disciplines, such as psychology, sociology and management. Several studies in psychology have analysed the job satisfaction – quits link, supporting the view that job enrichment, strongly correlated with job satisfaction, has a negative and significant impact on voluntary turnover: Warr (1999) provides a useful survey. In the economics literature, early studies that explore the link between job satisfaction and quits include Flanagan *et al.* (1974) and Freeman (1978). These studies use larger, random samples that overcome some of the difficulties associated with the small and non-representative samples used in the psychology literature. More recent work showing that job satisfaction is a powerful predictor of both separations and quits includes Clark *et al.* (1998), using the first ten waves of the GSOEP, and Clark (2001), with the first seven waves of the British Household Panel Survey. Job



satisfaction data may also be validated by linking it to absenteeism or productivity (see, Clegg, 1983 and Patterson *et al.*, 1997, respectively).

Linking individuals' prior evaluations to their subsequent behaviour helps to validate the interpersonal comparison of such subjective measures in cross-sectional data. One argument is that the cross-sectional analysis of measures of job and life satisfaction is meaningless due to the inherent non-comparability of the responses: one worker's satisfaction with their job of 8 (on a 0 to 10 scale, say) can mean something quite different from another worker's 8, yet cross-section statistical analysis of such a variable requires that everyone's 8 be identical. If it is true that such responses cannot be compared, then, controlling for other individual and job characteristics, we would expect past job satisfaction to have no predictive power in behavioural equations. The growing evidence to the contrary reassures us that both comparisons between individuals and changes over time are valid research tools. This paper will appeal to both using long-run panel data.

### **3. Methodology and Data**

The empirical work in this paper uses data from the first fourteen waves of the West German sub-sample of the GSOEP, spanning the period 1984-1997 (see Burkhauser *et al.*, 2001). Focusing on those respondents who were between 19 and 59 years of age yields a sample of 43,243 person-year observations for males and 44,526 person year observations for females. As this is panel data, there are multiple observations per individual. The data are unbalanced, in that not every person is present for all fourteen waves (some leave before 1997, and some enter after 1984). This will turn out to be important for the sample that we analyse below.

Our measure of subjective wellbeing is the response to the question "*How satisfied are you with your life, all things considered?*" This is asked of all respondents every year in the GSOEP. Responses are on a scale of zero to ten, where 0 means completely dissatisfied and 10 means completely satisfied. Table 1 shows the distribution of this satisfaction score for men and women in the GSOEP sub-sample used in our subsequent empirical analysis.

We wish to examine how life satisfaction responds to a number of different experiences. We consider six labour market and family events (this list is not intended to be exhaustive) that occur to some of the sample members during the sample period: Marriage, divorce, birth of first child, entry into unemployment, quitting one's job and layoff. The long run of panel data yields non-negligible numbers of observations of these phenomena over the

whole sample. For men (women), we observe 1218 (1243) marriages, 211 (229) divorces, and 768 (915) births of first child. For the labour market events, the respective figures are 915 (623) layoffs, 1456 (1451) quits, and 1215 (1136) entries into unemployment.

The panel nature of the data allows us to track individuals' reported life satisfaction both before and after these events occurred. Note that, given fourteen waves of panel data, we can follow an individual for a maximum of thirteen years preceding or following the event, depending on both the calendar year in which the event occurred and how long the individual is present in the sample. For example, for someone who experienced layoff in 1997 and who has been in the sample since 1984, we could in principle observe thirteen years of reported life satisfaction prior to the event. However, in practice the vast majority of individuals can be tracked for less than 13 years, both previous to and after the event. In the statistical analysis, we will restrict ourselves to four-year periods before and after the event in question.

### *3.1. Definition of "baseline satisfaction"*

The baseline satisfaction,  $SB_i$ , for each individual  $i$  in the sample is defined as the average life satisfaction that they reported over the period five to seven years before the event took place. This reduces our sample size significantly, as it requires that individuals be continuously observed for at least seven years. Table 2 shows the number of life and labour market events in the resulting analysis sample. The six events are approximately evenly distributed between men and women. Unemployment, layoffs and marriage seem to be slightly more prevalent amongst men in this sample, whereas we have more observations of quits and divorce amongst women. These numbers are not meant to reflect the population incidence rate, as the characteristics of men and women who stay seven years in the GSOEP are not representative of the population at large.

An alternative definition of baseline satisfaction is that reported by "people like you" at the time the event (marriage, unemployment, etc.) occurs. This raises the obvious question of "Who are 'people like you'"? Using a baseline definition widespread in the early Leyden literature on reference groups (the average life satisfaction of those with the same sex, age and level of education) produces similar results to those presented below.

Denoting the time at which the event occurred as  $t$ , our approach limits the sample to individuals who are observed for all periods from  $t-7$  to  $t$ . "Baseline satisfaction" is their average life satisfaction score from  $t-7$  to  $t-5$ . We then consider deviations from this baseline level over the period  $t-4$  to  $t+4$  (four years before to four years after the event).

### 3.2. Hypotheses

Our objective is to look at movements in life satisfaction, before, during, and after a certain event, compared to the baseline satisfaction a number of years prior to the event. Our work differs from the vast majority of the existing literature, which has only considered the contemporaneous impact of an event on subjective wellbeing. We have four main research questions.

- [1] Are family and labour market events contemporaneously correlated with life satisfaction?
- [2] Do past events matter?
- [3] Is there evidence of anticipation?
- [4] Are happy people less affected by negative life events?

The first question is the least original, and has been covered in existing work. The other questions are to our mind more innovative.

Note that the second can potentially be broken up into two parts for events which are entries into states. Consider entry into unemployment as the event in question. The first part of the question then asks if, over the whole sample and **controlling for current labour market status**, a past entry into unemployment affects current life satisfaction. Most social science research, with its emphasis on contemporaneous correlations, has ignored this question. The second part of the question refers to habituation: does past entry into unemployment matter **for those who are still currently unemployed**? The question here is whether the effect of unemployment is smaller the longer one has been unemployed. In practice this distinction is only applied to unemployment in our statistical analysis. It could theoretically also be applied to marriage: we can in principle look at the effect of marriage three years ago for everyone who married at that time, and then only for those who remained married. In practice (as opposed to unemployment where many individuals leave the state fairly rapidly) very few individuals dropped out of marriage in the first four years, making this distinction untractable.

A first bivariate look at the data will provide some answers to questions [1] through [3]. The issue of other confounding explanatory variables, and question [4], will be addressed through multivariate analysis.

#### 4. Lags and leads: graphs

Figures 1-6 present a first pass at the question of lags and leads. Here there are no controls: we simply track average life satisfaction (from  $t-4$  to  $t+4$ ) for those who, at time  $t$ , experience the event in question. Life satisfaction graphs are produced separately for men and women. Figures 1, 2 and 3 present the three family events (marriage, divorce and birth of first child respectively), while Figures 4, 5 and 6 concentrate on labour market events (unemployment, layoff, and quitting). The horizontal line represents baseline satisfaction: statistically significant differences of life satisfaction from the baseline are marked by “\*”. The number of individuals who experienced the event at  $t = 0$  and the subsequent number of individuals who remain in the sample in the post-event period are shown in parentheses.

A number of general points stand out in these Figures. First, there are indeed significant movements away from the baseline satisfaction level associated with the six events analysed in this paper. Second, there is evidence of both lags and leads: the shift away from baseline satisfaction is evident both before and after the event. The peak effect is most often, but not always, located at time  $t$ , when the event itself actually occurs. Last, although the specifics differ, the general shape of changes in life satisfaction as a function of life events is similar between men and women.

Specifically, Figure 1 shows that, as might be expected (or hoped), the contemporaneous correlation between marriage and life satisfaction is positive. However, the lead or anticipation effect is also positive: the life satisfaction of those who will be married in the future is higher than their baseline. The positive effects of marriage also last for a couple of years into the future. There is a noticeable difference here between men and women: both the significant lead and lag effects of marriage are only one year for men, compared to two for women. In addition, the greatest life satisfaction effect for women, compared to baseline, is larger than that for men.

The lead effect is much larger in Figure 2, where life satisfaction is significantly below its baseline level in the two to three years prior to a divorce. After divorce, men’s satisfaction quickly reverts to its baseline level, whereas women’s remains significantly below its baseline level for another three years. In addition, the greatest life satisfaction effect of divorce for women is found two years preceding the event, whereas for men it is at the time that the divorce occurs.

Finally, looking at the effect of birth of first child on life satisfaction (see Figure 3),

we see some evidence of anticipation for men, but not for women, and a lasting effect for both men and women, in that life satisfaction remains statistically higher than the baseline one year after the event.

Figures 4-6 present the same graphs as a function of labour market events. Focusing on entry into unemployment (Figure 4), we see that both men and women anticipate unemployment the year before the event, and that its effects persist long after the event. Entry into unemployment is associated with sharp movements in life satisfaction, with a peak reduction, compared to baseline, of almost one point on the zero to ten life satisfaction scale. This reduction is of the same order of magnitude as that associated with divorce in Figure 2.

Figure 5 shows the effect of quits. For women, there is evidence that life satisfaction just before quitting is significantly lower than its baseline level. One interpretation is that low satisfaction predicts future quits. Further, satisfaction post-quitting is significantly lower both for women (up to four years later) and for men (up to three years later).

Last, Figure 6 shows that layoffs are associated with lower wellbeing for women one year before the event, and lower wellbeing for both men and women after the event. However, women tend to return to their baseline satisfaction level after two years, while the negative impact of layoff for men's wellbeing persists for at least four years after the event. Although economists usually consider layoffs as exogenous, and thus as "news" to the individual, we do see here some evidence of anticipation.

Although the approach is simple, we believe that these figures provide useful information. Two points are worth emphasising. The first is that, although the approach is bivariate, we still control for selection as we map out all life satisfaction changes relative to baseline. If a happy person marries, we trace out their life satisfaction relative to their normal happiness; if an unhappy person marries, we trace out their life satisfaction relative to their normal miserableness. Second, we are aware that there is attrition in this sample (the numbers in parentheses fall over time). Could the "adaptation" data shapes be a statistical artefact due to a shift-share phenomenon? Redrawing the graphs only for those who are observed for four years after the event in question (*i.e.* on balanced panel data) did not alter the data shapes.

These figures provide some preliminary (because bivariate) answers to the hypotheses in section 3.2. There is clear evidence that life events are correlated with life satisfaction (question [1]); we also see anticipation (question [3]), in that there are significant movements in life satisfaction before the event occurs, for both men and women and for all six events. Question [2] concerned habituation. Here the bivariate approach reveals its weakness for

entries into states that may potentially only last for relatively short periods of time. Specifically, we do not know what happens to these individuals in the years that follow this transition. Although the dropout rate from marriage over four years is small in these data, this is less true for those who enter unemployment, who on average will find a new job or leave the labour force relatively quickly (in terms of the figures' time scale). As such the “bouncing back” that many of the figures reveal could be either habituation, or new life events. Multivariate analysis is needed to disentangle them.

## **5. Regression results**

In this section, we move to a multivariate analysis of leads and lags in life satisfaction, considering the same six events as above. The principal reason for using multivariate, rather than bivariate, analysis is the likely presence of omitted variables (or confounding factors) which may be correlated with both life satisfaction and the life event under consideration. For example, unemployment is accompanied by a sharp fall in income: is it this movement in income that is behind the life satisfaction effects of unemployment? Alternatively, marriage and divorce tend to be concentrated at certain times of life, and many studies find a strong relationship between measures of SWB and age.

As in the graphical analysis above, our sample is limited to individuals who are observed for at least seven years before the year in which they experienced the event. Missing values in some of our explanatory variables also reduce the sample size somewhat. When focusing on future events (leads) the regression sample is restricted to those who are currently at risk of experiencing the event in the future (for example, current employees who are at risk of future layoff, or single people who may marry). All of the regressions control for the baseline level of life satisfaction, so that intuitively we are analysing movements away from “normal” wellbeing in the pre-event stage.

We present our method in detail for only one of the life events above: unemployment. The results for the other five life events then follow. We model life satisfaction via ordered probits, as satisfaction is an ordinal, as opposed to cardinal variable (someone with a life satisfaction score of eight is not exactly twice as satisfied as someone with a life satisfaction score of four: they are simply more satisfied than someone reporting seven, and less satisfied than someone reporting nine). Our control variables include nationality, education, number of children, age and age-squared, household income, health, marital status, and region and year dummies. Men and women are analysed separately. As the Figures suggested, the

relationship between life satisfaction and life events may well differ by sex.

Table 3 shows the effect of current, past and future entry into unemployment on life satisfaction. Columns 1 and 3 deal with past entry into unemployment (lags), while columns 2 and 4 consider future entry into unemployment (leads). Unemployment therefore enters in three dimensions, corresponding to research questions [1] to [3] above. Row four shows the estimated coefficient on **current** unemployment. As is usual, this enters with a significant negative coefficient (the figures in parentheses are t-statistics).

Second, rows five through eight show the estimated coefficients on dummy variables for **past** unemployment status over the past four years. These typically attract negative coefficients, but only those referring to relatively recent unemployment are significant. Past entry into unemployment reduces current life satisfaction. Those who entered unemployment in the past could of course be currently occupying any kind of labour market position: employed, unemployed, or inactive: this will be picked up by the “Current Status” variables.

We might expect the life satisfaction effect of entry into unemployment two years ago (say) to depend on whether the individual is still unemployed today. The last set of unemployment dummies in columns one and three, under the heading of “interactions”, therefore tests whether the effect of past unemployment depends on current unemployment status. The first two of these dummy variables attract positive and significant coefficients. The SWB effect of past entry into unemployment for the unemployed is thus given by the sum of the respective “Entry into unemployment” and “Interaction” variables. It is noticeable that this sum is roughly zero, so that the wellbeing effect of unemployment is mostly independent of the duration of that unemployment.

The conclusion from this analysis of lagged unemployment is therefore threefold:

- current unemployment hurts;
- past unemployment reduces SWB for those who are **not** currently unemployed;
- the date of past entry into unemployment is not correlated with SWB for those who **are** currently unemployed: unemployment is bad and doesn’t get any better the longer the unemployment spell lasts (see also Clark, 2002).

Regression coefficients with lags and interactions can be difficult to decode. The text table below illustrates the estimated wellbeing effect of various types of labour force histories for men. These are all relative to the omitted category (representing the zero): someone who is inactive in the labour market, who has not been unemployed over the past four years, and

will not become unemployed in the next four years.

***The estimated effect of unemployment on life satisfaction: Males***

	Current status	Lags/leads	Interactions	Total
Employed; no past or future unemployment	0.211	0	0	0.211
Employed; was unemployed with spell starting 1 year ago	0.211	-0.431	0	-0.220
Employed; was unemployed with spell starting 2 years ago	0.211	-0.345	0	-0.134
Unemployed; spell started less than 1 year ago	-0.379	0	0	-0.379
Unemployed; spell started 1 year ago	-0.379	-0.431	0.463	-0.347
Unemployed; spell started 2 years ago	-0.379	-0.345	0.274	-0.450

This table illustrates two key points.

- The effect of unemployment on wellbeing is largely independent of its duration (compare lines 4 through 6).
- A male with an entry into unemployment one year ago has very roughly the same level of wellbeing whether currently employed or unemployed (compare lines 2 and 5). But for an entry into unemployment two years ago, current employment yields higher wellbeing (line 3 vs. line 6), and employment’s relative attractiveness is greater still if there has been no entry into unemployment in the past four years (line 1 vs. line 4).

Columns 2 and 4 in Table 3 then consider the effect of **future** unemployment on current life satisfaction. There are no “current status” or “interactions” variables in these regressions as the “risk group” for future unemployment consists only of those who are currently employed. These “leads” regression results show evidence of anticipation one year (men) or two years (women) prior to the event:

- future unemployment significantly reduces both men’s and women’s current wellbeing.

All regressions include a full set of demographic controls. The estimated coefficients show that life satisfaction is U-shaped in age, as is often found, but is not strongly correlated with education. There is a negative correlation with number of children, and a strong positive



correlation with household income. Last, almost the strongest effects in these regression tables come from individual health, which is extremely significant. The baseline level of satisfaction is enormously significant, which is unsurprising.

Table 4 addresses our fourth research question on the SWB effects of unemployment. Specifically, we estimate the effect of past unemployment separately for high and low baseline individuals, the baseline being based on their mean life satisfaction score between  $t-5$  and  $t-7$ . Those with a baseline score over the mean population level are “high baseline” and those with baseline under the population mean are “low baseline”. This population mean baseline is 7.23 for men and 7.25 for women. The important question that we consider here is whether those people who are “typically happy” (*i.e.* with a high baseline level of satisfaction) bounce back from unemployment more quickly. If this were the case, then we would expect the effect of past unemployment to be smaller (in terms of the absolute size of the estimated coefficients) for high baseline than for low baseline individuals. It should be noted that regression to the mean is unlikely to be an issue here as the time scale is too long: baseline satisfaction is measured between  $t-7$  and  $t-5$ , and we are looking at reactions following an event that occurs at time  $t$ .

Table 4 provides little evidence for the “happiness as insurance” hypothesis. The estimated coefficients for past unemployment in the high baseline group are mostly larger in absolute terms than those for the low baseline group; this is especially true for men. Past entry into unemployment has a more severe wellbeing effect on those who originally (before entry into unemployment) were more satisfied. It is likely a good thing to be happy, but this happiness does not seem to be an antidote for the negative effects of unemployment.

The remainder of this section considers our five other life events. The key regression results are in Table 5. There is strong evidence of a negative effect of past layoff for men, somewhat larger for those with high baseline satisfaction. As our earlier graphs suggested, layoffs affect women to a lesser extent. It should be remembered that all of the regressions in Table 5 control for a large number of individual characteristics, including household income. One of the main interests of the economic literature on layoffs has been the income implications. This is controlled in the regression, so that the “EVENT” variables are picking up the non-pecuniary psychological impact of past layoff. We find some lead effects for men, but not for women. With respect to our last labour force event, quits, we again find strong lagged effects for men, but not for women. There are no significant lead effects with respect to quits.

The last three panels of Table 5 refer to family events: marriage, divorce and birth of first child. Current marriage is positively correlated with life satisfaction, from Table 3. Table 5 shows that, in addition, having married in the past few years is associated with additional positive estimated coefficients: recent marriage is associated with higher life satisfaction than longer-running marriages, *ceteris paribus*. This can be taken as evidence of habituation. This habituation is particularly marked for women, where the added wellbeing impact of recent marriage diminishes monotonically with the number of years since marriage (see column five). The wellbeing boost from recent marriage is larger for low baseline individuals. Last, there are one-year lead effects for both men and women.

Current divorce is negatively correlated with life satisfaction, while past divorce has no effect on men's life satisfaction. For women, the estimated coefficients show that divorce two years ago has a negative effect, while divorce one year ago has an insignificant effect, although we do not hold to a strict interpretation of the time scale implied by these coefficients. Divorce is where we find the strongest lead effects: two years for men and three years for women. Last, significant positive lag effects are found for one year with respect to birth of first child, but some evidence of a negative effect of a child between one and two years old. There is a one-year lead effect of birth of first child for women.

Tables 3 through 5 contain a great deal of information. Table 6 summarises what we have found, in multivariate analysis, regarding years of significant lags and leads in life satisfaction with respect to the six events analysed. Table 6 also indicates whether it is the high baseline ("happy") or low baseline individuals who seem the most affected by the event in question. As Table 6 shows, high baseline individuals are more affected by labour market events (in terms of the persistence of the effect after the event occurred). The results are more equivocal with respect to marriage, divorce and birth of first child: for some events high baseline individuals are more affected, whereas for others low baseline individuals are most affected.

In terms of our research questions, Table 3 showed that, as expected, unemployment, divorce and separation reduce life satisfaction. More interestingly perhaps, Table 6 reveals that even in multivariate analysis we find evidence of anticipation for every event except quits, although the length of the anticipatory period varies. There are also substantial lag effects. For example, a layoff four years ago continues to have a negative effect on men's life satisfaction. As a rough rule, the intertemporal effects (both lags and leads) are longer for men with respect to labour market events, but longer for women with respect to family

events. Last, happiness does not necessarily provide insulation against the effect of negative experiences.

## **6. Conclusion**

This paper has used fourteen waves of the GSOEP to examine the relationship between life satisfaction and past, contemporaneous, and future labour market and life events. Six events are considered: Marriage; Divorce; Birth of first child; Unemployment; Layoff and Quit. The results, both bivariate and multivariate, provide strong evidence for both lag and lead effects on current life satisfaction. There are, however, differences in time scales. For some events, there is a rapid return to baseline satisfaction, while others have a lasting effect. Similarly, the anticipation of a pleasant or unpleasant event is often a very important explanatory factor of an individual's current level of wellbeing. We believe that this represents some of the first large scale evidence of effects of habituation and anticipation in life satisfaction.

We have uncovered significant differences between men's and women's life satisfaction in terms of the relationships with both past and future events. Last, we have considered the question of whether "happier" individuals (those who are happier than average) are less affected by adverse life events: does happiness provide insurance against hard knocks? Intriguingly, we find little evidence of this. In the labour market, especially, it is those with high baseline satisfaction who are most adversely affected by unemployment, quits and layoffs. With respect to family events, it is the low baseline individuals who are most affected by marriage and the birth of first child, which are positive events. This relationship provides food for thought: initially happy people are suffer more when confronted with a negative event, but profit less from what might be called happy events. There is some sense of egalitarianism in life satisfaction over time.

We have only started to scratch the surface of what can be done with large-scale long-run panel data including subjective wellbeing variables. Our most general conclusion is that research that seeks to relate measures such as life satisfaction only to an individual's labour force and marital status at a point in time is in danger of missing important information. Just as the word "life" implies a long-term process, life satisfaction seems to contain an important intertemporal dimension.

## FIGURES

Notes to all Figures: \* indicates significance at the 5% level; Number of observations in parentheses; Number of pre-event observations same as number of observations at t=0 (time event occurred)

Figure 1. Marriage and life satisfaction.

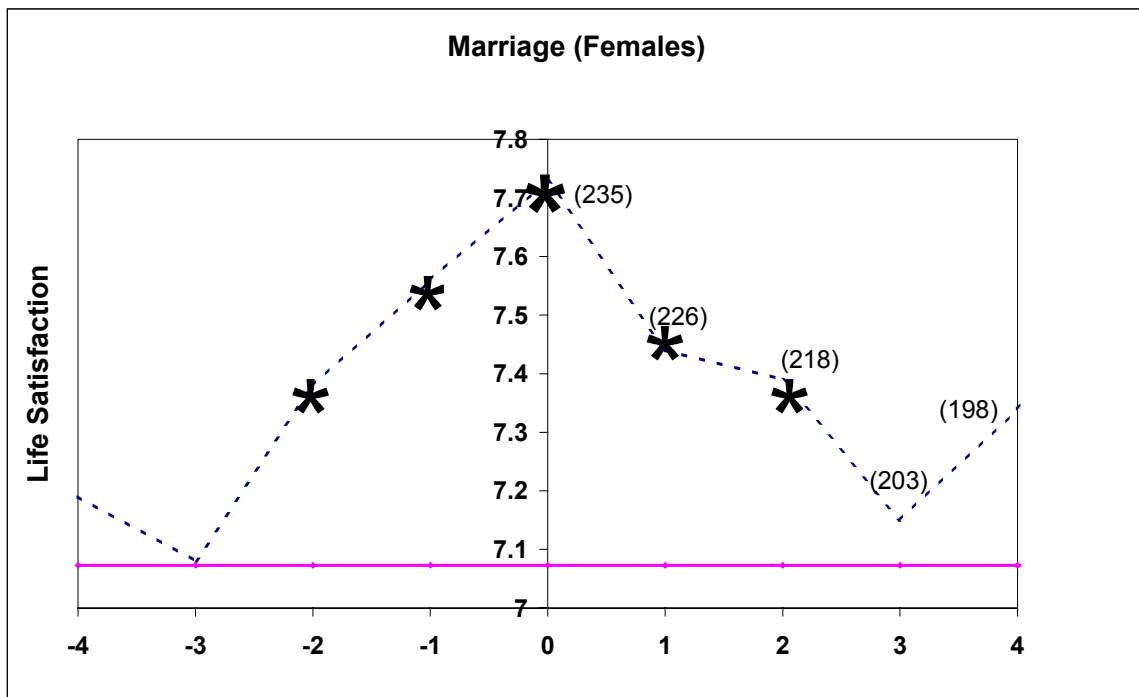
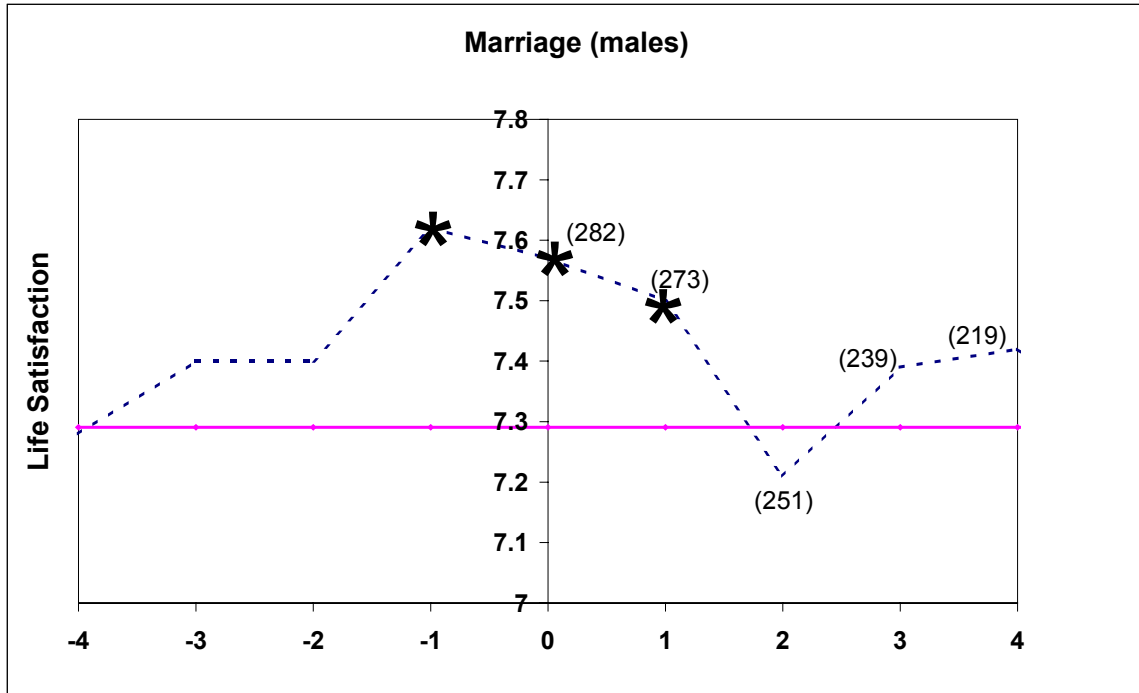
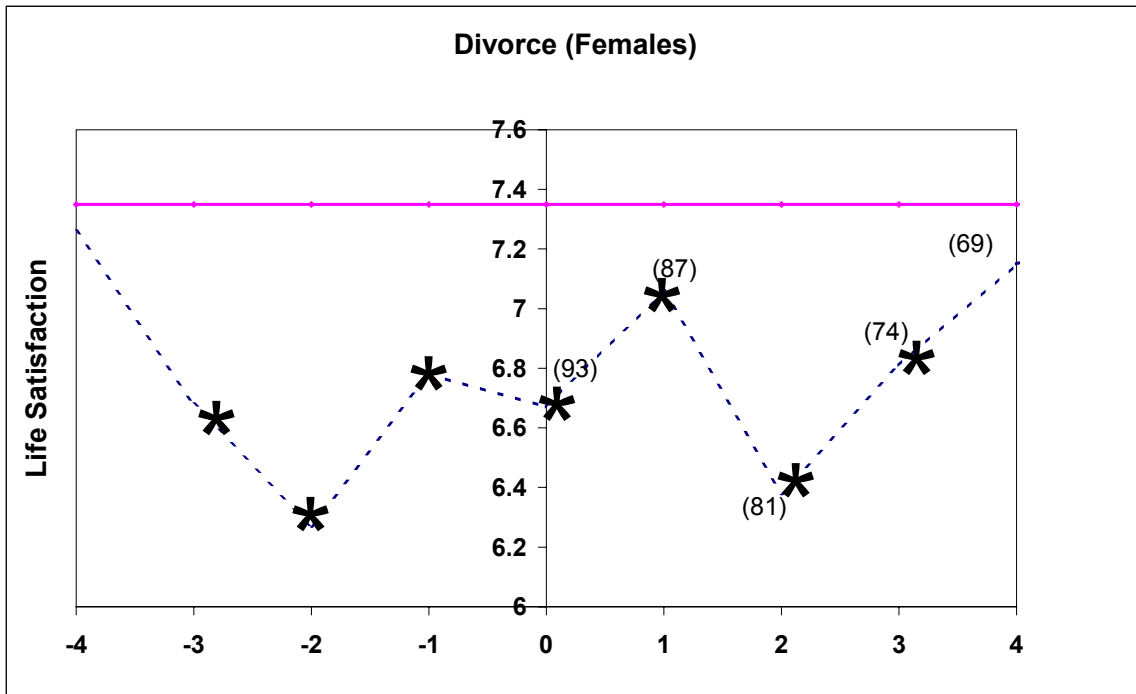
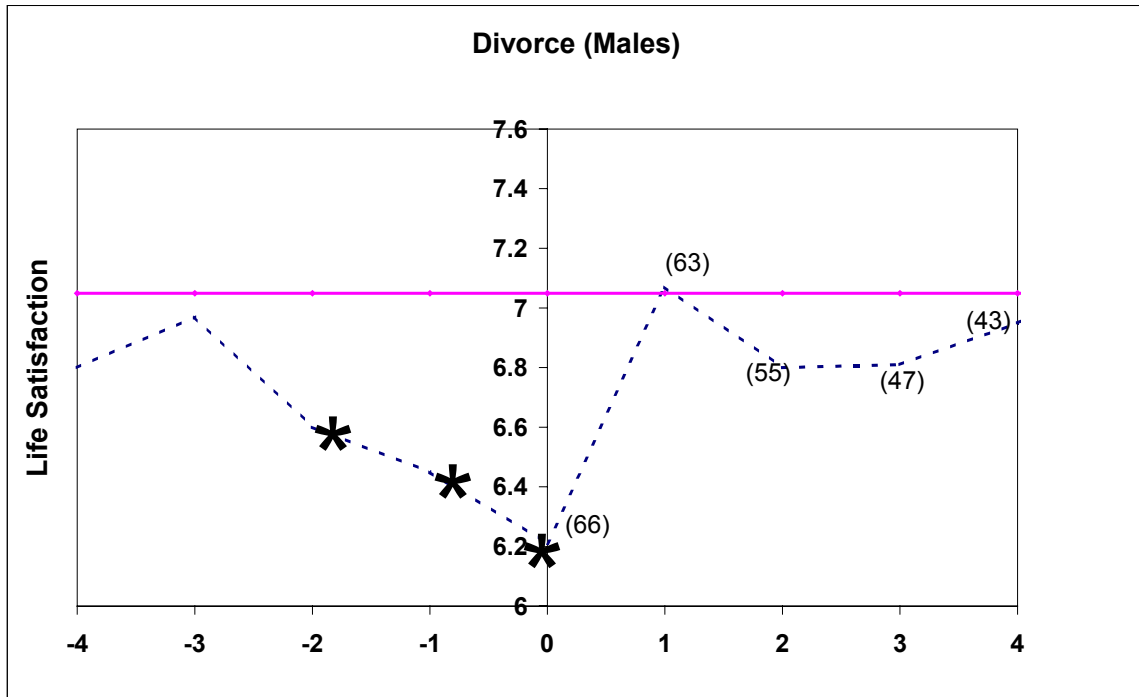


Figure 2. Divorce and life satisfaction.



**Figure 3.** Birth of first child and life satisfaction.

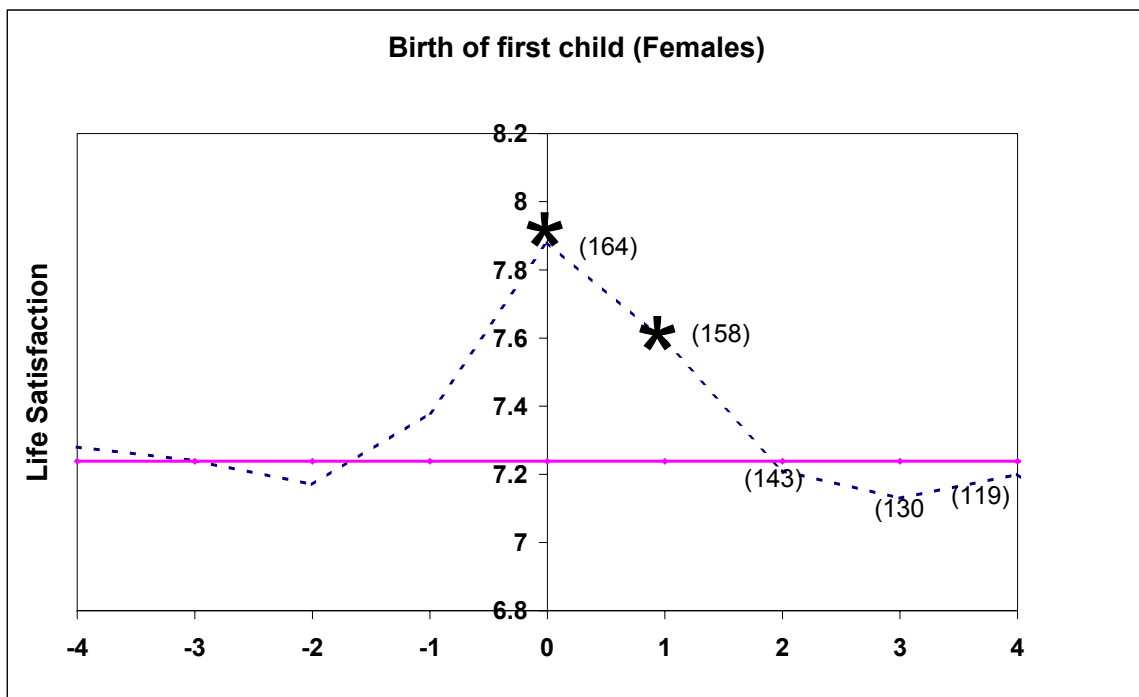
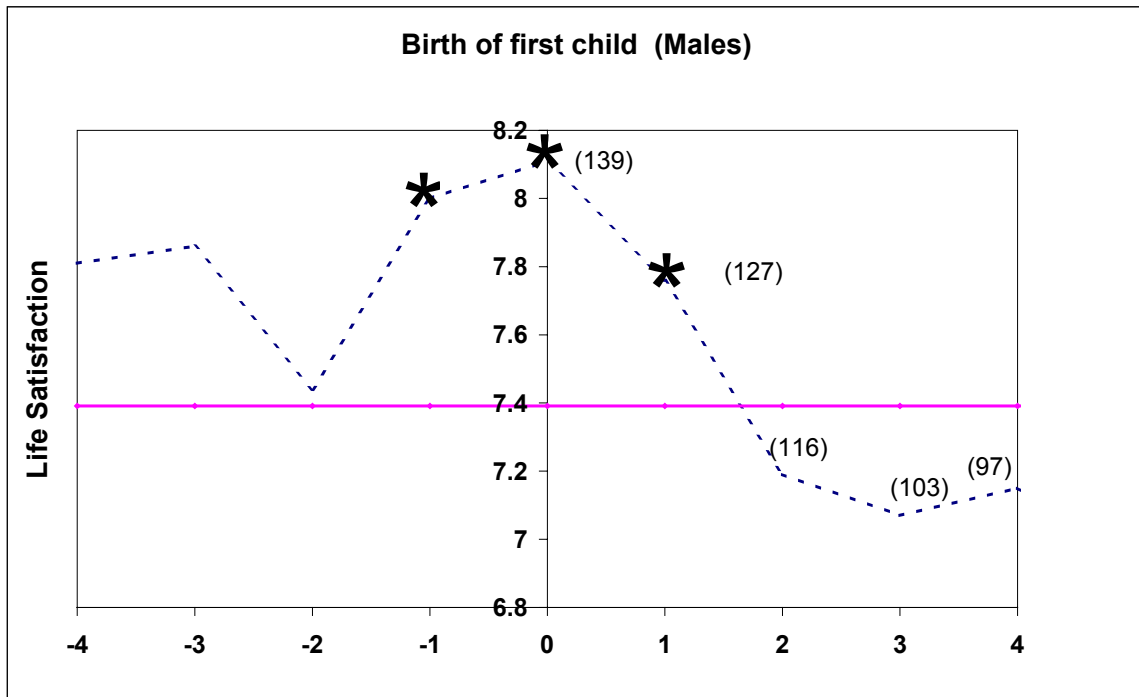


Figure 4. Unemployment and life satisfaction.

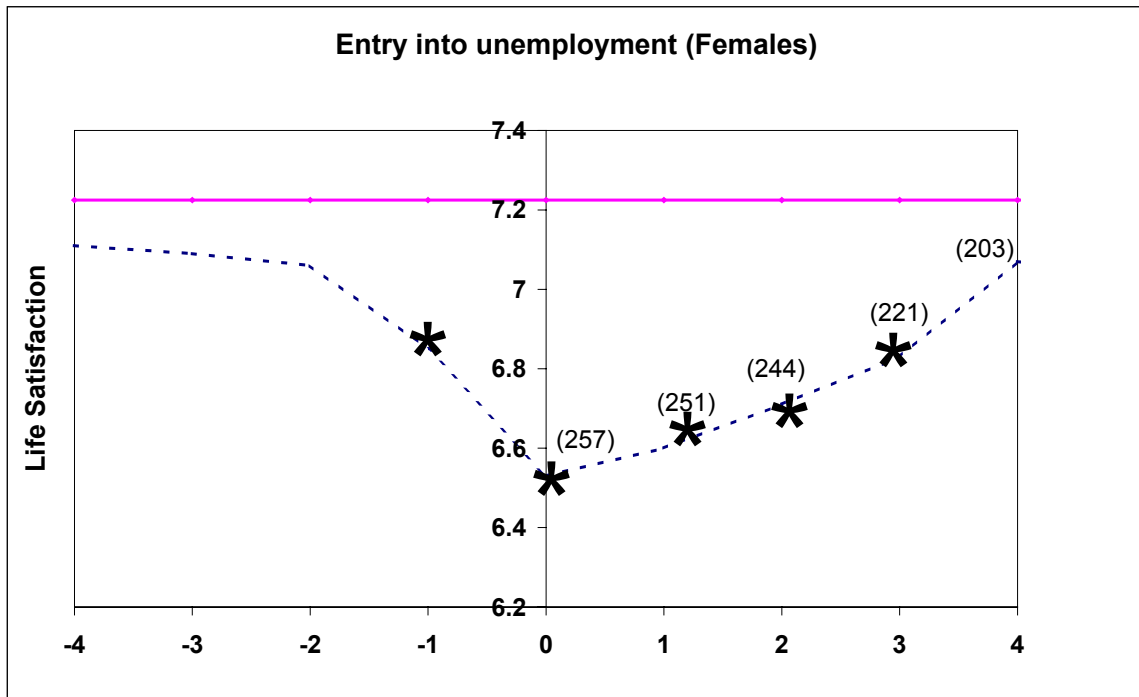
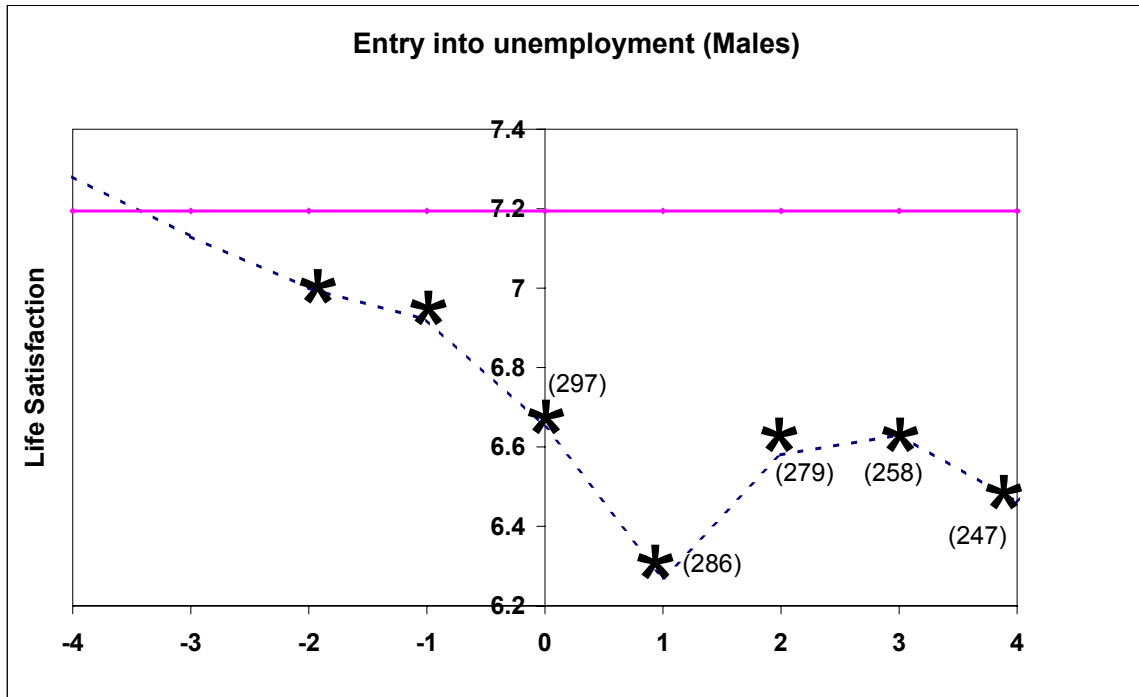
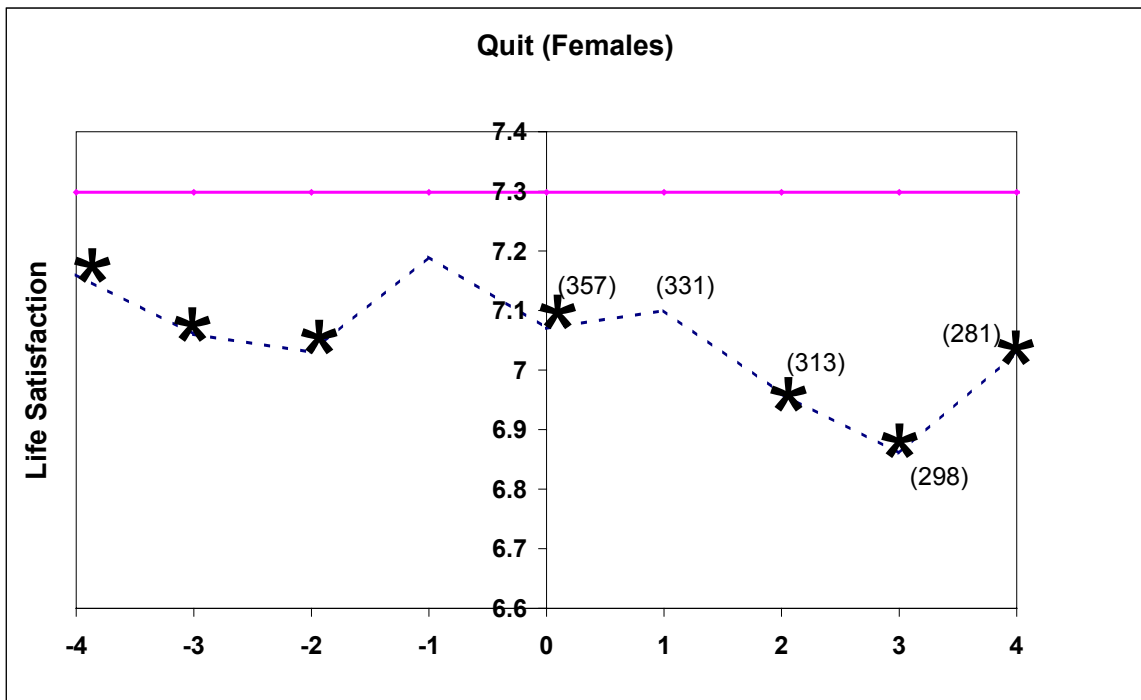
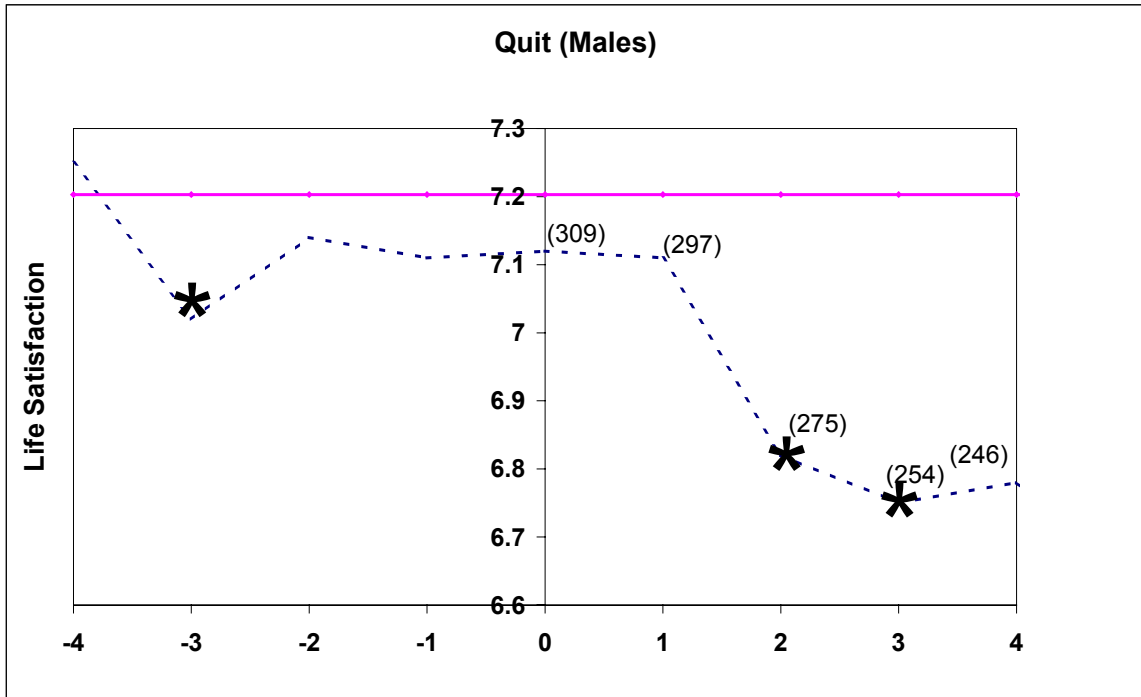


Figure 5. Quits and life satisfaction.





**Figure 6.** Layoffs and life satisfaction.

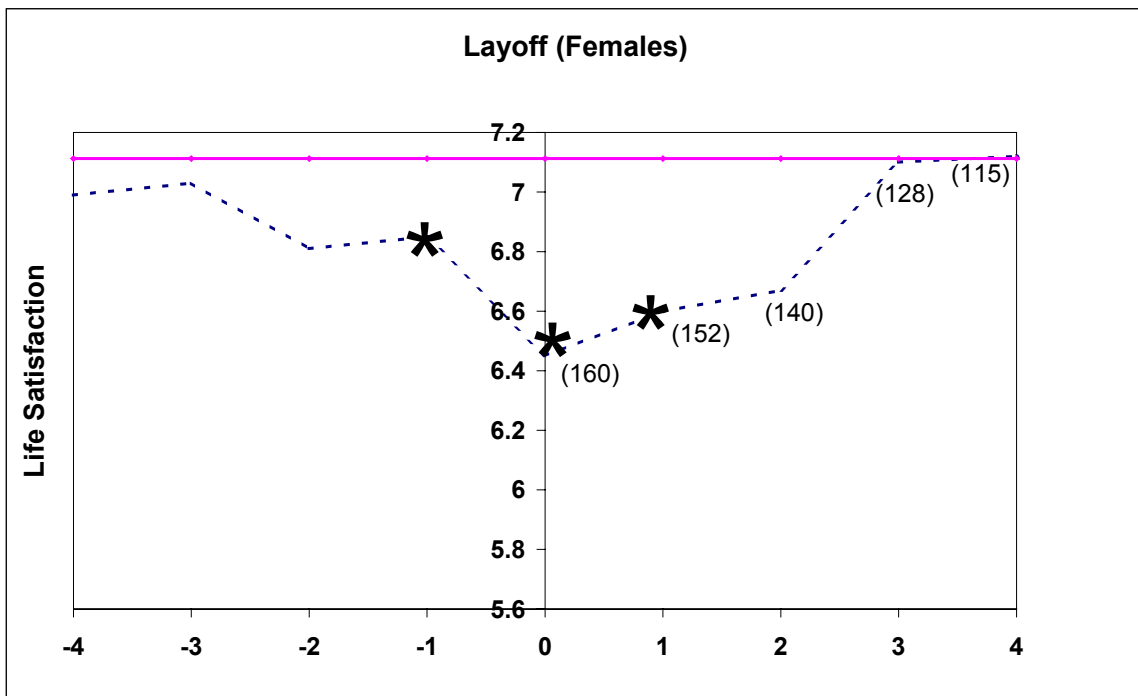
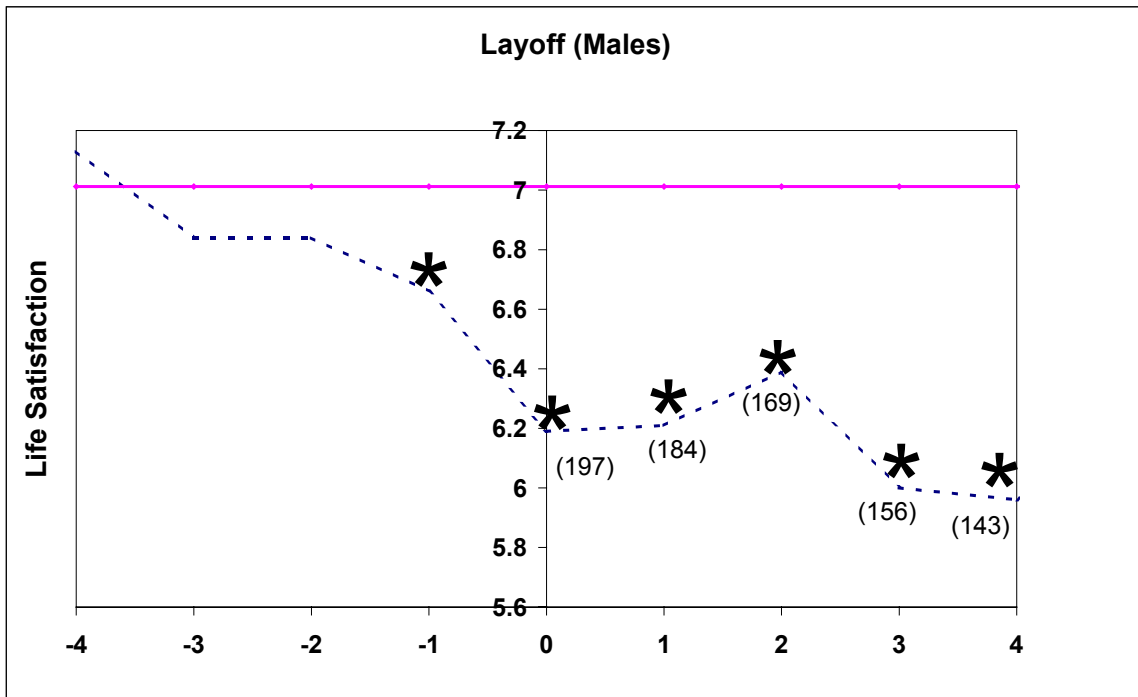


Table 1. The distribution of life satisfaction

Life satisfaction	Males		Females	
	Count	%	Count	%
0			57	0.4
1	39	0.3	43	0.3
2	116	1.0	127	1.0
3	265	2.3	275	2.1
4	392	3.3	430	3.3
5	1311	11.2	1541	11.8
6	1368	11.7	1510	11.5
7	2751	23.5	2917	22.3
8	3684	31.4	4148	31.6
9	1220	10.4	1391	10.6
10	578	4.9	671	5.1
Total	11724	100	13110	100

Table 2. Number of life event occurrences in the analysis sample of the GSOEP

	MALES	FEMALES
<i>Entry into unemployment (first)</i>	297	257
<i>Layoff</i>	197	160
<i>Quit</i>	309	357
<i>Marriage</i>	282	235
<i>Divorce</i>	66	93
<i>Birth of first child</i>	139	164

**Table 3.** Entry into Unemployment and Life Satisfaction (Ordered Probit)

	MALES		FEMALES	
	<i>LAGS</i>	<i>LEADS</i>	<i>LAGS</i>	<i>LEADS</i>
Constant	0.281 (1.47)	-0.127 (0.68)	0.123 (0.55)	-0.155 (1.04)
Baseline Satisfaction	0.426 (48.92)	0.552 (50.08)	0.323 (54.74)	0.441 (55.93)
<b>Current status</b>				
Employed	0.211 (2.24)		0.016 (0.73)	
Unemployed	-0.379 (3.88)		-0.354 (6.45)	
<b>Past/Future Unemployment</b>				
1-Year	-0.431 (2.94)	-0.225 (2.68)	-0.220 (1.65)	-0.242 (1.74)
2-Year	-0.345 (1.92)	-0.124 (1.53)	-0.336 (3.49)	-0.219 (2.28)
3-Year	-0.069 (0.49)	-0.007 (0.18)	0.015 (0.46)	-0.153 (0.59)
4-Year	-0.103 (1.27)	-0.083 (0.26)	0.003 (0.97)	-0.146 (1.25)
<b>Interactions</b>				
(Unemployed) $\times$ UN <sub>t-1</sub>	0.463 (3.81)		0.298 (1.81)	
(Unemployed) $\times$ UN <sub>t-2</sub>	0.274 (1.67)		0.544 (3.37)	
(Unemployed) $\times$ UN <sub>t-3</sub>	0.021 (0.65)		0.018 (0.09)	
(Unemployed) $\times$ UN <sub>t-4</sub>	0.079 (0.59)		0.174 (1.09)	
German national	0.118 (1.05)	-0.018 (0.42)	0.106 (4.59)	0.123 (3.85)
Education (years)	0.003 (0.66)	0.002 (1.12)	-0.001 (0.22)	0.002 (0.43)
Number of children	-0.056 (5.41)	-0.054 (4.46)	-0.048 (4.45)	0.056 (1.36)
Age	-0.041 (2.30)	-0.042 (2.51)	-0.032 (3.15)	-0.030 (3.25)
Age <sup>2</sup>	0.0005 (2.28)	0.0004 (2.47)	0.0004 (2.99)	0.0004 (1.76)
Household income/1000	0.038 (6.62)	0.039 (4.75)	0.039 (10.73)	0.041 (10.14)
Good health	0.413 (18.36)	0.448 (19.28)	0.383 (19.13)	0.342 (18.48)
<b>Marital status</b>				
Married	0.132 (3.51)	0.145 (2.49)	0.179 (4.38)	0.162 (2.62)
Separated	-0.362 (1.69)	-0.503 (2.32)	-0.093 (1.48)	-0.089 (0.56)
Divorced	-0.287 (2.53)	-0.226 (3.30)	0.136 (2.71)	0.124 (0.82)
<i>Log-likelihood</i>	-20388	-17664	-22029	-7021
<i>Person-year observations</i>	11724	10361	13110	4033

*Notes:* All regressions include, region (federal lands) and year dummies; Reference categories: out-of-the labour force, never married; Absolute t-values in parentheses.

**Table 4.** Lagged Entry into Unemployment and Life Satisfaction – High vs. Low Baseline (Ordered Probit)

	MALES		FEMALES	
	<i>High Baseline</i>	<i>Low Baseline</i>	<i>High Baseline</i>	<i>Low Baseline</i>
Constant	0.115 (0.47)	0.126 (1.36)	0.114 (0.63)	0.141 (1.49)
Baseline Satisfaction	0.538 (50.16)	0.452 (49.61)	0.337 (52.40)	0.282 (48.73)
<b>Current status</b>				
Employed	0.149 (1.85)	0.142 (1.12)	-0.182 (0.49)	0.070 (1.41)
Unemployed	-0.352 (3.46)	-0.126 (2.25)	-0.351 (4.21)	-0.316 (3.29)
<b>Entry into Unemployment</b>				
UN <sub>t-1</sub>	-0.510 (1.93)	-0.354 (2.11)	-0.270 (2.15)	-0.054 (1.68)
UN <sub>t-2</sub>	-0.551 (2.60)	0.125 (1.38)	-0.194 (2.52)	-0.132 (1.51)
UN <sub>t-3</sub>	-0.129 (2.62)	0.181 (1.54)	0.135 (0.89)	0.055 (1.43)
UN <sub>t-4</sub>	-0.273 (1.77)	0.178 (1.60)	0.053 (0.66)	0.078 (1.48)
<b>Interactions</b>				
Unemployed × UN <sub>t-1</sub>	0.142 (1.15)	0.491 (1.85)	0.275 (2.54)	0.082 (1.31)
Unemployed × UN <sub>t-2</sub>	0.469 (2.64)	-0.226 (0.67)	0.161 (0.17)	0.329 (1.86)
Unemployed × UN <sub>t-3</sub>	-0.173 (1.13)	-0.115 (1.12)	-0.129 (1.71)	0.118 (0.45)
Unemployed × UN <sub>t-4</sub>	-0.135 (1.08)	-0.052 (2.43)	0.116 (0.85)	0.256 (1.28)
<i>Log-likelihood</i>	-11189	-8586	-12501	-9812
<i>Person-year observations</i>	6858	4866	7603	5507

*Notes:* Other control variables as in Table 3; Absolute t-values in parentheses.

**Table 5.** Labour Market and Life Events and Life Satisfaction (Ordered probits)

		MALES				FEMALES			
		<i>LAGS</i>			<i>LEADS</i>	<i>LAGS</i>			<i>LEADS</i>
		<i>All</i>	<i>High baseline</i>	<i>Low baseline</i>		<i>All</i>	<i>High baseline</i>	<i>Low baseline</i>	
LAYOFF	Baseline	0.522	0.559	0.503	0.538	0.341	0.358	0.339	0.382
	Satisfaction	(52.16)	(54.79)	(50.37)	(51.35)	(55.68)	(52.61)	(55.71)	(53.84)
	1-Year	-0.341	-0.408	-0.355	-0.236	-0.147	-0.244	-0.135	-0.128
		(2.57)	(2.31)	(1.76)	(1.82)	(3.54)	(2.56)	(0.62)	(1.50)
	2-Year	-0.223	-0.349	-0.231	-0.153	-0.156	-0.118	0.140	-0.211
		(2.46)	(2.82)	(2.65)	(0.69)	(1.74)	(0.59)	(0.98)	(1.26)
	3-Year	-0.274	-0.569	-0.136	-0.153	0.126	0.135	0.251	0.159
	(2.51)	(2.72)	(0.68)	(1.81)	(1.03)	(1.54)	(1.42)	(0.78)	
	4-Year	-0.241	-0.218	-0.057	0.130	0.063	0.203	-0.056	0.120
		(2.65)	(2.03)	(0.07)	(0.62)	(0.55)	(1.20)	(0.72)	(0.38)
	<i>Log-likelihood</i>	-20601	-11215	-8532	-17753	-23038	-12437	-9826	-6899
	<i>Person-year obs.</i>	11724	6847	4877	10361	13110	7603	5507	4033
QUIT	Baseline	0.514	0.521	0.512	0.515	0.361	0.328	0.322	0.371
	Satisfaction	(50.26)	(52.60)	(49.57)	(50.11)	(53.49)	(51.37)	(53.63)	(54.35)
	1-Year	-0.059	-0.151	-0.118	-0.153	0.025	0.052	0.124	0.136
		(1.26)	(1.43)	(0.54)	(0.79)	(0.20)	(0.61)	(1.58)	(1.29)
	2-Year	-0.152	-0.183	-0.139	-0.116	-0.076	-0.065	0.124	-0.138
		(1.63)	(0.62)	(1.20)	(1.28)	(0.98)	(0.93)	(0.80)	(1.50)
	3-Year	-0.157	-0.258	-0.062	-0.043	-0.115	-0.073	0.078	0.077
	(2.72)	(2.23)	(0.93)	(0.55)	(1.31)	(0.67)	(0.82)	(0.59)	
	4-Year	-0.131	-0.150	-0.126	0.062	0.158	0.138	0.153	0.145
		(2.88)	(2.21)	(1.47)	(0.59)	(0.64)	(0.82)	(0.65)	(0.86)
	<i>Log-likelihood</i>	-20629	-11257	-8524	-17728	-23016	-12441	-9813	-6905
	<i>Person-year obs.</i>	11724	6847	4877	10361	13110	7603	5507	4033
MARRIAGE	Baseline	0.438	0.460	0.425	0.453	0.352	0.354	0.348	0.371
	Satisfaction	(49.67)	(50.45)	(50.13)	(49.61)	(51.50)	(50.36)	(51.11)	(48.63)
	1-Year	0.146	0.063	0.168	0.250	0.292	0.184	0.349	0.342
		(1.27)	(0.66)	(1.73)	(2.52)	(2.71)	(0.28)	(3.10)	(2.59)
	2-Year	0.126	0.133	0.248	0.182	0.216	0.222	0.401	0.159
		(1.68)	(1.54)	(1.75)	(0.99)	(2.52)	(2.36)	(3.46)	(1.53)
	3-Year	0.144	0.133	0.258	0.185	0.172	0.194	0.326	0.176
	(2.52)	(1.62)	(2.00)	(1.41)	(2.49)	(0.86)	(2.78)	(1.70)	
	4-Year	0.148	0.194	0.188	0.126	0.125	0.097	0.214	0.232
		(1.46)	(2.60)	(1.42)	(0.79)	(1.64)	(0.63)	(1.98)	(1.33)
	<i>Log-likelihood</i>	-20644	-11241	-8564	-2289	-23100	-12453	-9828	-1472
	<i>Person-year obs.</i>	11724	6847	4877	1362	13110	7603	5507	956

**Table 5 - continued**

		MALES				FEMALES			
		<i>LAGS</i>			<i>LEADS</i>	<i>LAGS</i>			<i>LEADS</i>
		<i>All</i>	<i>High baseline</i>	<i>Low baseline</i>		<i>All</i>	<i>High baseline</i>	<i>Low baseline</i>	
DIVORCE	Baseline	0.499	0.503	0.439	0.512	0.396	0.380	0.337	0.399
	Satisfaction	(50.57)	(48.62)	(49.28)	(51.78)	(50.42)	(49.31)	(51.18)	(51.55)
	1-Year	-0.145	-0.251	0.155	0.107	0.086	0.074	0.166	1.348
		(1.56)	(1.29)	(1.38)	(0.50)	(0.32)	(0.81)	(0.75)	(1.46)
	2-Year	-0.153	-0.149	-0.130	-0.486	-0.234	-0.245	-0.221	-0.436
		(1.48)	(1.60)	(0.46)	(2.66)	(2.25)	(2.03)	(1.62)	(2.68)
	3-Year	-0.150	-0.216	0.169	-0.149	-0.048	0.092	0.133	-0.403
	(1.53)	(1.39)	(0.58)	(0.58)	(1.29)	(1.44)	(1.51)	(2.30)	
	4-Year	-0.251	-0.158	0.147	-0.335	-0.045	-0.163	0.315	0.146
		(1.58)	(1.37)	(0.92)	(1.39)	(0.55)	(1.27)	(2.33)	(0.61)
	<i>Log-likelihood</i>	-20637	-11098	-8684	-16995	-23004	-12330	-9758	-19523
	<i>Person-year obs.</i>	11724	6847	4877	10059	13110	7603	5507	11316
BIRTH OF FIRST CHILD	Baseline	0.505	0.514	0.489	0.517	0.413	0.402	0.426	0.412
	Satisfaction	(51.64)	(51.23)	(50.68)	(52.94)	(50.42)	(49.38)	(50.39)	(50.52)
	1-Year	0.231	0.225	0.280	0.154	0.265	0.294	0.288	0.312
		(2.48)	(1.55)	(2.06)	(0.40)	(1.98)	(2.19)	(1.67)	(2.54)
	2-Year	-0.216	-0.237	-0.089	0.059	0.120	0.233	0.164	0.155
		(1.78)	(1.94)	(0.26)	(0.72)	(1.58)	(2.24)	(1.56)	(0.68)
	3-Year	0.144	-0.072	0.163	0.182	0.106	0.118	0.099	0.168
	(0.79)	(0.58)	(1.39)	(0.47)	(0.51)	(0.69)	(0.85)	(0.57)	
	4-Year	0.105	0.111	0.171	0.326	-0.034	-0.124	0.183	0.275
		(1.46)	(1.56)	(0.92)	(1.30)	(0.65)	(1.48)	(1.45)	(1.50)
	<i>Log-likelihood</i>	-20652	-11080	-8546	-10890	-23034	-12369	-9777	-11562
	<i>Person-year obs.</i>	11724	6847	4877	6173	13110	7603	5507	6610

*Notes:* Absolute t-values in parentheses; Other control variables as in Table 3; For the Lead regressions the sample is restricted to the risk group (currently full-time salaried employee for layoffs and quits; currently married for divorce; and currently no children for birth of first child).

**Table 6.** Summary of lead and lag effects

	<b>MALES</b>	<b>FEMALES</b>
<b>Entry into unemployment</b>	t-2, t+1, HB	t-2,t+2, HB
<b>Layoff</b>	t-4, t+3, HB	t-2, t+0, HB
<b>Quit</b>	t-4, t+0, HB	t-0, t+0, =
<b>Marriage</b>	t-3, t+1, LB	t-4, t+3, LB
<b>Divorce</b>	t-0, t+2, HB	t-2, t+3, LB
<b>First child</b>	t-2, t+0, LB	t-1, t+1, HB

Key: The first figure refers to the longest significant lag, and the second figure refers to the longest significant lead (both at the ten per cent level). The last entry shows whether it is high (HB) or low (LB) baseline individuals who are most affected by the lagged event in question.

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