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No 827

WARWICK ECONOMIC RESEARCH PAPERS

DEPARTMENT OF ECONOMICS

THE UNIVERSITY OF WARWICK

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October 31 2007

Keywords: Bereavement; damages; happiness; compensation; well-being; GHQ scores
JEL codes: D1, I3, I31, K0
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Acknowledgements: This paper has benefited from the comments of participants in a June 2007 Chicago Law School workshop and in university seminars at Birmingham, IOE London, LSE, Nottingham, Sheffield, Uppsala, and Warwick. For particularly helpful suggestions, we thank Matthew Adler, Valentina Corradi, Dan Gilbert, Amanda Goodall, Carol Graham, Jon Haidt, Dan Hamermesh, Peter Hammond, Peter Huang, Emily Jackson, Emanuel Kohlscheen, Nicola Lacey, George Loewenstein, Alan Neal, Dennis Novy, Eric Posner, Mark Stewart, Cass Sunstein, Ken Wallis, a referee, and an anonymous judge. We thank Alex Dobson for research assistance. The Economic and Social Research Council (ESRC) provided support through a research professorship to the first author. The British Household Panel Survey data were made available through the UK Data Archive. The data were originally collected by the ESRC Research Centre on Micro-social Change at the University of Essex, now incorporated within the Institute for Social and Economic Research. Neither the original collectors of the data nor the Archive bears any responsibility for the analyses or interpretations presented here.

Abstract

This paper studies the mental distress caused by bereavement. The largest emotional losses are from the death of a spouse; the second-worst in severity are the losses from the death of a child; the third-worst is the death of a parent. The paper explores how happiness regression equations might be used in tort cases to calculate compensatory damages for emotional harm and pain-and-suffering. We examine alternative well-being variables, discuss adaptation, consider the possibility that bereavement affects someone's marginal utility of income, and suggest a procedure for correcting for the endogeneity of income. Although the paper's contribution is methodological, and further research is needed, some illustrative compensation amounts are discussed.

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1. Introduction

This paper studies the impact upon a person's happiness of the death of a loved one -- especially a child, a spouse[1], or a parent. It uses longitudinal data on randomly sampled individuals. Although our results may be applicable in other ways in social science, we shall have in mind, for concreteness, one particular application. Thinking of a court setting the size of damages for emotional loss, we shall try to suggest ways to assign a financial value to the unhappiness caused by another's death. [2]

Our methods will not draw upon answers to complex questions about how intensely the person values (or valued) that loved one. Although it may go without saying, we wish to emphasise from the start that this kind of inquiry is a difficult and morally sensitive[3] one, and that -- perhaps hidden to lay readers by the later algebra and econometrics -- the results will rely on a simple form of averaging across different people. Whatever its methodological contribution, this paper will be some way from the last word on the topic.

A tort occurs where there is a breach of a duty fixed by civil law. If a tort is committed, the law allows a victim to claim compensation. The underlying principle is one of restitutio in integrum. The claimant should be restored, by the payment of compensatory damages, to their original position.

Many of the valuable things in life -- love, friendship, health -- come without dollar price-tags attached. If their financial value is to be judged, therefore, some method has to be found for assigning pecuniary amounts in situations that do not appear to have any intrinsically financial aspect. In most countries, it is judges who set

[1] We shall use the terms 'spouse' and 'partner' largely interchangeably. The latter includes those who are unmarried but co-habit.

[2] Terminology varies across countries. We shall not focus upon the distinction between the term 'hedonic damages' and the wording 'pain-and-suffering awards'. For simplicity we shall treat these as similar; the paper is about the general problem, namely, that of how to set a level of financial compensation for emotional loss. Within the United States, only a small number of states officially recognize the concept of hedonic damages.

damages, and they do so by using rules of thumb with conceptual foundations that are *ad hoc* (see, for example, pages 345-347 of Elliott and Quinn, 2005). From an economist's perspective, the law literature here can be difficult to understand. Elliott and Quinn (2005), for example, make the (to an economist confusing) statement: "it is not … easy to calculate the value of a lost limb, or permanent loss of general good health, and even if it were, money can never really compensate for such losses." [p.340]. Moreover, financial settlements can in practice be so small that their intellectual basis is perplexing. In West and Son versus Shephard (1964) in the United Kingdom, the claimant was a married woman who was 41 when severely injured. She was left paralysed in all limbs and unable to speak. A lump-sum award of £17,500 for loss of amenity (over and above a settlement for harm to her earnings) was upheld by the House of Lords. In today's terms, that is about 5% of the lifetime income for a successful professional white-collar worker. It seems implausible that many people would contentedly accept complete paralysis in return for a tiny pay rise.

Damages for the death of loved ones are generically low in some nations. In the United Kingdom, the Fatal Accidents Act 1976 provides a lump sum currently set at £10,000 damages for bereavement (that is, approximately $20,000 US dollars). This one-off payment "is designed to provide some compensation for the non-pecuniary losses associated with bereavement. It is only available to the husband or wife of the deceased, or, if the deceased was unmarried and a minor, to the parents. It does not give children a claim for the death of a parent." Elliott and Quinn, 2005 [p.350].

A UK judge and law professor sent us the following view:

> The area you are concerned with is hugely problematic for English lawyers - the US approach has been much more forceful on this kind of front.
>
> Expressions such as "diminution of quality of life" for a tort victim have been found for some time, but the notion of "loss of pleasure" of life is not the normal way in which lawyers in the English courts tend to talk about such heads of loss.
>
> Nevertheless, we do struggle with similar issues - particularly in jurisdictions such as that in which I sit (sex, race, disability, etc. discrimination claims) when it comes to awarding sums under the head of "injury to feelings". The appellate level courts have been consistent in stressing that this is "not a scientific exercise", and have tended to indicated broad "bands" within which awards should normally be made. Awards of a trivial or "tokenistic" nature are strongly discouraged - and the usual framework would consist of three bands (injury to be taken seriously, but not having that great an impact; mid-range injury to feelings, which would be the case where the particular impact on the individual is

[3] Tetlock (2003) discusses conditions under which human beings are willing to countenance taboo trade-offs.

shown to have been quite dramatic; and the top end, which is reserved for "outrageous" cases and is only rarely available to the judge).

Private communication dated May 2 2007, anonymous.

So what should courts do? Here we explore the empirical foundations of losses from bereavement, and, by using happiness regression equations, suggest methods for valuation.[4] The analysis could be viewed as an empirical analogue of Posner's (2001) call for a better understanding of the emotions and legal practice (earlier writing includes Kahan and Nussbaum 1996). [5] Posner and Sunstein (2005) discuss related ideas: the authors point out that in the US there are logical inconsistencies in how lives are valued in regulatory policy compared to in tort law; they note that the conventional wisdom in the United States legal profession is that damages for wrongful death can be arbitrary; and they argue that in some cases courts appear to misunderstand the nature of hedonic loss.

The paper's aim is to sketch an alternative to willingness-to-pay (WTP) methods in the setting of emotional damages. This is not because we think WTP necessarily lacks validity, although we do believe that answering questions, even probabilistically worded, like "what number of dollars would compensate you for the death of your daughter?", is likely to be hard for everyone, and morally offensive to many.

Our purpose is to see what numbers come out of an alternative method. In actual courtroom settings, it seems possible that a complementary mixture of methods might one day be used.

Later analysis uses regression equations in which a measure of subjective well-being is the dependent variable. Intuitively, our method can trace out a form of indifference curve between income and any kind of life event (such as bereavement). This is achieved, put loosely, by measuring how many happiness points are gained on

[4] There is a large medical and psychiatric literature on the impact of bereavement on people. We shall not attempt to summarize that research field, but a readable introduction can be found in Middleton et al (1997), and an important paper in Lehman et al (1993).

[5] Peter Hammond has pointed out to us that our approach is reminiscent of Robert Nozick's idea that interpersonal comparisons could be used to equate a criminal's incremental disutility brought about by the punishment with the victim's disutility due to the crime.

average by a higher income of X thousand dollars, and how many happiness points are lost by the death of a loved one, and then calculating the ratio of the two. Doing so provides a statistical measure of the marginal rate of substitution between the pleasure of money and the pain from the death of a loved one.

For pedagogical simplicity, we shall often treat the well-being data as though they were cardinal. This is formally unattractive, and can be altered without affecting the paper's main points, but it has the advantage that it allows regression-equation coefficients to be read off in a way that is easily interpreted. Moreover, there has been much recent econometric work, at the borders between psychology, epidemiology and economics, on happiness and well-being, where it has been found that the precise kinds of econometric estimators do not affect the key findings. Here we follow methods explained in sources such as Argyle (2001), Clark and Oswald (2002), Diener et al (1999), Di Tella et al (2001, 2003), Frey and Stutzer (2002), Oswald (1997), Van Praag and Ferrer-i-Carbonell (2004), and Van Praag and Baarsma (2005). Redoing our later equations using ordered logit estimators, for example, leaves the substance unchanged.

A central issue in the paper will be that of how much, if any, extra happiness is produced by a greater level of income. There has been a long debate on this topic. It is still not settled. Currently the consensus position is probably that there is a statistically significant but small positive effect. In other words, money buys some extra happiness, but not a large amount. Methodological approaches vary: Kahneman et al (2006) and Gardner and Oswald (2007) provide recent evidence from different ends of the spectrum. Clark et al (2006) surveys the literature. Later in the paper we attempt to contribute to ideas on how to instrument an income variable.

What should we believe about the extent of hedonic adaptation, that is, the idea that human beings habituate to tragedy? Bagenstos and Schlanger (2006) make an argument that the existence of such adaptation largely nullifies the case for compensatory damages. The concept of adaptation has a long history, valuably summarized in Frederick and Loewenstein (1999) and Fujita and Diener (2005), and

discussed conceptually in Menzel et al (2002), Rayo and Becker (2007), Ubel et al (2005), and Dolan and Kahneman (2007). There is good evidence for habituation in utility levels: for example, Lucas et al (2003). In its most extreme form this is known as set-point theory: whatever life throws at them people return to an original well-being point. [6] Brickman et al (1978) is sometimes interpreted as support for complete adaptation, although Easterlin et al (2006) and our own longitudinal work sheds doubt on the claim that heavily disabled people go back fully to their original level of well-being (Oswald and Powdthavee 2004).

The paper will not say a great deal about differences between ex ante and ex post. Our methods seem to apply even in a world where people are poor at affective forecasting (Gilbert et al 1998, Hsee and Hastie 2006). Nor shall we draw upon other non-subjective measures of well-being and distress such as suicide rates (for example as Stevenson and Wolfers 2006 do); there may be some, presumably small, bias in our results if suicide rates are immediately higher among bereaved relatives. Although our methods could also be applied to the field of employment law -- Huang and Moss 2006 contains an interesting discussion of related issues -- that avenue will not be pursued here.

2. Concepts

The idea of compensatory damages for emotional harm seems a natural one. Assume that a person's utility (or 'happiness') is negatively affected by the death of a loved one. A person's utility is an increasing function of their earned income, y, plus any non-labor income, i. There is some choice behaviour, a, that is taken optimally by the individual. Costs of action are a function c = c(a).

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[6] Set-point theory is not usually expressed formally, but might be thought about in the following way. Assume that, where t is continuous time, utility u is described by a differential equation du/dt = a dx/dt + b – cu, in which x is some variable that influences well-being and a,b,c are non-negative parameters. This equation has the solution

$$u(t) = ax(t) - \int_0^t cu(\tau)d\tau + K$$

where K is a constant determined partly by the size of the b parameter. The integral term in this equation means that the longer utility has been above its set point the lower must current utility be. In the short-term, a positive shock to x raises u. Then utility erodes back down to the long-run steady state, which is determined solely by parameters b and c. In steady-state equilibrium, x does not affect long-run utility, u* = b/c. There is complete adaptation.

Write the direct utility function and maximization problem, assuming a separable form, as:

Maximize $u = u(a, y + i) – c(a) – D$

and the indirect utility function then as

$v = v(y + i) – D = max\ u$

where the action, a, is set optimally at the argmax a* of u, and D stands for the emotional cost of a death.

In a tort case, in which some party has been negligent, there may exist a sum of money, s, that satisfies for the victim the restitutio in integrum requirement that

$v(y + i + s) – D = v(y + i)$.

utility after the death and the compensation = utility without the death occurring

Given monotonicity and concavity of the utility function, the appropriate s is an increasing, convex function of D.

The financial sum s can be thought of as redressing the disutility consequences of D, namely, as the correct amount of emotional damages in a tort case in which the aim is to return the bereaved victim to the original utility level. In the harsh language of microeconomic theory, a person receiving s is indifferent between whether their loved one lived or died. This has, even to us, an inhuman sound[7] to it; perhaps future work will have to get to the bottom of why, but this paper will not. The remainder of the paper is concerned with methods that attempt to assess the appropriate value of s.

3. Empirics

Empirically, a key difficulty is that of deciding the extent of the emotional hurt caused to a person by the death of a loved one. Ideally a statistical inquiry has to have a number of features:

(i) individuals in a sample must be followed over a reasonably long period, so that information on them is available before bereavement and afterwards;

(ii) the bad life event must be exogenous;

(iii) there needs to be a control group of individuals unaffected by the event;

(iv) the sample should be reasonably representative of the adult population;

(v) a set of control variables, including income, should be available in the data set, so that confounding influences can be differenced out.

To our knowledge, no econometric study of this type on the emotional losses of various kinds of death of loved ones has been published (some, including Clark et al 2004 and Riis et al 2005, and the seminal panel-data paper on unemployment by Winkelmann and Winkelmann 1998, look at other life events, including death of a spouse, and do satisfy a number of these requirements). Powdthavee (2005a,b; 2007) studies crime, joblessness, and friendships. Ferrer-i-Carbonell and Van Praag (2002) and Groot et al (2004) explore the negative well-being effect of various diseases. Oswald and Powdthavee (2004) examine happiness levels after disability.

The source used in the paper is the British Household Panel Survey (BHPS). This is a nationally representative sample of households, which contains over 10,000 adult individuals, conducted between September and Christmas of each year from 1991 (see Taylor et al, 2002). Respondents are interviewed in successive waves; households who move to a new residence are interviewed at their new location; if an individual splits off from the original household, the adult members of their new household are also interviewed. Children are interviewed once they reach 11 years old (though we later drop the children from our sample). Since its inception, BHPS has remained representative of Britain's population.

[7] Cooter (2003) refers to our problem as the search for a 'repugnant formula' and argues that in some legal settings there are things -- such as dollars and the life of a child -- that are incommensurable: "the loss of a child is an extreme example of incompensable losses" p.1098.

This paper draws upon individual-level data from eight of the years: Waves 2-5, Wave 9, Wave 11, and Wave 14, which were collected between 1992 and 2005[8]. In these survey waves, which are the ones that provide detailed information on bereavement, the BHPS asks randomly selected adult individuals the same question about important events that happened to them or their family members in the last year:

Survey question:

"*Would you please tell me anything that has happened to you (or your family) which has stood out as important? This might be things you've done, or things that have been of interest or concern; just whatever comes to mind as important to you. Also state whether the event happened to you, one of your family member, or someone else from outside the household.*"

This is asked as an open-ended question, so the answers could be anything from ill health to getting a job promotion. Around 6% of the sample answered "*death*" as one of the major events that took place in the previous year. Respondents were also asked to state whose death it was. The answers to this question ranged from "*child*" to "*friend*". These are the data used in the paper.

As far as we are aware, the only other paper on well-being to use these responses from BHPS -- that is, the open-ended questions -- is innovative work by Ballas and Dorling (2007). Their methods and main purpose are different from ours and the respective projects began independently. Nevertheless, although the authors are not concerned with the calculation of emotional damages, Ballas and Dorling (2007) do note some negative effects from the death variables (using a form of mental well-being equation, namely one based on a sub-question from the twelve on the GHQ list of questions), and their first draft slightly pre-dated our own. More broadly, it is known in the happiness literature that spousal bereavement has large negative consequences: see for instance Diener et al (1999), Easterlin (2003) and Blanchflower and Oswald (2004). To the best of our knowledge, the published regression-equation happiness literature has not examined the influence of child death and other

[8]The wave 2 data were collected between late 1991 and early 1992. The wave 3 data were collected between late

bereavements of this kind. There is, however, a relevant psychiatric literature, such as Li et al (2005). There is also some evidence that marital well-being falls after the death of a child in the family: Broman et al (1996).

The analysis will use two measures of mental well-being. One is a psychological distress score (from 0 to 12). The other is a life-satisfaction score (from 1 to 7).

The BHPS contains a mental health measure, a General Health Questionnaire (GHQ) score. This has been used internationally by medical researchers and other investigators as an indicator of psychological strain or stress. Recent applications of GHQ include Cardozo et al (2000), Clark and Oswald (1994, 2002), Martikainen et al (2003), Pevalin and Ermisch (2004), Robinson et al (2004), and Shields and Wheatley Price (2005).

A GHQ score is one of the most commonly adopted questionnaire-based methods of assessing psychological well-being. It amalgamates answers to the following list of twelve questions:

Have you recently:

1. *Been able to concentrate on whatever you are doing?*
2. *Lost much sleep over worry?*
3. *Felt that you are playing a useful part in things?*
4. *Felt capable of making decisions about things?*
5. *Felt constantly under strain?*
6. *Felt you could not overcome your difficulties?*
7. *Been able to enjoy your normal day-to-day activities?*
8. *Been able to face up to your problems?*
9. *Been feeling unhappy and depressed?*
10. *Been losing confidence in yourself?*
11. *Been thinking of yourself as a worthless person?*
12. *Been feeling reasonably happy all things considered?*

1993 and early 1994, and so on.

Responses are made on a four-point scale of frequency of feeling in relation to a person's usual state: they are "Not at all", "No more than usual", "Rather more than usual", and "Much more than usual".

As a measure of mental strain, the paper takes a simple summation. It is coded here so people answer with respect to usual and the responses with the two lowest well-being values score 1 and those with the two higher well-being value scores 0. Put exactly, this is the BHPS variable HLGHQ2: it converts valid answers to questions wGHQA to wGHQL to a single scale by recoding 1 and 2 values on individual variables to 0, and 3 and 4 values to 1, giving a scale running from 0 (the least distressed) to 12 (the most distressed). Medical opinion is that normal individuals score around 1 or 2 on the GHQ measure. Numbers near 12 are rare and correspond to clinical depression. For reasons not fully understood, GHQ scores are trending slightly up through time in Britain (Oswald and Powdthavee 2007), and we adjust for that in the later analysis.

In some cases the paper uses as an alternative a life satisfaction question. This form has been widely used in the happiness literature. The wording in the BHPS survey is:

"All things considered, how satisfied or dissatisfied are you with your life overall using a 1-7 scale?"

Results

The data set provides information on more than 2000 bereavements. Table 1 summarizes the occurrence of the different deaths in the data.

As might be anticipated, the death of a loved one has psychological consequences. Figure 1 charts the before-and-after mental distress levels, on a 0 to 12 GHQ scale, of those who suffer the death of a child, a spousal partner, or a parent[9]. The two time periods depicted are for the year before the person died and the year of bereavement (so these individuals reported that there had been a death in the 12 months since they

were last interviewed). Figure 1 is for 1992 to 1995 alone, because this period gives us consecutive observations on bereavements. The Figure covers those in BHPS who lost a loved one in any of those years in the data set. As would be expected, child deaths are relatively unusual.

Bereavement is painful. Figure 1 shows that psychological distress (i.e. GHQ-12) is initially around 1.3 among those who will lose a child, and slightly below 3 among those who go on to lose a partner in the next year. Mental distress then rises abruptly to 3.5 in the actual year that the person reports having had a child die, and to 6.3 if the person lost a spousal partner. A smaller rise is discernible among those who had a parent die. Ideally we would exploit data on the circumstances of the bereavement, including to what extent it was a premature death, but that information is not available in the BHPS data set.

To allow the extent of any hedonic adaptation to be explored, Figures 2 and 3 extend the graphs for a further year. These also broaden the categories of bereavement. They plot separately the mean psychological distress scores of those in the sample who either lost a mother (N = 120), father (N = 119), a sibling (N = 80), or a friend (N = 114). As can be seen in Figures 2 and 3, there is evidence of a rise in the mean levels of psychological distress after all types of death. For example, the mean level of individual GHQ mental strain is 2.5 in the year before losing a father. In the actual year of their father's death, a person's psychological distress increases to approximately 3.2. One year later, however, psychological distress has fallen again to around 2.5. Similar patterns of apparent hedonic adaptation are seen for other types of death. For spousal bereavement, these graphs reinforce the earlier results of Clark et al (2004), Easterlin (2003), and Gardner and Oswald (2006). Other types of death have not, to our knowledge, been systematically studied (though, as explained, Ballas and Dorling is in part a counter-example).

We now turn to regression equations.

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[9] For simplicity, we only used wave 2 to wave 5 (and so ignore the discontinued waves, i.e. waves 9, 11, and 14) in our longitudinal plots of psychological distress for those who lost someone to death.

Table 2 presents cross-section life satisfaction equations. We treat bereavement as exogenous (partly because it seems reasonable to do so, and partly because it is difficult to know how to instrument for others' deaths). Assuming cardinality in the 7-point-scale life satisfaction scores (1 = very dissatisfied, …, 7 = very satisfied), the first column includes deaths as the only independent variables in the least squares regression. The econometric analysis is restricted to those of working age (that is, of ages16-65). This is to reduce the risk of, say, anticipated natural death of children and parents.

The coefficient on death of father is -0.249 in the first column of Table 2, which implies that the bereavement loss is approximately a quarter of a life satisfaction point. Its robust standard error is 0.106, so the null of zero can be rejected at the 5% level. The coefficients on death of mother and spousal partner are -0.268 and -0.894, respectively. Both coefficients are statistically well-determined at the 5% level. On the other hand, in column 1 of Table 2 the coefficients on death of a child, sibling, and friend are not statistically significantly different from zero. It should be noted, nevertheless, that the coefficient on child-death in the first column of Table 2 is large in an absolute sense at -0.395. Later in the paper, in larger samples, this effect becomes statistically significant.

Column 2 of Table 2 increases the number of independent variables. It controls for gender, age, age-squared, household income per capita (in £10,000), marital status, employment status, education, household size, number of children at different ages, and homeownership status. The R-squared values remain modest, at less than 10% of the variance explained, which suggests that much remains to be discovered, perhaps about the role of (here unobservable) personalities. Income is deflated by the consumer price index. All £ values in the paper are real, and expressed in 1996-pounds[10]. Compared to column 1, the coefficients in column 2 of Table 2 on the death-of-a-mother and death-of-a-father variables decline a little in size, whilst there is a slightly bigger drop in the coefficient size on death of partner from -0.894 to -0.670.

[10] Currently, £1 = approximately $2.

In column 2 of Table 2, the coefficient on real household income is 0.105, with a statistically well-determined effect (its standard error is 0.015). This makes it possible to work out how much income would be required to offset the distress from an event such as bereavement. To compensate for the loss of a mother, the necessary sum here = £20,000 per annum. To compensate for a loss of partner = £64,000 per annum. To compensate for the loss of a child = £41,000 per annum.

A difficulty here is that income may be endogenous. In column 3 of Table 2, we instrument income by income measured at t-1. The IV coefficient on income is 0.163, and is statistically significant at the 1% level. Here, to compensate for a loss of mother = £10,000 per annum. To compensate for a loss of partner = £36,000 per annum. To compensate for a loss of a child = £34,000 per annum. These numbers are smaller than before because the estimated marginal effect of income has increased. However, lagged income is arguably not ideal as an instrumental variable, and later in the paper we consider alternatives.

The last column of Table 2 includes instead a measure of average income over time within the life satisfaction regression. The average income over time represents a more permanent measure of household income. The coefficient on average income over time is 0.202, with a standard error of 0.023. Using this coefficient, we need approximately £10,000 per annum to compensate for a loss of mother; £32,000 per annum to compensate for a loss of partner; £21,000 per annum for a child.

Life satisfaction data are collected in the BHPS in Wave 7 and intermittently afterwards. On this measure of well-being, does bereavement have a long-lasting effect? Table 3 estimates life satisfaction equations as a function of events that happened long before. In particular, the logic of Table 3 is to see whether, controlling for deaths in the immediate period, there is any scarring effect on those who had experienced death prior to wave 7. Mostly such scarring seems to disappear (although some small negative effects can be seen, insignificantly different from zero). There are two exceptions: long-dead friends carry a long-term happiness penalty; a long-dead child carries a small long-term happiness gain. We do not feel qualified to speculate on psychological explanations for these patterns.

Using data on GHQ psychological distress, Table 4 explores the consequences of the death of loved ones upon a different measure of well-being. Estimation of GHQ equations goes back to the ordered estimators of Clark and Oswald (1994), and our equation form is similar in structure, but they did not have controls for deaths of different loved ones. The dependent variable here is GHQ-12 measured cardinally (where 12 = worst possible psychological well-being).

Table 4 has a larger sample than the previous regression tables. In column 1 of Table 4, only death variables are included in the psychological distress equation. Now, all the death dummies enter the distress equation with positive and statistically significant coefficients. The largest effect comes from death of partner, with a coefficient size of 3.498 and a standard error of 0.406. Next is the effect of a child's death; the coefficient is 2.074, with a standard error of 0.552. The smallest effect on psychological distress comes from death of sibling; the coefficient is 0.562 and the standard error 0.209.

Column 2 of Table 4 moves on to a full specification. Most coefficients on death are relatively little-changed. The coefficient on income is -0.151, with a standard error of 0.022. Ordinary least squares estimates imply the following: To compensate for death of father = £78,000 per annum; death of mother = £61,000 per annum; death of partner = £206,000 per annum; death of a sibling = £32,000 per annum; death of a child = £137,000 per annum; death of a friend = £51,000 per annum.

Column 3 estimates an individual random effects model of psychological distress that includes death variables as the independent variables. The coefficient on income is -0.099, and is statistically significant at the 1% level. To compensate for death of father = £101,000 per annum; death of mother = £87,000 per annum; death of partner = £286,000 per annum; death of a sibling = £39,000 per annum; death of child = £221,000 per annum; death of friend = £55,000 per annum. Column 4 of Table 4 presents IV-RE estimates, using income at t-1 to instrument for the current real income. The coefficient of income is -0.171, with a standard error of 0.035. Now to compensate for death of father = £55,000 per annum; death of mother = £59,000 per annum; death of partner = £172,000 per annum; death of a sibling = £20,000 per annum; death of child = £141,000 per annum; death of friend = £38,000 per annum.

Column 5 includes mean income over time (i.e. permanent income) into an RE regression. The coefficient on mean income over time is -0.247, with a standard error of 0.032. To compensate for death of father = £40,000 per annum; death of mother = £35,000 per annum; death of partner = £115,000 per annum; death of a sibling = £16,000 per annum; death of child = £89,000 per annum; death of friend = £22,000 per annum.

Column 6 of Table 4 reports fixed effects estimates. These can allow for genetic and unchanging personality variables. Most of the coefficients on death variables remain similar in size. For example, the coefficient on death of mother is 0.861 in RE and 0.877 in FE; the coefficient on death of partner is 2.834 in RE and 2.752 in FE. However, income's coefficient is not very precisely determined.

Some readers of earlier drafts of this paper -- we thank especially George Loewenstein -- were concerned about the possibility that bereavement and income might not appear in a separable way in a well-being equation. This is an important issue. If the marginal utility of income is affected by undergoing the loss of a loved one, the calculations done above are incorrect (or at least incomplete). We spent some time examining different functional forms. However, we could not find strong evidence for the idea that bereaved people have a different marginal utility of income. Appendix A sets out one illustrative test that shows it is not possible to reject the null hypothesis that all interaction terms have coefficients of zero. Could this merely be for the reason that such tests lack power because of relatively small sample sizes on bereavements? Our experiments suggested not. For instance, when equations were estimated for the sub-sample of people who had suffered bereavement, the point estimate of their marginal utility of income was similar to that for the much larger sub-sample of people who did not experience bereavement. Thus it does not appear that there are problems caused by a low-power test. Instead, the data suggest it is reasonable simplification to assume that well-being can be written as an additively separable linear equation.

Table 5 presents fixed-effects estimates for each gender.

Men suffer a significantly smaller blow from deaths than women (with the exception of losing a partner, which seems to have a symmetrical impact on psychological distress on both men and women). This is consistent with some medical evidence that hospitalization rates for mental illness are higher, after child death, among women: Li et al (2005). When a father dies, for example, women here experience on average a worsening of 1.127 GHQ points; men experience a worsening by 0.534 points. The death of a child raises a woman's psychological distress by 2.169 GHQ points. A man's is raised by 1.315 points. Income's coefficient is not significantly different from zero in these Table 5 FE equations, however.

It should be noted that, with the exception of the male-female divide, this paper has not greatly explored the case of disaggregated valuation of bereavement losses. Following the ideas of Sunstein (2004), there seems scope for a fuller analysis. Smith et al (2005) conclude that wealth buffers the size of the drop in happiness caused by a decline in health; it is possible that richer people are affected less by bereavement shocks, but Appendix A does not find empirical support for that.

The sizes of possible payments for emotional damages are documented, in summary form, in Table 6.

A potential weakness of most of the regression equations estimated above is that income is arguably endogenously determined. This raises the standard identification problem: if happiness depends on income, and income is itself a function of happiness, then the parameter estimates are biased and inconsistent. To solve this, a valid instrument for income is needed. The use of lagged income is open to objections. Here we draw upon two instruments not used before. First, the British Household Panel Survey asks their interviewers to try to see the actual payslip of the survey respondent. Where this is achieved, the information about income is likely to be more accurate. However, there is no reason to expect happiness itself to be affected by whether or not the interviewer sees the payslip. Hence we use this -- a dummy variable for the observation of the payslip -- as an instrument for income. Second, although income in the paper is deflated by a consumer price index, there is information in Britain on regional house prices. We employ this variable, lagged at t-

1, as a further instrument for income; one rationale is that high house prices eventually act to raise wages in a region.

We found that instrumented personal income then works strongly in a well-being equation. Appendix B gives the details. It shows that both instrumental variables enter positively, with well-determined standard errors, in a log-of-personal-income equation. An over-identification test suggests that the instruments are valid.

Table 7 thus reports both life-satisfaction and mental-distress regression equations in which the log level of real personal income is treated as an endogenous independent variable. The coefficients on the death variables are approximately as before. However, these instrumented estimates -- particularly in columns 2, 4 and 6 of Table 7 -- produce much better-defined coefficients on income. Moreover, instrumenting income increases the size of the estimated effect, by between 5-fold and 10-fold. In the life-satisfaction equations in Table 7, for example, the coefficient on log income rises between columns 1 and 2 from 0.091 to 0.698. In the fixed-effects GHQ distress equations, instrumenting the income variable produces in column 6 a coefficient of -0.818 with a standard error of 0.144. By contrast, without the instrumenting the income coefficient is small. This suggests that the bias under OLS is negative: happy people may work less hard to earn income so that, in simple correlations, where no correction for simultaneity is done, this can produce the illusion that money does not buy much happiness.

Calculating the size of necessary hedonic compensation per-annum amounts once again, gives, in this case using the GHQ equations from Table 7, for the average individual a set of amounts listed in Table 8. Despite the change in detailed method in Table 7, these numbers are not too different from those earlier in the paper.

Because the paper's aim is principally to lay out a method of analysis, we shall not here attempt to adjudicate between the compensation amounts calculated under different econometric specifications. Many economists, however, would be likely to put most reliance on equations in which person fixed-effects were accounted for, and in which the income variable was instrumented.

4. Conclusions

This paper studies a class of extreme negative shocks to utility -- how people are affected by different kinds of deaths, and especially the death of a spouse, a child, and a parent. We are conscious that this is a complex, emotive area.

By estimating mental well-being equations, in a way that averages across the individuals in our sample, the paper draws five conclusions.

First, bereavement causes substantial mental distress. The rank order of emotional severity is (starting with the greatest): death of a spouse; death of a child; death of a parent. Second, our data suggest that, in response to bereavement, women suffer larger falls in happiness than men. The death of a child, for example, here worsens women's mental well-being by 2.2 GHQ points, compared to 1.3 points for men.[11] Third, we find signs of hedonic adaptation to six kinds of bereavement (spouse; child; mother; father; sibling; friend). Because of gaps in the collection of the deaths data, however, we lack a large enough number of consecutive years to allow us to study adaptation in a systematic way. This is an important arena for further inquiry. Fourth, the paper suggests that happiness equations could be used in a tort setting to calculate emotional damages[12]. Some illustrative compensation amounts are given. Using GHQ mental distress as the measure of well-being, the hedonic compensation annual amount *in the first year* for the death of a child might be of the order of £100,000 ($200,000). However, in our judgement more research is needed, on other countries and data sets, before courts could implement such methods. The paper's contribution is methodological; we believe these ideas should, for the time being, be treated cautiously. Fifth, instrumenting the income variable raises its coefficient in well-being regression equations. This issue is of more than technical interest. The

[11] These are large effects from bereavement -- approximately equal in size to one standard-deviation in measured well-being. They lie on a GHQ distress scale where the mean is approximately 2 and the range of possible psychological well-being levels is between zero and 12 points.

[12] The paper does not attempt to contribute to ideas on deterrence, and, with some justification, a referee has criticized us for that. Issues of deterrence certainly matter, although Sunstein et al (2000) raises interesting difficulties with whether human beings actually want efficient deterrence. How deterrence and restitutio in integrum ought to interact -- as discussed by Ireland (2001) -- remains incompletely understood. It is likely that future work will have to tackle this.

size of the parameter has a fundamental bearing on the appropriate level of compensation for hedonic harm.

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Table 1: Data on Deaths of Loved Ones in the British Household Panel Study Between 1992 and 2005

	For GHQ-12 analysis		For life satisfaction analysis	
Death	***n***	**% of sample**	***n***	**% of sample**
Child	120	0.14	49	0.17
Partner	278	0.32	89	0.31
Father	521	0.60	148	0.52
Mother	700	0.81	300	1.06
Sibling	430	0.50	161	0.57
Friend	455	0.53	139	0.49
N	**86,623**		**28,418**	

Note: The figures are taken from people answering 'death' in the life events question: "*Would you please tell me anything that has happened to you (or your family) in the previous year which has stood out as important? This might be things you've done, or things that have been of interest or concern; just whatever comes to mind as important to you*." The question was asked only intermittently. The GHQ mental distress questions were asked in every year of the sample. The life satisfaction question was first introduced in wave 6 of the BHPS. It was then dropped for wave 11, but reintroduced again for wave 12. This limits what can be done in any consecutive-year analysis.

Means and standard deviations in the later analysis:

Mean of life satisfaction = 5.23
(SD = 1.31 (overall), 0.78 (within)).

Mean of GHQ-12 psychological distress = 1.90
(SD = 2.94 (overall), 2.11 (within)).

Table 2: Life-Satisfaction Regression Equations with Death Variables

	OLS	OLS	IV	OLS
Life event				
Death father	-0.249**	-0.157	-0.182	-0.170
	(0.106)	(0.105)	(0.127)	(0.105)
Death mother	-0.268***	-0.214***	-0.163*	-0.213***
	(0.080)	(0.078)	(0.084)	(0.078)
Death partner	-0.894***	-0.670***	-0.590**	-0.661***
	(0.242)	(0.250)	(0.275)	(0.251)
Death sibling	0.014	-0.051	0.117	-0.047
	(0.168)	(0.167)	(0.166)	(0.167)
Death child	-0.395	-0.430*	-0.556*	-0.430*
	(0.245)	(0.242)	(0.287)	(0.240)
Death friend	0.096	0.090	0.131	0.110
	(0.119)	(0.116)	(0.130)	(0.115)
Personal & household characteristics				
Male		-0.046**	-0.046**	-0.051***
		(0.019)	(0.021)	(0.019)
Age		-0.066***	-0.073***	-0.070***
		(0.006)	(0.007)	(0.006)
Age-sq/100		0.075***	0.083***	0.079***
		(0.007)	(0.008)	(0.007)
Real household income per capita (£10k)		0.105***	0.163***	0.004
		(0.015)	(0.033)	(0.015)
Mean income over time				0.202***
				(0.023)
Living as couple		-0.152***	-0.163***	-0.151***
		(0.028)	(0.031)	(0.028)
Widowed		-0.497***	-0.426***	-0.474***
		(0.077)	(0.082)	(0.077)
Divorced		-0.664***	-0.593***	-0.642***
		(0.047)	(0.050)	(0.047)
Separated		-0.814***	-0.787***	-0.789***
		(0.070)	(0.082)	(0.071)
Single		-0.454***	-0.437***	-0.452***
		(0.033)	(0.036)	(0.033)
Unemployed		-0.447***	-0.410***	-0.424***
		(0.054)	(0.065)	(0.054)
Retired		0.030	0.023	0.023
		(0.047)	(0.052)	(0.047)
Family care		-0.123***	-0.104**	-0.107***
		(0.039)	(0.043)	(0.039)
Student		0.084**	0.114**	0.074*
		(0.042)	(0.053)	(0.042)
Education: A-level		0.077***	0.067**	0.071**
		(0.028)	(0.031)	(0.028)
Education: University		0.091***	0.072**	0.069**
		(0.028)	(0.032)	(0.028)
Household size		0.013	0.013	0.021**
		(0.011)	(0.012)	(0.011)
Number of children (age 0-2)		0.030	0.063*	0.019
		(0.031)	(0.035)	(0.031)
Number of children (age 3-4)		0.031	0.071**	0.025
		(0.031)	(0.035)	(0.031)
Number of children (age 5-11)		-0.033*	-0.004	-0.025
		(0.017)	(0.020)	(0.017)
Number of children (age 12-15)		-0.049**	-0.052**	-0.037*
		(0.022)	(0.025)	(0.022)
Number of children (age 16-18)		-0.047	-0.068	-0.046

		(0.038)	(0.046)	(0.038)
Home ownership		0.183***	0.167***	0.171***
		(0.026)	(0.028)	(0.026)
Constant	5.164***	6.475***	6.528***	6.418***
	(0.010)	(0.125)	(0.146)	(0.126)
Year dummies	Yes	Yes	Yes	Yes
R-sq	0.002	0.059	0.052	0.063
N	23417	22927	18113	22927

* p<0.1, ** p<0.05, *** p<0.001

Note: Here the data are taken from waves 9, 11, and 14. The 7-point-scale life-satisfaction question was asked first in Wave 7 (that is, in 1997), with 1 = very dissatisfied with life, and 7 = very satisfied with life. OLS stands for ordinary least squares; IV is instrumental variables. Here the instrument for income is lagged income. Standard errors are in parentheses.

A dummy variable such as "Death father" means that the interviewee's father died during the 12 month period prior to interview.

The income variable, here and in later tables, is real income. It has been deflated by the consumer price index (CPI).

Table 3: Life-Satisfaction Regression Equations with Death and Deaths Long Ago (Before Wave 7 of the Panel)

	OLS
Death father	-0.175*
	(0.105)
Death mother	-0.209***
	(0.078)
Death partner	-0.660***
	(0.251)
Death sibling	-0.051
	(0.167)
Death child	-0.432*
	(0.240)
Death friend	0.106
	(0.115)
Previously had death of child	0.385**
	(0.167)
Previously had death of partner	-0.181
	(0.241)
Previously had death of dad	-0.013
	(0.069)
Previously had death of mum	0.056
	(0.075)
Previously had death of friend	-0.293***
	(0.094)
Previously had death of sibling	0.063
	(0.134)
Real household income per capita (£10k)	0.004
	(0.015)
Mean income over time	0.202***
	(0.023)
Constant	6.411***
	(0.126)
Other personal and household characteristics	Yes
Year dummies	Yes
R-sq	0.0636
N	22927

* p<0.1, ** p<0.05, *** p<0.01

Note: Here the data are taken from waves 9, 11, and 14. The "Previously had…" death variables go back to events up to twelve years earlier. Standard errors are in parentheses.

Table 4: Psychological-Distress Regression Equations with Death Variables

	OLS	OLS	RE	IV-RE	RE	FE
Life event						
Death father	1.259***	1.172***	0.998***	0.940***	0.998***	0.877***
	(0.164)	(0.162)	(0.117)	(0.130)	(0.117)	(0.127)
Death mother	1.001***	0.928***	0.858***	1.008***	0.861***	0.877***
	(0.139)	(0.137)	(0.105)	(0.116)	(0.105)	(0.115)
Death partner	3.498***	3.115***	2.835***	2.936***	2.834***	2.752***
	(0.406)	(0.409)	(0.273)	(0.317)	(0.273)	(0.306)
Death sibling	0.562***	0.486**	0.386**	0.336*	0.385**	0.279
	(0.209)	(0.207)	(0.183)	(0.199)	(0.183)	(0.204)
Death child	2.074***	2.074***	2.193***	2.413***	2.201***	2.422***
	(0.552)	(0.547)	(0.330)	(0.372)	(0.330)	(0.358)
Death friend	0.802***	0.776***	0.544***	0.646***	0.537***	0.422***
	(0.196)	(0.194)	(0.146)	(0.161)	(0.146)	(0.157)
Personal & household characteristics						
Male		-0.497***	-0.508***	-0.522***	-0.501***	
		(0.034)	(0.033)	(0.036)	(0.033)	
Age		0.078***	0.070***	0.074***	0.076***	
		(0.009)	(0.008)	(0.009)	(0.008)	
Age-sq/100		-0.091***	-0.084***	-0.089***	-0.090***	-0.063***
		(0.012)	(0.010)	(0.011)	(0.010)	(0.015)
Real household income per capita (£10k)		-0.151***	-0.099***	-0.171***	-0.020	-0.012
		(0.022)	(0.017)	(0.035)	(0.020)	(0.021)
Mean income over time					-0.247***	
					(0.032)	
Living as couple		0.162***	0.104**	0.077	0.106**	-0.039
		(0.049)	(0.043)	(0.048)	(0.043)	(0.062)
Widowed		0.590***	0.701***	0.609***	0.680***	0.754***
		(0.133)	(0.102)	(0.112)	(0.102)	(0.168)
Divorced		0.673***	0.514***	0.427***	0.494***	-0.014
		(0.086)	(0.061)	(0.065)	(0.061)	(0.093)
Separated		1.372***	1.326***	1.346***	1.302***	1.097***
		(0.125)	(0.084)	(0.094)	(0.084)	(0.107)
Single		0.204***	0.182***	0.160***	0.190***	0.114
		(0.055)	(0.047)	(0.052)	(0.047)	(0.080)
Unemployed		0.884***	0.855***	0.835***	0.828***	0.768***
		(0.070)	(0.052)	(0.059)	(0.052)	(0.064)
Retired		-0.039	-0.080	-0.107	-0.077	-0.111
		(0.071)	(0.060)	(0.065)	(0.060)	(0.075)
Family care		0.278***	0.243***	0.232***	0.222***	0.161***
		(0.061)	(0.046)	(0.051)	(0.047)	(0.059)
Student		0.216***	0.130**	-0.007	0.134**	-0.043
		(0.057)	(0.058)	(0.073)	(0.058)	(0.080)
Education: A-level		-0.212***	-0.201***	-0.169***	-0.183***	0.083
		(0.047)	(0.040)	(0.045)	(0.040)	(0.110)
Education: University		-0.151***	-0.197***	-0.176***	-0.155***	0.027
		(0.048)	(0.042)	(0.047)	(0.042)	(0.103)
Household size		-0.049***	-0.024*	-0.029*	-0.031**	0.014
		(0.016)	(0.014)	(0.016)	(0.014)	(0.019)
Number of children (age 0-2)		0.054	0.054	0.044	0.055	0.065
		(0.044)	(0.040)	(0.045)	(0.040)	(0.048)
Number of children (age 3-4)		-0.036	-0.035	-0.061	-0.040	-0.058
		(0.044)	(0.040)	(0.044)	(0.040)	(0.047)
Number of children (age 5-11)		-0.036	-0.078***	-0.093***	-0.088***	-0.128***
		(0.028)	(0.023)	(0.026)	(0.023)	(0.030)
Number of children (age 12-15)		0.076**	0.046*	0.060*	0.040	0.010
		(0.034)	(0.028)	(0.031)	(0.028)	(0.034)

Number of children (age 16-18)		-0.058	-0.040	-0.022	-0.044	-0.019
		(0.059)	(0.053)	(0.061)	(0.053)	(0.062)
Home ownership		-0.261***	-0.214***	-0.220***	-0.205***	-0.085
		(0.044)	(0.037)	(0.041)	(0.037)	(0.053)
Constant	1.895***	0.874***	1.056***	1.076***	1.127***	2.534***
	(0.017)	(0.199)	(0.180)	(0.204)	(0.180)	(0.211)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-sq	0.005	0.035				
R-sq (within)			0.013	0.013	0.013	0.015
N	66673	66194	66194	55735	66194	66194
* p<0.1, ** p<0.05, ***	p<0.01					

Note: These are GHQ equations. Here the data are taken from waves 2-5, 9, 11, and 14. Standard errors are in parentheses. RE stands for random effects; FE for fixed effects. The instrument here is lagged income.

Table 5: Psychological-Distress Regression Equations with Different Death Variables: Female and Male Sub-samples

	Women	Men
Life event		
Death father	1.127***	0.534***
	(0.166)	(0.180)
Death mother	1.251***	0.380**
	(0.151)	(0.148)
Death partner	2.743***	2.188***
	(0.230)	(0.287)
Death sibling	0.476**	-0.178
	(0.189)	(0.210)
Death child	2.169***	1.315***
	(0.342)	(0.436)
Death friend	0.513***	0.091
	(0.175)	(0.190)
Personal & household characteristics		
Age-sq/100	0.034***	0.023*
	(0.013)	(0.012)
Real household income per capita (£10k)	0.009	-0.036
	(0.029)	(0.026)
Living as couple	0.038	-0.213***
	(0.086)	(0.079)
Widowed	0.625***	0.328**
	(0.125)	(0.162)
Divorced	0.084	-0.047
	(0.115)	(0.131)
Separated	1.097***	1.063***
	(0.136)	(0.152)
Single	0.065	-0.051
	(0.113)	(0.101)
Unemployed	0.838***	0.687***
	(0.103)	(0.072)
Retired	0.009	-0.248***
	(0.077)	(0.079)
Family care	0.148**	0.079
	(0.061)	(0.248)
Student	0.165	-0.094
	(0.110)	(0.105)
Education: A-level	0.022	0.036
	(0.150)	(0.144)
Education: University	0.101	0.049
	(0.143)	(0.133)
Household size	0.019	0.028
	(0.027)	(0.024)
Number of children (age 0-2)	0.114*	0.017
	(0.067)	(0.062)
Number of children (age 3-4)	0.018	-0.084
	(0.064)	(0.061)
Number of children (age 5-11)	0.125***	-0.083**
	(0.040)	(0.039)
Number of children (age 12-15)	0.066	-0.006
	(0.046)	(0.044)
Number of children (age 16-18)	0.096	0.081
	(0.086)	(0.082)
Home ownership	0.093	-0.169***
	(0.068)	(0.061)
Constant	0.972**	0.954***

	(0.392)	(0.368)
Year dummies	Yes	Yes
R-sq (within)	0.019	0.012
N	43258	36374

* p<0.1, ** p<0.05, *** p<0.01

Note: These are GHQ equations. Here the data are taken from waves 2-5, 9, 11, and 14. Standard errors are in parentheses.

Table 6:

Illustrative Valuations of Compensatory Damages (in the first year)

These are taken from Columns 3 and 5 (RE results) of Table 4.

Death amount per annum	
GHQ-12 equation	
Partner	£114k-£202k
Child	£89k-£140k
Father	£40k-£101k
Mother	£35k-£61k
Friend	£22k-£51k
Sibling	£16k-£32k

Note: £114k stands for 114,000 per annum UK pounds sterling. At the time of writing, the exchange rate is approximately $2 to £1.

Table 7: Well-being Regression Equations with Death Variables and Personal Income: Further Instrumented Estimates

	Life satisfaction		Psychological distress (GHQ-12)			
	OLS	**IV**	**RE**	**RE-IV**	**FE**	**FE-IV**
Life event						
Death father	-0.145	-0.108	1.018***	1.016***	0.892***	0.935***
	(0.190)	(0.213)	(0.118)	(0.156)	(0.128)	(0.162)
Death mother	-0.338**	-0.168	0.888***	1.025***	0.903***	0.964***
	(0.165)	(0.174)	(0.107)	(0.137)	(0.116)	(0.144)
Death partner	-0.809	-1.642*	2.829***	2.910***	2.748***	2.839***
	(0.537)	(0.856)	(0.273)	(0.361)	(0.308)	(0.387)
Death sibling	-0.218	-0.133	0.407**	0.086	0.313	0.093
	(0.375)	(0.453)	(0.187)	(0.237)	(0.208)	(0.251)
Death child	-0.130	-0.208	2.228***	2.240***	2.441***	2.137***
	(0.242)	(0.328)	(0.333)	(0.422)	(0.361)	(0.447)
Death friend	0.042	0.305**	0.544***	0.658***	0.411***	0.464**
	(0.252)	(0.151)	(0.148)	(0.184)	(0.159)	(0.192)
Personal & household characteristics						
Male	-0.112***	-0.385***	-0.504***	0.000		
	(0.036)	(0.059)	(0.034)	(0.062)		
Age	-0.094***	-0.143***	0.065***	0.180***	0.054	0.134**
	(0.011)	(0.014)	(0.008)	(0.014)	(0.045)	(0.062)
Age-sq/100	0.106***	0.161***	-0.077***	-0.212***	-0.064***	-0.193***
	(0.013)	(0.017)	(0.010)	(0.017)	(0.017)	(0.029)
Log of real personal income	0.091***	0.698***	-0.017	-1.159***	0.018	-0.818***
	(0.020)	(0.097)	(0.013)	(0.092)	(0.017)	(0.144)
Living as couple	-0.142***	-0.280***	0.090**	0.141**	-0.048	-0.005
	(0.049)	(0.057)	(0.044)	(0.055)	(0.062)	(0.078)
Widowed	-0.780***	-0.771***	0.693***	1.029***	0.702***	1.018***
	(0.163)	(0.163)	(0.103)	(0.137)	(0.171)	(0.220)
Divorced	-0.770***	-0.782***	0.528***	0.565***	-0.013	0.143
	(0.077)	(0.081)	(0.061)	(0.076)	(0.093)	(0.117)
Separated	-0.695***	-0.810***	1.339***	1.597***	1.091***	1.472***
	(0.095)	(0.116)	(0.085)	(0.112)	(0.107)	(0.136)
Single	-0.603***	-0.548***	0.178***	0.074	0.109	0.142
	(0.062)	(0.063)	(0.048)	(0.062)	(0.082)	(0.101)
Unemployed	-0.540***	-0.163	0.889***	0.098	0.773***	0.341***
	(0.099)	(0.154)	(0.054)	(0.092)	(0.066)	(0.104)
Retired	-0.006	0.246**	-0.074	-0.540***	-0.102	-0.444***
	(0.087)	(0.096)	(0.061)	(0.083)	(0.077)	(0.107)
Family care	-0.122	0.611***	0.258***	-0.958***	0.174***	-0.593***
	(0.074)	(0.143)	(0.049)	(0.110)	(0.062)	(0.136)
Student	0.167*	0.926***	0.166***	-1.214***	-0.004	-0.876***
	(0.090)	(0.166)	(0.064)	(0.135)	(0.087)	(0.176)
Education: A-level	0.306***	0.241***	-0.211***	-0.025	0.118	0.176
	(0.052)	(0.059)	(0.041)	(0.055)	(0.112)	(0.139)
Education: University	0.348***	0.085	-0.227***	0.208***	0.039	0.102
	(0.052)	(0.067)	(0.042)	(0.063)	(0.105)	(0.130)
Household size	0.003	0.023	-0.018	-0.077***	0.014	-0.314***
	(0.020)	(0.024)	(0.014)	(0.020)	(0.020)	(0.064)
Number of children (age 0-2)	0.079	-0.062	0.080**	0.191***	0.070	0.120**
	(0.050)	(0.063)	(0.040)	(0.053)	(0.048)	(0.060)
Number of children (age 3-4)	-0.014	-0.020	-0.011	0.002	-0.054	-0.103*
	(0.060)	(0.069)	(0.040)	(0.051)	(0.047)	(0.058)
Number of children (age 5-11)	-0.076**	-0.112***	-0.056**	-0.005	-0.126***	-0.087**
	(0.035)	(0.040)	(0.023)	(0.030)	(0.030)	(0.036)
Number of children (age 12-15)	-0.051	-0.074*	0.066**	0.152***	0.013	0.046
	(0.040)	(0.044)	(0.028)	(0.036)	(0.034)	(0.043)

Number of children (age 16-18)	-0.064	-0.157	-0.035	0.012	-0.023	-0.013
	(0.079)	(0.096)	(0.055)	(0.069)	(0.064)	(0.077)
Home ownership	0.126**	0.272***	-0.221***	-0.265***	-0.084	-0.116*
	(0.051)	(0.054)	(0.038)	(0.048)	(0.054)	(0.065)
Constant	5.955***	1.509*	1.197***	8.985***	0.550	
	(0.269)	(0.781)	(0.201)	(0.677)	(1.480)	
Round dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	22801	16042	64528	45928	64528	42190

* p<0.1, ** p<0.05, *** p<0.01

Note: Here the data are taken from waves 9, 11, and 14 for life satisfaction regressions, and include waves 2-5 for GHQ psychological distress regressions. Here income is instrumented with a variable for payslip-seen (that is, whether the survey interviewer was shown the person's actual pay slip) and the level of regional house prices. Standard errors are in parentheses.

Table 8: Further Illustrative Compensation Amounts (in the first year) for Different Forms of Bereavement

Implied per-annum compensatory damages in thousands of pounds sterling £ for different deaths, under IV random-effects and fixed-effects specifications:

Type of death	RE	FE
Partner	110k	312k
Child	59k	126k
Mother	14k	22k
Father	14k	21k
Friend	8k	8k
Sibling	1k	1k

Notes

Here the first column is for GHQ random-effects estimates (RE) and the second is for fixed-effects estimates (FE). These are in thousands of UK £ sterling (at the time of writing, the exchange rate is approximately $2 to £1.).

Appendix A: Psychological-Distress Equations with the Death Variables Interacted with Income

	OLS	RE
Death father	1.277***	1.166***
	(0.313)	(0.209)
Death mother	1.105***	0.989***
	(0.261)	(0.191)
Death partner	3.277***	3.114***
	(0.571)	(0.412)
Death sibling	0.611*	0.202
	(0.353)	(0.331)
Death child	2.304***	2.503***
	(0.926)	(0.554)
Death friend	0.744***	0.547***
	(0.241)	(0.199)
Real household income per capita (£10k)	-0.149***	-0.098***
	(0.022)	(0.017)
Death father*household income	-0.127	-0.194
	(0.292)	(0.182)
Death mother*household income	-0.176	-0.130
	(0.216)	(0.160)
Death partner*household income	-0.195	-0.333
	(0.447)	(0.364)
Death sibling*household income	-0.176	0.206
	(0.325)	(0.336)
Death child*household income	-0.206	-0.293
	(0.664)	(0.415)
Death friend*household income	0.030	-0.006
	(0.107)	(0.130)
Personal and household controls	Yes	Yes
Year dummies	Yes	Yes
R-sq	0.035	0.034
N	66077	66077

*<0.1, ***<0.01

Note: Here the data are taken from waves 2-5, 9, 11, and 14. Standard errors are in parentheses.

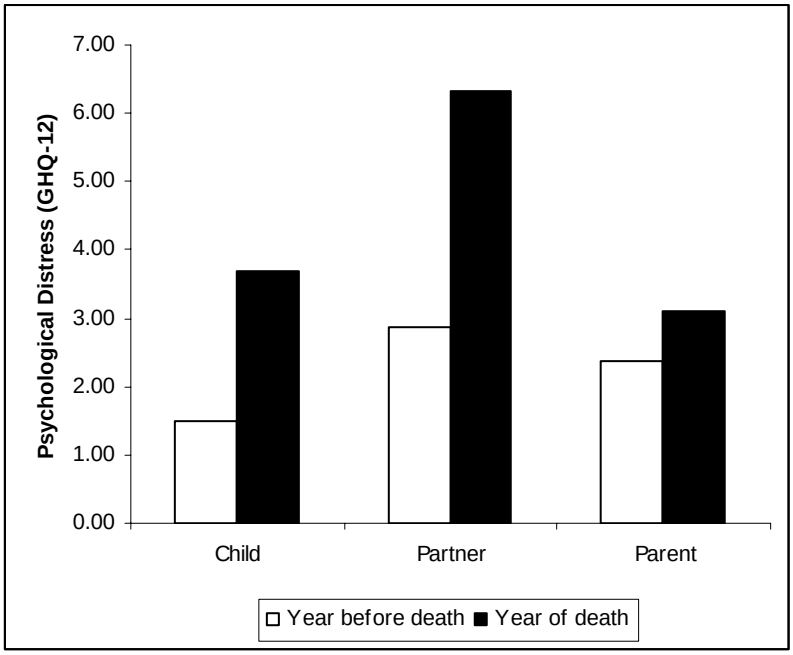
Appendix B: Income Regression Equations

(The First-stage Regression of Personal Income -- for Table 7)

Instrumental variables equations used to identify the role of income in Table 7	Personal Income		Personal Income			
	Life Sat IV		GHQ RE-IV		GHQ FE-IV	
	Coefficient	**SE**	**Coefficient**	**SE**	**Coefficient**	**SE**
Instruments						
Latest pay slip seen	0.139***	(0.015)	0.115***	(0.011)	0.078***	(0.012)
Early pay slip seen	0.127***	(0.038)	0.095***	(0.028)	0.078***	(0.030)
Not applicable	-0.436***	(0.025)	-0.401***	(0.012)	-0.341***	(0.015)
House price at t-1	0.048***	(0.012)	0.044***	(0.009)	0.043***	(0.012)
Life event						
Death father	-0.021	(0.114)	-0.011	(0.043)	-0.019	(0.044)
Death mother	-0.138*	(0.070)	-0.069*	(0.037)	-0.068*	(0.038)
Death partner	0.152	(0.158)	-0.041	(0.098)	-0.027	(0.104)
Death sibling	-0.130	(0.108)	-0.126*	(0.064)	-0.111*	(0.067)
Death child	-0.356**	(0.149)	-0.211*	(0.115)	-0.254**	(0.119)
Death friend	0.086	(0.107)	0.086*	(0.050)	0.104**	(0.051)
Personal & household characteristics						
Male	0.498***	(0.016)	0.518***	(0.012)		
Age	0.087***	(0.005)	0.101***	(0.003)	0.100***	(0.016)
Age-sq/100	-0.096***	(0.006)	-0.115***	(0.004)	-0.138***	(0.005)
Living as couple	0.109***	(0.023)	0.088***	(0.015)	0.063***	(0.021)
Widowed	0.332***	(0.048)	0.393***	(0.036)	0.530***	(0.055)
Divorced	0.129***	(0.032)	0.138***	(0.021)	0.237***	(0.030)
Separated	0.120***	(0.043)	0.140***	(0.030)	0.209***	(0.036)
Single	0.006	(0.025)	-0.052***	(0.017)	0.045*	(0.027)
Unemployed	-0.485***	(0.051)	-0.350***	(0.021)	-0.202***	(0.024)
Retired	-0.092**	(0.046)	-0.114***	(0.022)	-0.148***	(0.026)
Family care	-0.783***	(0.045)	-0.687***	(0.019)	-0.537***	(0.023)
Student	-1.035***	(0.073)	-0.911***	(0.024)	-0.768***	(0.031)
Education: A-level	0.057**	(0.023)	0.113***	(0.015)	-0.059	(0.037)
Education: University	0.300***	(0.023)	0.322***	(0.015)	-0.003	(0.035)
Household size	-0.079***	(0.010)	-0.066***	(0.005)	-0.413***	(0.007)
Number of children (age 0-2)	0.208***	(0.025)	0.123***	(0.014)	0.063***	(0.016)
Number of children (age 3-4)	0.125***	(0.026)	0.045***	(0.014)	-0.028*	(0.015)
Number of children (age 5-11)	0.109***	(0.014)	0.052***	(0.008)	0.033***	(0.010)
Number of children (age 12-15)	0.083***	(0.019)	0.056***	(0.010)	0.057***	(0.011)
Number of children (age 16-18)	-0.008	(0.038)	0.012	(0.019)	0.018	(0.021)
Home ownership	-0.101***	(0.025)	-0.031**	(0.013)	-0.017	(0.018)
Constant	7.259***	(0.121)	6.826***	(0.068)		
Partial R-sq of excluded instruments	0.045		-		0.021	
F-Test of excluded instruments	F(4, 11408) =	130.59	-		F(4, 30991) =	168.87
Over-identification test	2.557	[0.465]	-		2.322	[0.465]
Round dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	22801	16042	64528	45928	64528	42190

Figure 1:

People's Levels of GHQ Psychological Distress Before and After the Death of a Child, Spousal Partner and Parent

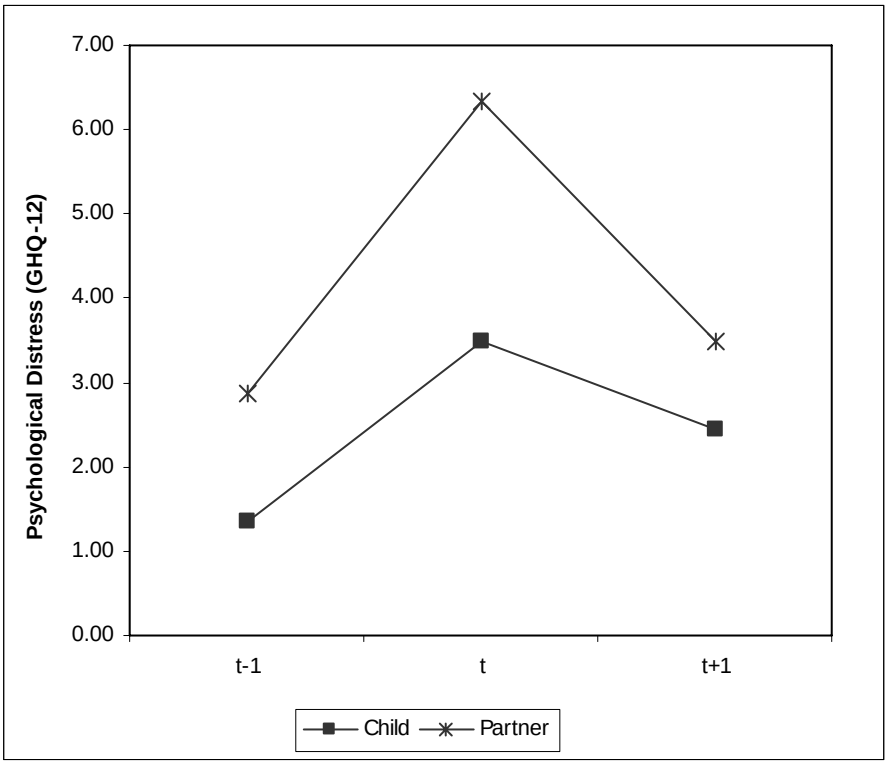


Note: Higher GHQ-12 values here signify worse psychological well-being. The figure uses a subsample of individuals on whom we have strictly consecutive yearly observations. These data are from the years 1992 to 1995; this is because, for this survey question, these are the only consecutive years available. The number of bereavements here are: death of child (N=37), death of spousal partner (N=59), and death of parent (N=386). .

The three rises are significantly different from zero at the 1% level. The t-test results are:
Child: t = -2.905 [p>0.000]
Partner: t = -6.773 [p>0.000]
Parent: t= -2.9730 [p>0.000]

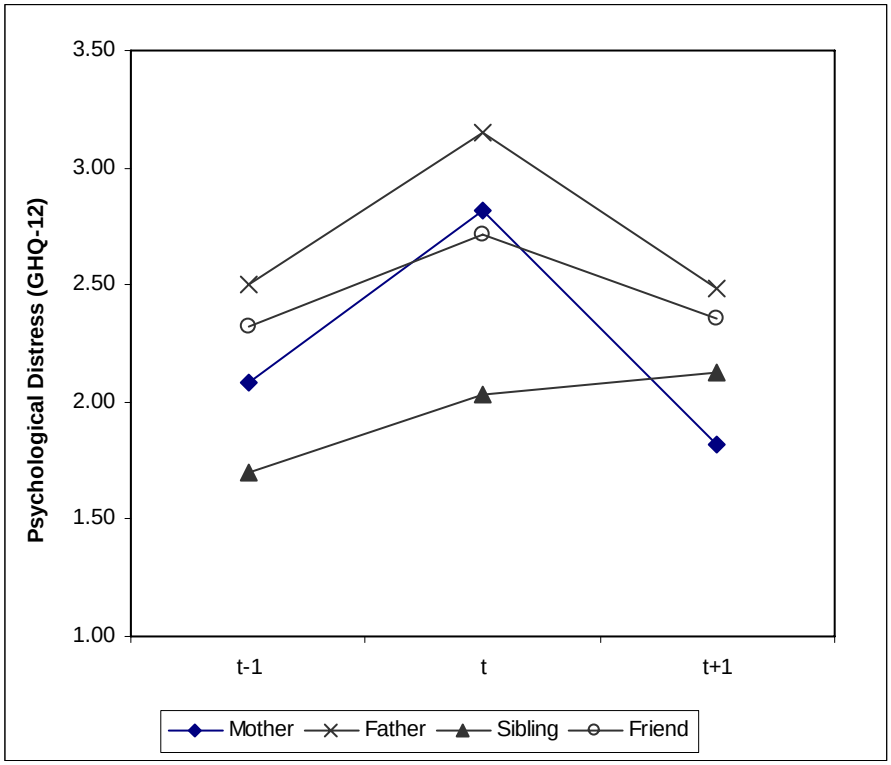
These longitudinal graphs depict raw means; they are not regression-corrected.

Figure 2: Adaptation after Deaths of Partner and Child: Psychological Distress in Three Consecutive Years



Note: Here the data are from the years 1992 to 1995. Higher GHQ-12 values signfiy worse psychological well-being. Year t = year of death. No death at t-1 and t+1. There are very small numbers of multiple deaths in the sample (i.e. 0.08%). N of observations: 27 (child) and 59 (partner).

Figure 3: Adaptation after Deaths of Mother, Father, Sibling, and Friend in Three Consecutive Years



Note: Here the data are from the years 1992 to 1995. Higher GHQ-12 values signify worse psychological well-being. Year t = year of death. No death at t-1 and t+1. There are very small numbers of multiple deaths in the sample (i.e. 0.08%). N of observations: 120 (mother), 119 (father), 80 (sibling), and 114 (friend).