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HIGH SKILLS AND HIGH ANXIETY: SKILLS, HARD WORK AND MENTAL WELL-BEING

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High Skills and High Anxiety:
Skills, Hard Work and Mental Well-Being

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SUMMARY

Jobs in Britain are becoming more demanding in two senses: since 1986 they have been requiring increasing levels of skill, and up to 1997 they were also requiring higher levels of work intensity. Job satisfaction fell during the 1990s. This paper examines the implications of increased skill requirements in jobs for workers' well-being and job satisfaction. Understanding this association is important because if there are disadvantageous effects on individuals' welfare these need to be balanced against the better known wage effects of increased skills needs. It would also have implications for the wider economy if lower levels of well-being impair workers' performance.

Using data from the 2001 Skills Survey, we measure welfare using four measures: two scales of affective well-being, namely enthusiasm-depression and contentment-anxiety, self-reported changes in stress levels, and overall job satisfaction. We find that:

- Compared to less skilled jobs, higher skilled jobs engender greater enthusiasm but also greater anxiety. Taken together, higher skilled jobs are associated with greater levels of arousal among workers. Those who have experienced an increase in the skills required in their job are more likely to report a rise in their level of stress, than those whose skills are stationary or falling.
- The reasons for the positive connection between job skills and enthusiasm are that, compared to low-skilled jobs, higher skilled jobs are more likely to fully utilise workers' skills, and are likely to involve greater task discretion, greater participation of workers in the decisions that concern their jobs and more support from other team members in learning new skills.
- Part of the reason why higher skilled jobs are associated with greater levels of anxiety and self-reported stress is that higher skilled jobs also involve significantly harder work. Increased work effort has an unambiguously detrimental and substantial impact on well-being.
- It is important for workers' skills to be well-matched to their jobs' requirements. Those with under-utilised skills experience more boredom and depression, more anxiety, and less satisfaction than those who do not have under-utilised skills. Those whose skills have not kept up with job requirements also experience greater depression, more anxiety and less satisfaction than those in matched jobs.
- Team support has a greater beneficial impact on well-being in jobs involving hard work than in jobs that are less intense. However, the benefits of team support are neither especially high nor especially low in skilled jobs. The worst situation for a worker to be in is a job that involves

high skill, hard work, little discretion, few opportunities for participating in decision-making and no team support.

- Well-being is enhanced when workers receive wages above the level they might expect, and conversely lowered when wages are below expectations.
- Finally, although less than one in five workers are insecure in their jobs, in the sense that they think they might become unemployed in the following year, those that are insecure are considerably less enthusiastic, more anxious and less satisfied in their jobs.

The main implication of these findings is that it is important to see the full effects of upskilling on workers' welfare, beyond the effects on wages. Other research suggests that reducing workers' well-being reduces performance at work. In order to enhance the benefits of upskilling for employees and for the economy, policies on upskilling may need to be accompanied by other policies to encourage an already-increasing level of participating in decision-making, to inhibit the recent decline in task discretion and to encourage other factors that could benefit well-being.

1. Introduction

This paper looks into an assumption that is often taken for granted, namely that increasing the skills of the workforce is unambiguously beneficial. Higher skills are known to be associated with greater individual wages and higher productivity at work; they are usually assumed to be beneficial for the macroeconomy, with the proviso that full employment is maintained. Set against this optimistic perspective for workforce upskilling, however, are research findings which show that there is a strong and robust correlation across individuals between upskilling and work intensification, and that during much of the 1990s work in Britain was becoming both more intense and more skilled (Gallie et al, 1998; Green, 2001a). At the same time, workers in Britain became less satisfied with their jobs, and exhibited greater stress as measured on a standard GHQ scale (Oswald and Gardner, 2001). In common parlance, it is often said that jobs are becoming more "demanding", interpretable in the twin sense of both an increase in skill and an increase in pressure to work hard (Green, 2001b). While increases in skill are generally welcomed as a source of increasing prosperity, greater work pressures are typically, though not universally, seen as a problem to be addressed. The problems range in magnitude from the straightforward adverse consequences for personal welfare attendant on managing a work-life balance in an increasingly pressured working society, to the more severe consequences of broken families and days lost through stress which feed back into adverse economic consequences. These problems are well recognised, but they are not typically linked with debates elsewhere in the policy and academic literature concerning the upskilling of the workforce. Indeed, the links between increasing skills, work effort and worker welfare have not been adequately explored.

These relationships have a potential bearing on skills policies, if only because of their potential implications for the motivation of learners. A typical approach to encouraging learning is to increase awareness among potential learners of the benefits for skills acquisition, while removing barriers to training access. But if moving to a more high skilled job carries potential increased burdens the overall benefits of skills acquisition may be thought to be lower. Indeed, if the disadvantages of increased stress and loss of well-being were large enough, this could become a substantive demotivating factor. In addition, training itself sometimes has the problem that it takes up out-of-work time, and is therefore difficult to fit with other parts of people's lives (Hewison et al, 1998).[1]

[1] Casual observations suggest also a trend towards "downshifting", the act of giving up high-flying jobs in exchange for a more satisfying life (e.g. Guardian, 9/2/02).

In this paper, we investigate the association between job skills and worker well-being, using data from the 2001 Skills Survey. This survey has indicators, not of motivation as such, but of the states of mental well-being experienced by workers in their jobs. We examine the links between the increasing skill demands of jobs, the extent to which job-holders' skills are being fully utilised or over-stretched, and the mental well-being of workers. We also investigate the potential importance of other developments in mitigating or reinforcing any adverse effects on welfare, including the importance of training, and of increasing levels of participation and social support at the workplace.

2. Skills, effort and mental well-being

There is relatively little theoretical discussion or evidence about the links between skills and the welfare of workers. It is typically assumed, in many traditions, that skilled jobs are inherently more rewarding, other things equal, than less skilled jobs. Empirical evidence on the link between job satisfaction and education, however, does not always bear this prediction out: in some studies it is found that those with more education experience less job satisfaction. This apparent puzzle has been variously attributed to better educated workers having higher expectations, or, relatedly, to problems of "over-education", whereby workers are in jobs that require skills below their own education level (Clark, 1997).

If, however, skilled jobs require higher levels of work effort, beyond a certain point there arises a trade-off between the benefits for well-being arising from the greater skill and the disadvantages of having to work under greater pressure. This trade-off is a commonplace dilemma for many workers. One reason why skilled jobs tend to be associated with greater work pressure could be the requirement to shoulder more responsibilities at work. Another reason is that multi-skilling and job rotation -- the purposeful equipping of workers with skills to perform a range of jobs within the same workplace – permit workers to be deployed more continually on productive tasks rather than remaining idle for periods of varying length. More generally, it may be that the technological changes (including organisational changes) of the modern era favour both a rising demand for skills and increased work effort over time. In the jargon of economists, this is to say that technological change is both "skill-biased" and "effort-biased". There remains some controversy as to whether harder work is unambiguously disadvantageous for workers. For example, it can be argued that long hours working, far from being a burden imposed on unwilling workers, is often a response to people liking their jobs and being strongly committed to their work. There is a suggestion from psychological literature, though no strong evidence, that too little work pressure could also bring

problems of boredom and lack of fulfilment at work (Warr, 1996). Nevertheless, a large number of studies robustly show in a range of contexts that high workloads are always strongly associated with low indicators of worker well-being. Given this finding, and the association between skill and high work loads, part of any association between skill and welfare will reflect the impact of the workload, rather than the skills themselves.

A second issue concerns which aspects of worker welfare we might expect skills to be associated with. Psychological theory and evidence delineate two major dimensions of affective well-being, "arousal" and "pleasure". If skilled work involves responsibilities and relatively complex thought processes and actions, the person is more likely to be aroused in some way. That arousal might be associated with greater pleasure in the job, with feelings of greater enthusiasm, happiness or satisfaction; but skill could equally be associated with feelings of anxiety, uneasiness and dissatisfaction. Skilled work is less likely than unskilled work to be associated with feelings of boredom, sluggishness, tranquillity and so on. Job satisfaction scales typically capture moods and emotions along the "pleasure" dimension, but are unlikely to pick up variations in well-being along the arousal dimension.

In addition to the trade-off between hard work and skill, in their impact on well-being at work, an important factor is the match between workers' own skills and the skills that are required to be used in the job. A key environmental determinant of worker well-being is the "opportunity for skill use", by which is meant both the utilisation and the development of skills at work (Warr, 1987). "Skilled performance … is psychologically important in assisting people to achieve targets, or to produce something useful or attractive" (ibid, p. 4). Many empirical studies have demonstrated a negative connection between under-utilisation of skill and various indicators of well-being (e.g. O'Brien, 1982). There appears to be little evidence, however, of connections between the opportunity to develop skills and worker well-being.

The other side of the coin arises if individuals find themselves in jobs for which they perceive that their skills are insufficient. This could arise if they had been mistakenly appointed to a job, but is also attributable to being in a job with changing skills, where the training or other forms of learning have been inadequate to keeping the job-holder up with the new skill requirements. In other words, while skills gaps are perceived correctly as a problem for employers, as indicating potential constraints on productivity, the same gaps when perceived by the workers themselves would be predicted to be a source of anxiety and stress. This hypothesis is consistent with the evidence referred to above attributing negative welfare effects from excessive "job demands" (Warr, 1987, Chapter 7). However, here we emphasise in particular that the excessive demands of the job may

refer to types of tasks that the job-holder feels he/she is not able to perform adequately, rather than just the quantity of tasks: for this, we are not aware of any direct evidence hitherto.

The skills required for a job are one element of the wider environment, which impinges on workers' welfare. In attempting to identify the link between skills and welfare, it will be important to place the link in this wider context.

One widely used model of the determinants of well-being delineates nine factors, including the opportunity for skill use. The other factors are opportunity for control, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact and valued social position. In several cases, it is argued, a non-linear relationship is to be expected between the environmental indicator and the welfare outcome (Warr, 1987). Substantive bodies of evidence confirm the impact of several environmental factors on worker well-being in a work context. For example, well-being is known to be adversely affected by high job demands, but positively affected both by discretion over regular tasks and by wider opportunities to participate in decision-making that may affect the nature of the job. There is ongoing debate about the extent to which opportunities for control and participation can mediate the impact of excessive job demands, as proposed by Karasek (1979).[2] "Skill variety", the extent to which a range of different activities are involved, is consistently found to be positively related to welfare (Oldham et al, 1978). Uncertainty about the future is found to be negatively related to welfare, and in this context job insecurity has been widely found to be a source of stress and tension (Burchell reference). More recently, the extent of social support that individuals experience has been argued to be an important moderator of adverse effects on welfare (see Inert, 2002, for a review of evidence).

This brief overview of extant research allows us to set the issues in context for the empirical work to follow. In the light of the above discussion, our aim is to investigate the following questions:

- Is there a positive association, as is usually assumed, between the skill level of jobs and the well-being of job-holders? If not, or if moreover the association is negative, to what extent is this the consequence of a complementarity between skilled jobs and hard work?
- Do work pressures and long hours unambiguously lower worker well-being? Or do those who work hard and/or long hours do so because they derive more satisfaction and mental well-being from work than those working less hard do?

[2] According to this interactive model, the worst state to be in was one with high demands but little control over the job.

- How important is it for workers to be well-matched to their jobs? Is well-being linearly related to their skills, or is it also important that they do not have too many skills for their jobs (and thus feel undervalued) or that they do not have too few skills (and thus feel inadequate)?
- Does participation in decision-making in the organisation help to raise mental well-being? Does it in addition mediate any ill effects from upskilling and high levels of work effort? Do forms of social support at the workplace also help to mitigate adverse effects?

3. Data and Methods

Data

We utilise data drawn from the 2001 Skills Survey, which is a cross-sectional representative survey of 4470 individuals aged between 20 and 60 in Britain in paid work at the time of interview in spring 2001. The design of the survey was patterned on that of the first Skills Survey, conducted in spring 1997 (Ashton *et al*, 1999). Random sampling methods were used, and the achieved sample was representative of the British population. Full details of the sampling frame and fieldwork methods can be found in Felstead *et al* (2002). The questionnaire comprises a detailed investigation of the nature of the individual's job with an emphasis on the activities that the job entails. Additional information was obtained on the organisation in which the individual works, pay and changes that have occurred in the job in the last 5 years. Some background demographic information on each individual was also collected. Finally, questions were also asked concerning well-being at work.

Measuring Well-Being

We make use of three indicators of worker well-being available in the 2001 Skills Survey – two are indicators of affective well-being, and the third is the self-reported change in workplace stress.

A common method of measuring mental health in survey work is through instruments to capture affective well-being. A considerable body of psychological research into the structure of emotions and moods has suggested that there are two substantive, though not exhaustive, dimensions, which can be labelled "arousal" and "pleasure". This structure is relevant to describing feelings arising from both work and non-work settings. Within this framework, psychological studies have examined the merits of various instruments for tapping combinations of these dimensions. Relatively straightforward scales tend to be needed for occupational research, so as to gain a good

balance of practicality and psychometric acceptability. Typically, a job satisfaction scale has been thought of as capturing the "pleasure" dimension. Warr (1990) examines and validates instruments to tap two correlated axes of affective well-being, namely "enthusiasm-depression" and "contentment-anxiety". These dimensional axes each comprise combinations of pleasure and arousal.

It seemed likely that the link between skills and worker well-being might be more complex than, simply, positive or negative. Rather, skills and their utilisation could simultaneously be associated with positive emotions such as enthusiasm and negative emotions such as anxiety. Hence there was merit in adopting Warr's two instrument approach in the Skills Survey and for this paper. Respondents were asked: "Thinking of the past few weeks, how much of the time has your job made you feel each of the following…?". There followed a series of adjectives, some positive some negative. To tap enthusiasm-depression, the adjectives were depressed, gloomy, miserable, cheerful, enthusiastic and optimistic. To tap contentment-anxiety the adjectives were tense, uneasy, worried, calm, contented and relaxed. Responses were made against a standard 5-point frequency scale ranging from "never" to "all of the time". For each axis, an indicator scale was constructed by averaging responses to the six items, with the negative items reversed. The scale reliability coefficient (alpha) for the enthusiasm-depression indicator was 0.801, and for the contentment-anxiety indicator was 0.808.

We also utilised a third measure of well-being, a conventional indicator of overall job satisfaction, derived from the question: "All in all, how satisfied are you with your job?"; the scale ranges from 0 ("completely dissatisfied") to 6 ("completely satisfied").

Our final indicator of well-being concerns self-reported stress. Respondents were asked to focus on the comparison with their current job and the job that they were doing five years previously. If it became established that they were not in work five years previously (13 percent of respondents), then they compared with the job they were doing four years previously, and if not that, then three years previously. This method ensured responses from all but 250 (6 percent) respondents. They were asked: "Would you say that there has been a significant *increase* between then and now, a significant *decrease* or little or no change in the stress involved in your job?". This indicator is perhaps not as desirable as objective indicators of stress, as shown through physical symptoms. However, the advantage of this indicator is that it provides a measure of change in worker well-being, which can be examined for its relationship with changes in skill requirements and other

characteristics of the job.[3] Because the measure is only available as a change indicator, its relationship with the other well-being measures is not easily deduced. However, the correlations of stress change with contentment-anxiety, enthusiasm-depression and job satisfaction were, respectively, -0.30, -0.17 and –0.08. This suggests that the stress change measure is most closely tapping the experience of anxiety: those who report an increase in stress are likely to be low down on the contentment-anxiety scale.

To address the research questions above, we investigate the correlates of these indicators in multivariate analyses. The enthusiasm-depression and the contentment-anxiety scales were each regressed on a range of variables implied by the discussion in Section 2. Estimates of the determinants of the change in stress were obtained through an ordinal probit analysis, ranking the responses as 1 (a decrease), 2 (no change) and 3 (an increase). This method essentially adopts the "treatment-effect" approach in much research on the impact of the environment on affective well-being. However, the limitations of cross-section analyses are recognised and discussed in this context below.

Measuring the Right-Hand-Side (RHS) Variables

The indicator of required skills was obtained from three broad skills measures: the highest qualification level that someone would need to get the job, the total amount of training for the type of work performed, and the length of time needed to learn to do the type of work competently. These three broad measures, which are described in detail in Ashton et al (1999) and in Felstead et al (2002), show evidence of rising skill requirements in British workplaces since 1986. The highest qualification level is classified according to five levels from 0 (none) to 5 (degree level or higher). The training time scale ranges from 0 (no training) to 7 (over two years). Learning time ranges from 0 (less than a week) to 6 (over two years). For present purposes, we utilise the first principal component of these three measures, to capture all three in the "Required Skills" index.

The index of computing skills is based on two questions concerning the use of computers at work. The first asks how important using computers are at work; the second asks about the way in which computers are used, against a scale of complexity. From these we constructed a computing skills scale ranging from 0 (no use of a computer) to 4 (computers used for advanced work such as programming). For details, see Dickerson and Green (2002).

[3] A preferable approach would have been to track individuals through time, rather than rely on recall which is known to be subject to bias; however, such longitudinal data are scarce.

As a measure of hard work we constructed a single indicator from four questions in the survey designed to tap different aspects of the job-holder's perceptions of working hard. The questions had been used previously in a range of earlier surveys. The first two questions asked: "How often does your work involve working at very high speed?" and "How often do you come home from work exhausted?" The other questions measured agreement or disagreement with the statements: "My job requires that I work very hard",and "I work under a great deal of tension". These variables were entered into a factor analysis, which generated a single factor with a positive eigenvalue. The score on this factor was then used as the "Hardwork" index.[4]

As a measure of extensive work effort, that is, the length of time spent at work, we used usual weekly hours. To capture the possibility that hours could be related in a non-linear manner, we inputted also a quadratic in hours; we also used but do not show here an alternative method, with a similar pattern of results, which was to input dummy variables for different hours bands.

Task discretion is measured by a series of questions concerning the amount of influence the job-holder had on the work, including how hard, which tasks, how they should be done and the quality standards. These questions are combined into a single index. Comparisons with earlier surveys show that the average level of task discretion has decreased steadily since 1986 (Felstead et al, 2002; Gallie et al, 2002).

To obtain a measure of participation in decision-making, individuals were asked: "suppose there was going to be some decision made at your place of work that changed the way you do your job. Do you think that you personally would have any say in the decision about the change or not?" Those answering yes, were then asked "How much say or chance to influence the decision do you think that you personally would have?". From the responses, a participation scale was constructed, ranging from 0 (no say) to 3 (a great deal). For a detailed analysis, see Gallie et al (2002).

Social support for a worker is likely to be associated with whether the individual works in a supportive team. We computed an indicator of team support from the question which asked for agreement with the statement "I am able to learn new skills through working with other members of my work group". Those who agreed or strongly agreed were classified as having team support.[5]

To measure whether job-holders perceived they had the opportunity to use their skills in their jobs, they were asked: "How much do you agree or disagree with the following statement: 'In my current

[4] Green (2001a) used some of these indicators as evidence of an increase in work intensity between 1992 and 1997. Between 1997 and 2001, however, on the basis of the same indicators, there has been no significant change in the average level of work intensity across the whole workforce.

job I have enough opportunity to use the knowledge and skills that I have'?, and separately "How much of your past experience, skill and abilities can you make use of in your present job?". We combined responses from these two questions to classify a respondent as "over-skilled" if the individual disagreed or strongly disagreed with the first statement, or answered 'very little' or 'a little' to the second question. In addition, we also utilised a conventional indicator of "over-qualification", equal to one if the individual held a qualification level above that required for their job, zero otherwise (Green and McIntosh, 2002).

To capture whether individuals felt that they had insufficient skills for the job, two approaches were taken. First, we used responses to the question "How much do you agree or disagree with the following statement: 'I would perform better in my current job if I possessed additional knowledge and skills'? This question has been used with mixed success by Allen and van der Welden (2002). Those agreeing or strongly agreeing could be classified as under-skilled. However, our findings tended to be sensitive to the decision as to whether or not to include those agreeing alongside those strongly agreeing. Hence, we used an alternative indicator of insufficient skills, which we devised from two questions about recent training. Those who had received training in recent years were asked: "was the training you received over the last five/four/three years adequate for keeping up to date with the skills required in your current job?". Those who had not received training were asked: "Since five/four/three years ago, was there any time over this period when training would have been useful for keeping up to date with the skills required in your current job, but was not available from your employer?". Respondents who answered yes to either of these questions were classified as "under-trained". The question was only asked of individuals who had been in work five/four/three years ago.

To obtain a proxy for whether individuals are receiving a "fair" wage, we computed residuals from a conventional wage equation, with log wages predicted by qualifications, work experience, establishment size, industry and gender. The residual is thus a measure of how far the wage is above or below what would be expected from such a human capital prediction.

Job insecurity is measured from two questions concerning expectations of unemployment: "do you think there is any chance at all of your losing your job and becoming unemployed in the next twelve months?"; if yes, "from this card, how would you rate the likelihood of this happening?". We constructed a scale of insecurity ranging from 0 (no chance) to 5 (very likely). This is a

[5] An alternative indicator was also obtained by combining a series of questions about the influence of the worker's work group on several aspects of the job; these generated the same pattern of results, not shown here.

relatively narrow measure of job insecurity. For previous analysis of identical questions, see Green et al (2001).

In the change analysis, it is necessary to have indicators of changes in skill and in other job characteristics. As with the stress change question, respondents were asked to compare their current job with a previous one five, four or three years ago. The change in job skill is measured subjectively from the question: "Would you say that there has been a significant *increase* between then and now, a significant *decrease* or little or no change in the level of skill you use in your job?". Similar questions were used to capture the perceived change in the importance of a number of particular skills for respondents jobs, including computing, writing, mathematical and planning skills.

An alternative method was used to capture changes in work effort, work hours, work variety, choice of work method and closeness of supervision. In each case, the respondent was asked earlier in the interview a question about the level of each variable in their current job. Then, after being asked to focus on their previous job, they were asked an identical question about the level of each variable in that job. In so doing, respondents were reminded of their answer in respect of their current job, so that they could make a direct comparison and answer accordingly. This method of questioning was designed to focus the respondent's mind on whether there had been an increase or decrease or no change, and therefore reduce the extent of any measurement error. For work effort, respondents stated their agreement or disagreement with the statement "My job requires that I work very hard" (as used above in the levels analysis) against a four-point scale. They answered against the same scale in respect of their previous job, and then the difference was computed to give a measure of change over the period. The same procedure was followed to calculate changes in work hours, work variety, choice of work method and closeness of supervision.

Finally, respondents were also asked whether certain aspects of their job had changed since their job five, four or three years previously. These questions were only asked of those who had remained in the same job. In particular, they were asked whether there was "a reduction in the number of people doing this sort of work"; we constructed a dummy variable which we called "Downsized Workplace" equal to one if they responded yes, zero otherwise. They were also asked if they had been promoted.

Descriptive statistics for all the RHS variables are given in the Appendix.

4. Findings

(i) Well-Being, Stress, Skills and Effort

Table 1 presents some informative descriptive statistics for the measures of well-being. Mean values were 3.77 for anxiety-contentment and 4.32 for enthusiasm-depression, each somewhat lower than the means reported in Warr (1990).[6] The mean level of job satisfaction is 4.23, between the "fairly satisfied" and "very satisfied" categories. The comparable figure from the Employment in Britain Survey of 1992 is 4.45, thus confirming and extending the evidence highlighted by Oswald and Gardner (2001) that job satisfaction has been declining in Britain. [7]

We divided the sample of respondents into two equal halves according to the required skills level in their jobs. In Panel A it can be seen that those in high skilled jobs have a higher state of affective well-being according to the enthusiasm-depression scale and the job satisfaction scale than those in low skilled jobs. However, according to the contentment-anxiety scale the higher skilled fare less well than the lower skilled, in effect expressing more anxiety about their jobs.

It is known from previous work that higher skill levels tend to be associated with greater levels of work effort. Since the latter are found in many studies to be linked to lower levels of affective well-being, an initial possibility is that the greater anxiety of the high skilled might be associated with the fact that they need to work harder than the low skilled. Accordingly, we also divided the sample into two halves according to whether their jobs involved hard work, as defined above. Within both the high effort group and the low effort group, high skilled jobs entail lower levels of contentment-anxiety than the low skilled jobs. However, the differences are not so great as with the whole sample. For example, the difference is 0.14 within the low effort group, but is 0.22 within the whole sample. Thus, this initial investigation suggests that the phenomenon of high skilled jobs involving greater anxiety is partly but not entirely a question of differential workload between high skilled and low skilled jobs.

A similar story is found in Panel B which looks at the changes in self-reported stress. One in two respondents reported an increase over the period. It should be noted that these changes apply to individuals as they grow older, and do not accurately represent a change in the average level of self-reported stress in the workforce as a whole. Moreover, there can be an element of nostalgia

[6] Though Warr's survey respondents (in the 1980s) were not representative of those working in Britain, the mean values within particular social classes remain higher than for the 2001 Skills Survey. However, further research would be necessary to establish whether there has been a decline in these indicators of well-being over time.

[7] Oswald and Gardner have the mean score declining to 5.32 on their 1 to 7 scale, equivalent to 4.32 on our 0 to 6 scale. Although the populations of the BHPS and the Skills Survey are not the same, the latter being representative of all 20 to

bias, with past jobs seen in a rosier light than they were at the time. Nevertheless, the balance of the proportions stating an increase over the proportions stating a decrease is fairly substantial. Of particular note is the strong correlation with changes in the skills required over the same period: for example, where the skills were rising, 60 percent reported an increase in stress, compared to only 27 percent in jobs where skills were said to be falling. The correlation will be independent of any upward bias in the reporting of either stress change or skill change. However, it remains possible that part of the correlation is spurious because, although not asked consecutively, some respondents could have propensities to answer the change questions in a particular way.

(ii) The Determinants of Mental Well-Being

In order to investigate what factors might underly the relationships between the required skill level and the indices of well-being, we regressed the well-being scales against skills and also a number of variables designed to capture those determining factors identified by psychological theorists and in previous empirical studies.

We focus our discussion on Tables 2 and 3 which present the results for the contentment-anxiety and the enthusiasm-depression scales. In column (1) of each tables is reproduced the finding from Table 1, that skilled jobs are associated with higher levels of enthusiasm-contentment, but lower levels of contentment-anxiety. It is also seen that higher level computing skills is associated with greater anxiety. The strategy in subsequent columns is to introduce further determinants in order to examine both the influence of these determinants *per se* and the extent to which these other determinants account for the relationship between skills and well-being.

In column (2) of both tables, we introduce indicators of hard work and work hours. Hard work has an unambiguous, substantial negative impact on well-being, being associated with high anxiety and greater depression. This finding is consistent with several earlier studies which tend to show consistent negative links between a range of measures of workload and various well-being measures. Although this finding may seem unsurprising, it is not unknown for commentators to suggest that workers may prefer to work very hard. The sense of this notion is that, if work is satisfying in itself, then idling can cause dissatisfaction. The finding here shows that, when

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60-year-olds in work, comparison with our figure hints that there may have been a further decline in job satisfaction since 1998.

measured in terms of the variables underlying our composite indicator of hard work, there is no doubt that less tension, slower speeds, and so on are preferable.[8]

However, a related idea that some people like working long hours is supported. The relationship of work hours with well-being is U-shaped. It is negative up to 34 hours a week for the contentment scale, and up to 36 hours for the enthusiasm scale. Beyond these points, well-being starts to increase. In an alternative specification using hours bands, those working over 70 hours a week were found to have significantly higher enthusiasm levels than those working normal hours. These respondents may be what are often termed "workaholics", though the term has a more technical connotation within psychological theory which cannot be tested here.

As expected, a good deal of the negative relationship between skills and contentment-anxiety is accounted for by the effort variables. The skills coefficient for contentment-anxiety is reduced to a little more than a third of what it is in column (1), consistent with the idea that part of the association shown in column (1) was due to the correlation between skills and hard work. By similar reasoning, the coefficient for enthusiasm-depression on required skills in column (2) is also downward biased, as is suggested by the increased skills coefficient in Table 2.

A possibility is that the positive association of required skills with enthusiasm-depression arises because skilled jobs tend to come with higher levels of task discretion, participation in decision-making and team working. Accordingly, in column (3) we introduce these indices. It is observed that both measures of affective well-being are strongly associated with greater task discretion, higher levels of participation and the presence of team support for learning. Moreover, the required skills coefficient for enthusiasm-depression falls, between columns (2) and (3), from 0.071 to 0.041, indicating that part of the impact of skills is associated with the role of discretion, participation and team support.

Column (4) in each table examines additional hypotheses concerning the link between skills and well-being. It is argued that well-being is reduced if workers lack the opportunity to utilise their skills. This finding is strongly and robustly confirmed for both dimensions of well-being: those who are "over-skilled" are both less content and less enthusiastic about their work. This finding confirms those of previous studies. A further new finding is that those who are over-qualified for their jobs experience lower levels of well-being, additional to any impact from being over-skilled. However, the effect is only statistically significant in the case of contentment-anxiety. As shown in a companion paper, only one half of those who are over-qualified are also over-skilled (Green and

[8] In a further specification, not shown in the table, we also inputted a quadratic term in hard work, which carried a

Mcintosh, 2002); nevertheless, over-qualified individuals also experience an independent welfare loss. Our interpretation of this association is that individuals have expectations associated with their achieved qualifications, which if not met can lead to distress; but we do not have an independent measure of expectations with which to confirm this conjecture.

It is also expected that workers who perceive themselves as lacking some skills needed for their jobs will show lower levels of well-being. The variable "Undertrained" has a strong and robust negative influence on well-being. Where an individual feels that some or more training would have been helpful to keep up with the skills needed for the job, but was not made available by the employer, this occasions a palpable worsening of worker well-being.

With the introduction of these skills mismatch variables, the coefficient on required skills for the enthusiasm-depression scale becomes insignificantly different from zero. The impact of skills observable in columns (1) and (2) is accounted for by the fact that skilled jobs entail higher levels of discretion, participation and team support, and that skilled jobs are less likely to entail workers underutilising their skills or being over-qualified.

In column (5) of each of Tables 2 and 3, we introduce several control variables, those suggested by the existing literature on the determinants of worker well-being. Those of prime age have lower levels of well-being than both young and old workers. Receiving a "fair wage" is significantly positively related to enthusiasm, while those who are insecure about their jobs are both more anxious and more depressed in their work. Male workers appear to be more depressed but at the same time less anxious than female workers. The association of working in large establishments with enthusiasm-depression is negative, though it just failed to reach statistical significance at the 5% level. These findings are consistent with a number of earlier findings in the literature, and with expectations. Also included in these regressions, though not shown, are 17 industry dummies, designed to take account of unspecified factors particular to each industry. It is noteworthy that workers in Agriculture and Fishing show high levels of well-being on both scales; presumably, unspecified conditions in these industries are more conducive to well-being than elsewhere, an idea that seems at least plausible.

Column (6) of Tables 2 and 3 examine interaction effects that are suggested by some studies in the literature. It has been hypothesised that participation and social support might be able to mediate the negative effect of high work load. By extension the impact of skill level on well-being might be expected to interact with the extent of participation and support for the individual. Appropriate

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significant negative coefficient, suggesting that the marginal effects of hardwork on welfare are increasing.

interactive terms are thus included. These show only weak evidence for interaction effects. As expected, the interactions of participation and team support with hardwork carry positive coefficients, but the coefficient is only positive in the case of team support. That is, the effect of hard work in generating greater anxiety amongst workers is somewhat lessened when the worker has support from the team. However, neither participation nor team support have a positive interaction with required skill. Moreover, there are no interactive effects on the enthusiasm-contentment scale.

(iii) The Determinants of Job Satisfaction

As argued before, if the impact of being in a skilled job is to generate feelings of arousal, we would not necessarily expect a strong impact on job satisfaction, if the job satisfaction scale is not related to that emotional dimension. Nevertheless, as we saw in Table 1, higher skilled jobs gave greater job satisfaction. In Table 4, multi-variate analysis seeks to establish whether this association can be explained by the other variables that impinge on welfare. Using the same approach as in Tables 2 and 3, it is seen from column (1) that overall required skills are positively associated with job satisfaction. Once effort, participation, discretion and team support have been included, however, (column (3)), there is no further association with job satisfaction. Skills mismatch is negatively associated with job satisfaction (column (4)). Once this and other control variables have been the association of job satisfaction with required skills switches sign. Insecurity, gender, the fair wage, industry, work intensity, work hours, discretion, participation and team support have effects in the same direction on job satisfaction as they do on contentment-anxiety and on enthusiasm-depression.

(iv) The Determinants of Self-Reported Rising Stress

In the analysis of the previous section, the association of skills levels with worker well-being was investigated. The evidence is consistent with the view that the impact of being in a skilled job is best characterised as generating arousal, but not having an impact on the pleasure dimension (as measured by overall job satisfaction) independent of the associated factors of discretion, participation, team support and hard work.

A common problem with cross-section analyses is that the dependent variable's association with RHS variables need not reflect a causal relationship. Unobserved heterogeneity among individuals could generate such an association, even when no causal link exists. For example, in the case here it

is known that individual character types are associated with the propensity to experience certain states of affective well-being (Warr, 1996). If those character traits are also associated with selection into certain occupations with certain required skill levels, that could lead to the observed association with well-being and skill, even though "treating" the individual to a job with that level of skill might have no effect. This possibility means that the findings of the previous section must be qualified, as must many of the findings in the literature, by the caveat that they await confirmation in a longitudinal analysis. Nevertheless, it remains true that the evidence here is consistent with all the hypotheses as expected, and a large number of potential factors can be observed and controlled for in this analysis.

In this section we examine links between changes in worker wellbeing and changes in skills. An advantage of looking at changes is that, where any unobserved heterogeneity amongst individuals is fixed, the effect cancels out when differences among the dependent and independent variables are analysed. Possibilities of bias remain, but here the issue is whether unobserved individual factors might be associated with changes in the variables, rather than with the levels. Disadvantages of looking at changes also include an increased risk of measurement error, and this risk is greater when the dependent variable is completely dependent on the respondent's recall. Moreover, in this study the measure of stress is self-reported, with attendant possibilities of bias generated by media prominence given to the concept of stress. Given this balance of advantages and disadvantages, the objective here is to investigate the same issues in the change context, to see if the findings of the previous section are broadly consistent. Consistency of findings using two very different methods, and different variables is likely to generate greater confidence in the conclusions.

Column (1) of Table 5 examines whether the correlation demostrated earlier (Table 1) between stress change and skills change remains when account is taken of other changes over the period. We entered skills change by two dummy variables capturing skills "unchanged" and "increased", with "decreased" being the excluded category. The coefficients are positive, significant and increasing in skills change, thus re-affirming the earlier result that upskilling is associated with increased stress. We also entered the dummy variable "Under-trained" which indicates if the respondent has had insufficient training to keep up with skills changes in the job. This variable had a robust, positive, effect on stress. Finally we controlled for whether the individual moved job over the previous period of change considered. Unsurprisingly, moving job is associated with a

reduction of stress. We interpret this as saying that some individuals may move job in order to reduce stress levels.[9]

As with the previous analyses of mental well-being, the link between skill and stress could be attributable to the link between skill and hard work. When the change in effort level is included, as in column (2), the link between skill change and rising stress is reduced, though it is still significant. Also consistent with the previous analyses, increasing work effort is unambiguously associated with rising stress. Rising work hours are also associated with increased stress.

The relationship between skills and stress also holds separately for rising computing, maths, planning and writing skills, as is shown in column (3). In each case, rising skill is associated with rising stress. There is also evidence from this specification that where the variety of work in a job increases this has a mitigating effect, reducing the likelihood of rises in stress. The qualification made earlier, however, is again relevant here: it remains possible that some of the correlations are spurious because of the propensity of respondents to respond in similar ways to the change questions. However, the fact that coefficients remain high and significant when all the skills change variables are entered could not easily be explained by any single common spurious element in the responses.

Column (4) brings in an indicator of changes in task discretion, analogous to but quite separate from the levels indicator used in the previous section. Can greater choice over the way that the job is done help to mitigate any negative impacts of rising skills and effort? The More Discretion coefficient suggests that, just as in the levels analysis of affective well-being, task discretion is also associated with lower stress. We also entered a variable to tap changes in the closeness of supervision. The objective was to input an indicator of support at work, but whether close supervision is regarded as a support for workers or as an agency for monitoring of work effort will depend on circumstances. In the event, close supervision had no significant impact on stress change.

Finally, column (5) also includes further indicators of changing workload that are only applicable to situations where the individual has remained in the same job throughout the period of change. Consistent with expectations from the previous findings, a downsized workplace, where fewer workers are having to do the type of work that the respondent does, is one where stress has

[9] Of course, job-moves are endogenous. There are no plausible ways for controlling adequately for the endogeneity of job moves with this data. Note, however, that the pattern of results is unaltered even if we confine the sample to job stayers only.

increased more. Similarly, people who are promoted and, presumably, take on more responsibilities, are more likely to experience rising stress.

5. Discussion

In this study, we have explored the association between job skills and the well-being of workers.

One reason for some confidence in our findings is that, with respect to all the environmental variables that we entered into the analysis, in the light of the empirical and theoretical psychology literature, the coefficients are of the expected sign and are generally statistically significant. That does not mean, however, that the coefficients can be taken as estimates of the "effects" of the RHS variables. In some cases, the coefficient may reflect only the conditional association with, but not the causation by, the RHS variable. For example, conceivably job insecurity could be associated with lower well-being because of some unobservable factor which itself determines both well-being and feelings of insecurity. In many cases, we think that simplest interpretation, which is often the best, is that the correlation does reflect a causative process. Most obviously, the idea that hard work and task discretion would have, respectively, negative and positive impacts on well-being is much more plausible than any suggestion that there is a further, unobserved factor in the wings generating the correlation. While all cross-section results await confirmation where possible with longitudinal studies, the current findings are sufficiently robust to merit attention.

The evidence is that:

- The relationship between the skills required in jobs and the job-holders' well-being depends on the measure of well-being. Compared to less skilled jobs, higher skilled jobs are likely to be further up the enthusiasm-depression and job-satisfaction scales but lower down the contentment-anxiety scale. Taken together, skilled jobs are associated with greater levels of arousal among workers. Taking a dynamic approach, those who have experienced an increase in the skills required in their job are more likely to report a rise in their level of stress, than those whose skills are stationary or falling.
- These simple correlations conceal much, however. Part of the reason why skilled jobs are associated with greater levels of anxiety and self-reported stress is that skilled jobs also involve significantly harder work.[10] Longer hours of work have a U-shaped relationship to worker well-being, the minimum being just under the average workers' week. But hard work within given

[10] The correlation coefficient between the hard work index and the required skills index is 0.22 (p=0.00).

hours has an unambiguously detrimental and substantial impact on well-being. When account is taken of work intensity and working hours, skilled jobs are still negatively associated with contentment-anxiety and with self-reported stress, and positively associated with enthusiasm, as in the initial bivariate analysis.

- Part of the reason for the positive connection between skills and enthusiasm is that skilled jobs are more likely to involve greater task discretion and greater participation of workers in the decisions that concern their jobs, and to a lesser extent more support from a team.[11] Each of these factors helps to generate greater levels of affective well-being. These factors account for part of the role of skills in generating greater enthusiasm.

- Another reason why more skilled work is associated with greater enthusiasm is that workers in skilled jobs are less likely to report that their skills are being underutilised.[12] It is important, in fact, for workers' skills to be well-matched to their jobs' requirements. Those with underutilised skills (approximately one in three workers) experience more boredom and depression, less contentment, and less satisfaction than those who do not have underutilised skills. This is a common finding in many studies of well-being that has been confirmed here. However, we have also shown here, for the first time, that those whose skills have not kept up with job requirements (about one in six workers[13]) also experience greater depression, more anxiety and less satisfaction than those in matched jobs. When account is taken of the skills match in addition to the above factors of participation, discretion and team support, there remains no further independent link between required skills and enthusiasm.

- In contrast, none of our further control variables could account entirely for the negative association between required skills and the contentment-anxiety scale. Thus, we conclude that factors other than those we have been able to measure must account for the negative association. A possible candidate for such an explanation is that more skilled jobs carry responsibilities that, while challenging, may also induce anxieties.

- Finally, although less than one in five workers are insecure in their jobs, in the sense that they think they might become unemployed in the following year, those that are insecure are considerably less enthusiastic, more anxious and less satisfied in their jobs. Also important for

[11] The correlation coefficients between the Required Skills Index and, in turn, task discretion, participation and team support are, respectively, 0.25 (p=0.00), 0.20 (p=0.00) and 0.08 (p=0.00).
[12] The correlation coefficient between overskilled and the required skills index is – 0.34 (p=0.00).
[13] Note that some workers are both "undertrained" in this sense, but also "over-skilled". This can arise if the type of skills they have are not needed in their jobs, while they lack some of those that are needed.

worker well-being is the level of the wage in relation to what might be expected given one's qualifications, experience and other controls: what we have termed the "fairness" of the wage.

What are the significance and implications of these findings?

First, these findings suggest that it may be important to see the effects of upskilling on workers' welfare in a more comprehensive light. Hitherto, the benefits have been seen in terms of the wage premium accruing to skill acquisition, which in turn is thought to reflect the greater productivity of workers in skilled jobs. The benefits in terms of personal fulfillment in jobs have mainly been presumed, with little discussion, though they are typically included in the check list of benefits from education. When examined explicitly, however, the evidence reveals the importance of the greater participation and task discretion that on average accompany higher skilled jobs, and the fact that workers with good skills suffer in lower-skilled jobs precisely because they cannot utilise their skills. In those cases of skilled jobs where the opportunities for participation and discretion are low, the average worker is predicted to exhibit much lower levels of well-being on all measures. Lack of team support is a particular problem in those jobs where especially hard work is required, that is, jobs which involve high tension, exhaustion, high speeds and so on.

There is indeed a trade-off involved. If employers require higher level skills for their jobs (and even more so if they require higher commitments of effort), they would need to offer greater discretion and participation to keep their workers as well off on the contentment-anxiety scale as before. To give an example, a one standard deviation increase in the level of skill requirements[14] would lower well-being on the contentment-anxiety scale by 0.10 (1.32 x 0.077), which compares with 0.90, the standard deviation of contentment-anxiety; *ceteris paribus*, to compensate for this exactly would require an increase in the task discretion index by 0.77, that is, by approximately 1.17 times its standard deviation. A similar trade-off occurs in respect of stress: the effects of rising skill demands need to be balanced by increases in discretion and in training, or reductions in hours, if there is to be no rise in reported stress levels. By contrast, increasingly skilled jobs also bring, on average, a rise in enthusiasm for the job.

Second, the findings have a significant bearing on our understanding of trends in well-being over time. Both the decline in task discretion since 1986 and the increase in work intensity between 1992 and 1997 would imply, on the crude assumption that the cross-section relationships can be applied over time, that well-being could be in decline. Such a prediction is consistent with the

[14] A one-standard deviation spread either side of the mean covers roughly a third of jobs.

evidence about declining job satisfaction. By contrast, there has been a modest increase in the extent of participation between 1992 and 2001 (Gallie et al, 2002), which would in itself mitigate the decline in satisfaction.

To examine the decline in well-being further consider the following evidence. There is an additional, less conventional, indicator of well-being available in the survey which, while we do not subject it to a formal analysis here, is informative concerning the trends. Gallie et al (1998) use answers to three questions to construct an index of work strain. The questions ascertained the length of time that respondents reported that they "feel used up at the end of a workday", "keep worrying about job problems" after leaving work, or "find it difficult to unwind at the end of a workday". By asking the same questions, we were able to measure the change in this measure of work strain between 1992 and 2001. On all three variables, a significant increase in work strain is shown for workforce as a whole. For example, the proportions saying that they kept worrying about job problems after leaving work much, most or all of the time rose from 12 percent to 17 percent. We generated a work strain index based on the three questions. This index is most closely related to the contentment-anxiety scale that we have used in this paper, thus reinforcing the significance of our findings for this scale. In fact, the increase in work strain between 1992 and 2001 is easily accounted for by the large changes that have also occurred in work intensity. Using indicators of work effort that are available for both 1992 and 2001, we can divide the sample into high effort and low effort segments, similar to the analysis in Table 1 above. Within each segment, there is no significant rise in work strain; the overall rise in work strain is purely a consequence of a compositional change, involving jobs with higher levels of work intensity. Although an analysis of changes in the contentment-anxiety and enthusiasm-depression scales is not possible with our data here, changing work intensity appears likely to remain an important determining factor. In so far as rising work intensity may have come to a halt between 1997 and 2001, it may now be possible to re-establish higher levels of worker well-being through measures to halt the decline of task discretion and to encourage the rising trend of participation and of social support at the workplace.

Third, to the extent that worker well-being is adversely affected, whether by upskilling, work intensification, reductions in task discretion, or rises in job insecurity, there could be disadvantageous effects on economic performance. For example, Clark (2001) shows strong evidence that greater job satisfaction with various job facets robustly predicts quitting behaviour. There is evidence that job satisfaction is correlated positively with various measures of worker and organisational performance, although causation is sometimes not firmly established (Warr, 1996). Fewer studies have looked at associations of the contentment-anxiety and enthusiasm-depression

measures with performance, but those that do show positive links. For example, both measures are negatively correlated with absenteeism. There is considerable qualititative evidence of the detrimental effects of workplace stress on productivity, commitment and trust (Mankelow, 2002).

None of these studies allow us to quantify the extent to which the performance benefits of upskilling may be being reduced by disadvantageous effects on worker well-being, so at present their importance can only be guessed at. Further research that could incorporate both cause and effect, preferably with longitudinal data, would be needed to estimate the net benefits of higher skilled jobs for workers, incorporating both wage and welfare effects. The implication for governments in industrialised countries is that, while education and training continue to need to be matched to the changing skills demands of the economy, at the same time the associated changing pressures on workers need to be addressed with appropriate policies, so as to secure the full benefits of the increasingly skilled workforce.[15]

[15] A discussion of such policies is beyond the scope of this paper. For an interesting advocacy of regulatory policies on efficiency grounds, see Wilkinson and Ladipo (2002).

Table 1 Well-Being At Work in Britain, 2001

A. Well-Being Levels

	Contentment/ Anxiety	Enthusiasm/ Depression	Job Satisfaction
All	3.77	4.32	4.23
	(0.90)	(0.83)	(1.19)
High Skill	3.66	4.37	4.28
Low Skill	3.88	4.26	4.16
High Effort	3.43	4.18	4.10
High Skill	3.36	4.25	4.18
Low Skill	3.52	4.09	3.99
Low Effort	4.09	4.44	4.35
High Skill	4.01	4.51	4.41
Low Skill	4.15	4.38	4.29

High and Low Skill mean the upper and lower halves of the skills distribution, as measured by the Required Skills index. High and Low Effort mean the upper and lower halves of the effort distribution, as measured by the Hardwork index. Differences between the well-being means of the high skill and low skill jobs are all statistically significant at the 1% level, as are the differences between high effort and low effort workers.
Standard Deviations in Parentheses.

B. Change in Stress at Work over Previous Five Years*

	All (%)	Those with skills rising (%)	Those with unchanged skills (%)	Those with skills falling (%)
Increase in stress	49.3	60.5	35.3	26.6
No change in stress	30.8	24.8	46.4	13.7
Fall in stress	19.9	14.7	18.3	59.7

*Applies to those in work five years previously; for those not in work then, applies to change since four or three years previously if in work at either of those dates.

Table 2 Determinants of Well-Being at Work: Contentment-Anxiety Scale

	(1)	(2)	(3)	(4)	(5)	(6)
Required Skills	-0.079 (0.012)**	-0.027 (0.011)*	-0.051 (0.012)**	-0.076 (0.013)**	-0.077 (0.015)**	-0.042 (0.021)*
Computing skills	-0.077 (0.014)**	-0.070 (0.013)**	-0.083 (0.014)**	-0.082 (0.014)**	-0.080 (0.016)**	-0.080 (0.016)**
Hours/100		-0.512 (0.260)*	-0.320 (0.332)	-0.261 (0.351)	-0.421 (0.391)	-0.421 (0.392)
$Hrs^2/10^4$		0.746 (0.341)*	0.320 (0.450)	0.228 (0.468)	0.281 (0.509)	0.278 (0.508)
Hardwork		-0.501 (0.017)**	-0.498 (0.018)**	-0.503 (0.018)**	-0.495 (0.019)**	-0.560 (0.031)**
Task Discretion			0.142 (0.023)**	0.134 (0.023)**	0.132 (0.025)**	0.127 (0.025)**
Participation			0.067 (0.013)**	0.058 (0.013)**	0.050 (0.014)**	0.052 (0.014)**
Team Support			0.123 (0.026)**	0.112 (0.027)**	0.117 (0.028)**	0.119 (0.029)**
Undertrained				-0.146 (0.036)**	-0.152 (0.037)**	-0.153 (0.037)**
Overqualified				-0.079 (0.030)**	-0.086 (0.033)**	-0.089 (0.033)**
Overskilled				-0.144 (0.032)**	-0.130 (0.034)**	-0.126 (0.034)**
Age					-0.048 (0.011)**	-0.048 (0.011)**
Age squared/100					0.057 (0.014)**	0.057 (0.014)**
Fair Wage					0.022 (0.037)	0.017 (0.037)
Job Insecurity					-0.054 (0.012)**	-0.054 (0.012)**
Large Workplace					-0.037 (0.032)	-0.036 (0.032)
Male					0.073 (0.035)*	0.077 (0.035)*
Participation Times Hardwork						0.027 (0.017)
Team Support Times Hardwork						0.083 (0.037)*
Participation Times Skill						-0.016 (0.010)
Team Support Times Skill						-0.035 (0.022)
Observations	4092	4091	3589	3374	3030	3030
R-squared	0.03	0.21	0.24	0.25	0.27	0.27

* significant at 5% level; ** significant at 1% level
The regressions in columns (5) and (6) also include 17 industry dummies.

Table 3 Determinants of Well-Being at Work: Enthusiasm-Depression Scale

	(1)	(2)	(3)	(4)	(5)	(6)
Required Skills	0.050 (0.011)**	0.071 (0.011)**	0.041 (0.012)**	0.007 (0.013)	0.000 (0.014)	0.026 (0.020)
Computing skills	-0.015 (0.013)	-0.006 (0.013)	-0.035 (0.014)**	-0.031 (0.014)*	-0.024 (0.016)	-0.024 (0.015)
Hours/100		-1.177 (0.271)**	-1.104 (0.318)**	-0.931 (0.341)**	-0.620 (0.380)	-0.627 (0.381)
$Hrs^2/10^4$		1.620 (0.358)**	1.208 (0.437)**	0.985 (0.462)*	1.013 (0.496)*	1.025 (0.498)*
Hardwork		-0.221 (0.018)**	-0.210 (0.018)**	-0.215 (0.018)**	-0.218 (0.020)**	-0.260 (0.031)**
Task Discretion			0.248 (0.023)**	0.230 (0.023)**	0.208 (0.025)**	0.203 (0.025)**
Participation			0.131 (0.012)**	0.120 (0.013)**	0.106 (0.013)**	0.109 (0.014)**
Team Support			0.163 (0.026)**	0.146 (0.027)**	0.155 (0.028)**	0.156 (0.028)**
Undertrained				-0.127 (0.036)**	-0.098 (0.037)**	-0.100 (0.037)**
Overqualified				-0.045 (0.030)	-0.031 (0.031)	-0.033 (0.031)
Overskilled				-0.255 (0.032)**	-0.212 (0.033)**	-0.208 (0.033)**
Age					-0.024 (0.011)*	-0.024 (0.011)*
Age squared/100					0.033 (0.014)*	0.033 (0.014)*
Fair Wage					0.113 (0.037)**	0.109 (0.037)**
Job Insecurity					-0.079 (0.012)**	-0.079 (0.012)**
Large Workplace					-0.051 (0.031)	-0.049 (0.031)
Male					-0.091 (0.035)**	-0.088 (0.035)*
Participation Times Hardwork						0.015 (0.017)
Team Support Times Hardwork						0.060 (0.037)
Participation Times Skill						-0.017 (0.010)
Team Support Times Skill						-0.020 (0.022)
Observations	4087	4086	3584	3371	3027	3027
R-squared	0.01	0.05	0.14	0.17	0.20	0.20

* significant at 5% level; ** significant at 1% level
The regressions in columns (5) and (6) also include 17 industry dummies.

Table 4 Determinants of Job Satisfaction

	(1)	(2)	(3)	(4)	(5)	(6)
Required Skills	0.059 (0.017)**	0.078 (0.017)**	0.028 (0.018)	-0.048 (0.019)*	-0.050 (0.021)*	0.000 (0.031)
Computing skills	-0.023 (0.020)	-0.011 (0.020)	-0.037 (0.021)	-0.031 (0.020)	-0.017 (0.023)	-0.016 (0.023)
Hours/100		-1.956 (0.348)**	-2.090 (0.444)**	-1.674 (0.469)**	-1.858 (0.535)**	-1.856 (0.534)**
$Hrs^2/10^4$		2.785 (0.434)**	2.338 (0.590)**	1.783 (0.619)**	2.302 (0.686)**	2.303 (0.685)**
Hardwork		-0.224 (0.028)**	-0.204 (0.029)**	-0.192 (0.029)**	-0.193 (0.030)**	-0.293 (0.048)**
Task Discretion			0.344 (0.035)**	0.293 (0.036)**	0.264 (0.037)**	0.256 (0.037)**
Participation			0.216 (0.019)**	0.197 (0.019)**	0.168 (0.020)**	0.173 (0.020)**
Team Support			0.241 (0.039)**	0.211 (0.039)**	0.220 (0.041)**	0.222 (0.041)**
Undertrained				-0.333 (0.057)**	-0.287 (0.059)**	-0.289 (0.059)**
Overqualified				-0.115 (0.044)**	-0.091 (0.046)	-0.096 (0.046)*
Overskilled				-0.506 (0.048)**	-0.461 (0.049)**	-0.454 (0.050)**
Age					-0.029 (0.017)	-0.028 (0.017)
Age squared/100					0.036 (0.021)	0.036 (0.021)
Fair Wage					0.198 (0.055)**	0.190 (0.055)**
Job Insecurity					-0.135 (0.019)**	-0.135 (0.019)**
Large Workplace					-0.114 (0.046)*	-0.111 (0.046)*
Male					-0.068 (0.051)	-0.062 (0.051)
Participation Times Hardwork						0.029 (0.026)
Team Support Times Hardwork						0.156 (0.058)**
Participation Times Skill						-0.027 (0.014)
Team Support Times Skill						-0.047 (0.033)
Observations	4096	4095	3591	3375	3031	3031
R-squared	0.00	0.03	0.12	0.17	0.20	0.20

* significant at 5% level; ** significant at 1% level
The regressions in columns (5) and (6) also include 17 industry dummies.

Table 5 Determinants of Self-Reported Rising Stress

	(1)	(2)	(3)	(4)	(5)
Skills unchanged	0.509 (0.078)**	0.306 (0.087)**		0.316 (0.087)**	0.206 (0.175)
Skills increased	1.070 (0.077)**	0.798 (0.088)**		0.818 (0.089)**	0.696 (0.178)**
Under-trained	0.175 (0.051)**	0.169 (0.053)**	0.164 (0.053)**	0.170 (0.053)**	0.180 (0.078)*
Moved job	-0.447 (0.038)**	-0.399 (0.040)**	-0.431 (0.043)**	-0.389 (0.040)**	
Increase in work effort		0.428 (0.032)**	0.414 (0.033)**	0.424 (0.032)**	0.326 (0.055)**
Increase in hours		0.022 (0.002)**	0.020 (0.002)**	0.022 (0.002)**	0.022 (0.004)**
Increased work variety		-0.029 (0.020)	-0.058 (0.020)**	-0.013 (0.021)	-0.033 (0.042)
Computing skills unchanged			0.149 (0.112)		
Computing skills increased			0.291 (0.110)**		
Maths skills unchanged			0.090 (0.085)		
Maths skills increased			0.256 (0.093)**		
Planning skills unchanged			0.428 (0.094)**		
Planning skills increased			0.910 (0.098)**		
Writing skills unchanged			0.079 (0.078)		
Writing skills increased			0.251 (0.085)**		
More discretion				-0.042 (0.023)*	-0.143 (0.040)**
Downsized Workplace					0.210 (0.061)**
Promoted					0.364 (0.073)**
Closer Supervision				0.025 (0.023)	0.067 (0.043)
Observations	4034	3888	3889	3888	1984

* significant at 5% level; ** significant at 1% level

Table A1 Descriptive Statistics for RHS Variables

	Mean	Standard Deviation	Range
Age	39.9	10.6	20 to 60
Closer Supervision	-0.217	0.968	-4 to 4
Computing skills	1.55	1.12	0 to 4
Computing skills increased	0.52	0.50	0 or 1
Computing skills unchanged	0.42	0.49	0 or 1
Downsized Workplace	0.30	0.46	0 or 1
Fair wage (residual log pay)	0		
Hardwork	-0.02	0.81	-3.10 to 1.65
Hours	37.5	14.6	0 to 126
Increase in hours	-0.58	11.3	-74 to 82
Increase in work effort	0.029	0.75	-3 to 3
Increased work variety	0.30	1.21	-4 to 4
Job Insecurity	0.53	1.28	0 to5
Large Workplace (25 or more workers)	0.62	0.49	0 or 1
Male	0.55	0.50	0 or 1
Maths skills increased	0.22	0.42	0 or 1
Maths skills up unchanged	0.69	0.46	0 or 1
More discretion	0.380	1.07	-3 to 3
Moved job	0.48	0.50	0 or 1
Overskilled	0.33	0.47	0 or 1
Participation	1.03	1.12	0 to 3
Planning skills increased	0.45	0.50	0 or 1
Planning skills unchanged	0.46	0.50	0 or 1
Promoted	0.25	0.43	0 or 1
Required Skills	0.024	1.32	-2.04 to 2.41
Skills increased	0.59	0.49	0 or 1
Skills unchanged	0.32	0.47	0 or 1
Task Discretion	2.24	0.66	0 to3
Team Support	0.47	0.50	0 or 1
Underskilled	0.61	0.41	0 or 1
Undertrained	0.17	0.39	0 or 1
Writing skills increased	0.27	0.44	0 or 1
Writing skills unchanged	0.62	0.49	0 or 1

For definitions, see text.

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