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DISCUSSION PAPER SERIES

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ABSTRACT

Working for Nothing: Personality and Time Allocation in the UK

We contribute to the literature on the effects of personality traits on labour market outcomes focusing on time mismanagement as an underlying mechanism. We document differences in time allocation to the labour market by different personality types in the UK and show how they may account for some of the labour market disadvantage experienced by more neurotic types (and the advantage experienced by more conscientious types) focussing in particular on unpaid overtime. We make use of the first ten waves of the Understanding Society Survey and show that particular personality types are more prone to working longer hours and experiencing time pressures. Whilst the effect of most personality traits is consistent with a rational theory of time allocation, we also find that neuroticism is instead associated with inconsistent behaviour (working fewer paid and more unpaid hours) and discuss implications for both labour market discrimination and labour supply theory.

JEL Classification: A13, D01, J22, Z1

Keywords: labour supply, overtime, time, time allocation, personality

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Omnia aliena sunt*, *tempus tantum nostrum est
(Nothing is ours, except time)

Lucius Annaeus Seneca, Seneca - Epistulae morales ad Lucilium, Liber 1, 1.

1. Introduction

There has been a growing interest in economics in the role of personality in individual decisions and their impact on resulting outcomes (see Borghans et al, 2008; Almund et al., 2011; Heckman et al., 2019 for reviews), particularly in the field of labour economics. The most commonly used personality measures are the so called Big Five personality measures (Costa and McCrae, 1992). The Big Five are obtained through several underlying factors measured through survey questions (McCrae and Costa, 1992) and are described as follows:

(1) ***Extraversion***: An orientation of one's interests and energies toward the outer world of people and things rather than the inner world of subjective experience; characterized by positive affect and sociability.
(2) ***Neuroticism***: a chronic level of emotional instability and proneness to psychological distress (emotional stability is predictability and consistency in emotional reactions, with absence of rapid mood changes).
(3) ***Openness to Experience/Intellect***: the tendency to be open to new aesthetic, cultural, or intellectual experiences.
(4) ***Conscientiousness***: The tendency to be organized, responsible, and hardworking.
(5) ***Agreeableness***: The tendency to act in a cooperative, unselfish manner.

Personality traits have been shown to be between 40 and 60% heritable (Bouchard and Loehlin 2001), and the literature finds that personality measures are different across women and men (e.g. Feltcher, 2012; Mueller and Plug, 2006), with women's values being higher than men for all traits with the exception of openness to experience.

These traits have been found to be predictive of a variety of behaviours, such as schooling, academic achievement, wages, teenage pregnancy, health behaviours and risky behaviours, with a predictive power that is sometimes equal or greater than that of cognitive traits (Almlund

et al., 2011). Neuroticism in particular is associated with a range of negative outcomes and considered a public health issue (Lahey, 2009): both direct and indirect evidence link it to several serious physical and mental health problems (Brickman et al., 1996; Drossman et al., 2000; Smith and MacKenzie, 2006; Suls and Bunde, 2005; Russo et al., 1997), as well as quality of life (Arrindell et al., 1999; Lynn and Steel, 2006; Ozer and Benet-Martinez, 2006), marital satisfaction and separation (Gattis, et al., 2004; Donnellan, et al., 2004; Karney and Bradbury, 1997; Kelly and Conley, 1987; Roberts et al., 2007; Rogge, et al., 2006; Tucker, et al. 1998), and occupational success (Ozer and Benet-Martinez, 2006; Roberts et al., 2008).

Economists often view personality as a non-cognitive trait linked to decision making (Becker et al, 2012; Borghans et al, 2008; Jagelka, 2020; Heckman et al., 2019), with some debate regarding whether they should be viewed as preferences. Specifically, the literature links extraversion to risk aversion, conscientiousness to time preference and agreeableness to altruism (Becker et al, 2012; Heckman et al., 2019; Jagelka, 2020). Bowles et al. (2001a,b) suggest that the effect of personality traits on wage premia operates in particular through the ability to set incentive schedules (degree of future orientation), personal efficacy, and reduced disutility of effort. One may expect, for example, more conscientious individuals to put in more effort (and be more patient as shown by Daly et al., 2009) and hence to be more likely to participate in the labour market and work longer hours, especially as they tend to exhibit lower absenteeism (Stomer and Fahr, 2010). One may also expect an extravert person to value their leisure time more highly or a neurotic person to feel more pressure and face more obstacles to entering the labour market (Wichert and Pohlmeir, 2010). Neuroticism is instead always related to higher likelihood of experiencing negative events and to less effective strategies for coping with stress and lower levels of social support (Perkins et al., 2015; Watson & Hubbard, 1996; Kendler et al., 2002 and 2006).

Indeed, most of the literature tends to find conscientiousness and extraversion to be positively related to earnings, and neuroticism negatively associated with all labour market outcomes, with important heterogeneities by gender, race, and socioeconomic status (Furnham and Cheng, 2013; Fletcher, 2012; Wichert and Pohlmeier, 2010). Nandi and Nicoletti (2014) for example have estimated the effect on pay in the UK and found that openness to experience is the most important in explaining wages (but captures differences in workers characteristics), followed by neuroticism (penalty), agreeableness (penalty), extraversion and conscientiousness. Cubel Sanchez et al. (2016) have used a real effort task in the lab to examine

the impact of the Big Five personality traits on performance, finding more neurotic subjects performing worse and more conscientious subjects performing better, with both gender and university major affecting the relationship. Braakmann (2009) and Nyhus and Pons (2012) find that women's higher level of agreeableness contributes to their lower wages and Risse et al (2018) find the gender gap in hourly wage rates in Australia is partly explained through men's lower agreeableness, and partly compensated by women's higher level of conscientiousness. The effect of agreeableness is not entirely consistent in the literature: Gensowski (2018) finds agreeableness also negatively correlated with lifetime earnings in the US, but Heineck and Anger (2010) find agreeableness to be positively related to the earnings of women but not of men in Germany. A recent paper (Whener et al 2020) found recruiters in Germany select applicants on personality (conscientiousness and agreeableness positively affect hiring probability) and also assign them to different tasks once hired depending on their personality.

In this paper we explore the possibility of a unifying story tying some of the effects observed in the literature and focussing on the fact that some of the personality traits appear to linked with labour market outcomes related to time mismanagement. We therefore focus on working overtime, experiencing time pressures and being dissatisfied with own time allocation and investigate whether, controlling for a range of demand and supply factors, certain personality types are more systematically associated with experiencing these negative outcomes. We use the first 10 waves of the UK household panel survey, Understanding Society Survey (USS) and assess the role of personality as measured with the Big Five in the supply of time to the labour market of employed individuals, the experience of time pressure, and satisfaction with time allocation. We focus on unpaid overtime, to see whether the effect of personality traits persists even net of the possibility that personality traits correlate with sorting just in those jobs where the most hours are worked. Overtime is also important because the UK has historically had some of the longest average working hours in the EU (Hogart et al, 2007), and the TUC reports that unpaid overtime is rife in the UK labour market (TUC, 2017). Data released by the TUC (TUC, 2017) shows that in 2016 UK workers gave their employers £33.6 billion of free labour through unpaid overtime, with 5.3 million people supplying an average of 7.7 hours a week in unpaid overtime, corresponding to an average of £6,301 missed out in the average pay packet. The effects of long hours range from to high instances of accidents and mistakes in the workplace and low productivity (Pencavel, 2016 and 2015), to general poor health and stress, to family conflict and community depletion resulting from too little time being invested in relationships (Burke and Cooper, 2008; Bruchardt, 2008).

2. Data

Our sample is extracted from the UK Understanding Society Survey, an annual survey which follows around 40,000 UK household over time which began in 2009 as a successor to the UK BHPS longitudinal survey. The survey collects information on social and economic variables at the individual and household level. We focus on the general population and Northern Ireland sample and exclude the ethnic minority boost and BHPS samples, so our sample is representative of the UK. We include only individuals who were at least 25 when the personality questions were asked since Cobb-Clark and Schurer (2012) have showed personality traits are stable for those aged 25+, and limit to those of working age between the ages of 25 and 64, assuming the majority who are 25 and over should have finished their education (as also assumed by Wichert and Pohlmeir, 2010). We concentrate on those who are employed, since our main interest is hours allocated to the labour market, and exclude those who are self-employed (due to differences in variables collected for those in self-employment). We make use of all 10 waves and have a sample of 6,054 men and 8,207 women who have full information on personality and hours worked.

Personality questions were asked in one USS wave (wave 3), and we make the assumption as others have done that personality traits are fixed over time. Many studies have shown that personality traits are shaped during childhood and tend to be stable once individuals reach adulthood (Costa and McCrae, 1988, 1994, 2006; Costa et al., 2000; Roberts and DelVecchio, 2000; Caspi et al. 2005; Roberts et al., 2006; Cobb-Clark and Schurer, 2012; Wichert and Pohlmeier, 2010), and immune to fluctuations in life circumstances thus eliminating problems of reverse causality. Some studies have looked at whether personality traits change in response to changes to factors such as income and job, but have found no or no economically meaningful effect (Anger at al., 2017; Cobb-Clark and Schurer, 2012, 2013). Cobb-Clark and Schurer (2012) suggest that personality traits are stable for those aged 25+ and as mentioned we only focus on those aged 25+ when the personality questions were asked in wave 3. Some studies have shown that personality traits change with age (e.g. Roberts and Mroczek, 2008) which we control for with the inclusion of age in our models. A shortened version of the big five factor traits was asked in wave 3 with details of the questions and how they map onto the five traits

are provided in appendix 1[1]. Personality measures are measured on a scale of 1 to 7, with a higher value representing a higher score on that trait.

Average values for the personality traits by gender in our sample are provided in Table 1. Consistent with past literature (e.g. Muller and Plug, 2006; Fletcher, 2013; Risse et al. 2018) women tend to report higher values of agreeableness, conscientiousness, extraversion and neuroticism, and lower values for openness to experience also in our sample.

Table 1: Average Personality by Gender

	Men		Women	
	Mean	st.dev	Mean	st.dev
Agreeableness	5.43	1.04	5.79	0.95
Conscientiousness	5.48	1.02	5.74	0.99
Extraversion	4.45	1.26	4.76	1.29
Neuroticism	3.29	1.34	3.82	1.39
Openness to Experience	4.70	1.19	4.51	1.26

All personality traits are statistically significantly different by gender at the 1% level
*Refers to the sample aged 25-64 who report information on personality and are employed (excluding the self-employed)
Includes 6,054 men and 8,207 women

3. Empirical Strategy

Hours Supplied to the Labour Market

We estimate a traditional labour supply model with the addition of measures of personality. In the standard labour supply model individuals are assumed to allocate their time between work or leisure in accordance with their budget constraint and preferences, and the choice should be made rationally so as to maximise utility. In a traditional utility maximizing framework, hours of work are assumed to be a function of the wage rate (W), non-labour (V) and a set of demographics which may influence preferences (X)

$$H = H(W, V, X) \quad (1)$$

[1] A shorten version of the five factor model may raise concerns of validity however studies (Gosling et al, 2003; Benet-Martinez and John, 1998) have assessed and shown their reliability and suitability for large scale surveys of a shortened version. Some argue that personality is potentially situation-specific (see Borghans et al., 2008 for a review); however it is noted the questions used in the Understanding society are worded so as not to relate to specific situations and hence to reflect typical behaviour.

However, it is a strong assumption that individuals can work their preferred number of hours at a given wage rate and there may be constraints from the demand side, so it is important to control for a number of job characteristics. Labour supply models used for microsimulation exercises often assume optimisation errors (see Aaberge and Colombino, 2015) and we suggest that such errors may at least in part be related to personality traits. We estimate an adapted traditional labour supply model of hours worked:

$$H_{it} = \beta_1 W_{it} + \beta_2 V_{it} + \beta_3 PERS_i + \beta_4 X_{it} + \beta_5 jobchars_{it} + a_i + u_{it} \quad (2)$$

H_{it} refers to usual weekly hours (normal, paid overtime or unpaid overtime) worked by individual i in period t. We include a measure of wage (W), which is approximated (as commonly used) by usual weekly pay (converted from usual monthly pay) divided by normal weekly hours (including any usual over time hours)[2]. Non-labour income (V) is proxied by additional monthly household income (household monthly income minus the individual's monthly labour income) equivalised for household size using the OECD equivalised scale. PERS refers to the big 5 personality traits (see appendix 1). X includes a set of demographic variables assumed to affect labour supply, region of residence and dummies for year of the survey, along with age group, marital status, the age of the youngest child, other caring responsibilities, and highest qualification, all expected to impact on/reflect preferences. To allow for demand side factors/constraints we include a number of job characteristics (whether the job is permanent, firm size, occupation, whether they work in the public sector and any managerial duties). Full details of the variables included are provided in appendix 2. a_i is an unobserved individual specific effect which includes factors that are fixed but unobserved over time; u_{it} is an unobserved idiosyncratic time varying error term.

We consider three measures of hours for those in employment (we exclude the self- employed): normal hours worked, paid overtime hours and unpaid over-time hours per week[3]. We explicitly

[2] We excluded outliers i.e. values above 99 (as the UK Labour Force Survey does). wages are measured with error which will induce some downward bias in the estimates, however, here we are interested in whether individuals over work given their current wage and additional income.

[3] We exclude anyone who reports normal hours in the top 1% (above 60 hours) and anyone who reports total over time that is in the top 1% (above 40 hours) for those reporting over time greater than 0.

focus on paid and unpaid overtime, to see whether the effect of personality traits persists even net of the possibility that personality traits correlate with sorting just in those jobs where the most hours are worked. We are particularly interested in unpaid overtime as this is the dimension where workers may have more control since normal hours and paid overtime allowed may be set by the employer. Unpaid hours may also be more likely to impinge on work life balance and potentially reflect misallocation of time. However, we are not able to directly separate out supply and demand influences on unpaid overtime. In our sample, 21.61 (29.09)% of men and 14.38 (27.46)% of women report doing paid (unpaid) overtime work, Average normal hours worked are statistically significantly higher for men (37.86 hours) than women (29.32 hours). Of those who do paid (unpaid) overtime, men on average do 8.05 (8.45) hours and women 6.17(7.45); with these hours of unpaid overtime amounting to around an extra day's work (if we assume individuals typically work 7-8 hours a day), and statistically significantly different by gender[4]. We estimate our models separately by gender for several reasons: because both average hours and personality vary by gender; but also because past research suggests the factors that impact labour supply decision vary by gender (e.g. Killingsworth and Heckman, 1986; Blundell et al., 2016).

Time Pressures and Satisfaction with Time Allocation

Respondents are asked questions related to experiencing time pressures in wave 2, with individuals asked on a scale from strongly agree (1) to strongly disagree (6) with the statement 'in general I have enough time to do everything'. Men are statistically significantly (at the 1% level) more likely to report they do not have enough time to do everything (44.17% compared to 41.30% of women). We estimate the following model of time pressure:

$$TP_i = \beta_1 PERS_i + \beta_2 X_i + \beta_3 HOURS_i + u_i \quad (3)$$

where TP_i refers to whether an individual (i) experiences time pressure. We control for household income since we may expect having more income may reduce time pressures e.g. to reduce household tasks. We then control for personality (PERS), hours worked (HOURS), split into normal, paid overtime and unpaid overtime, and the same demographic (X) variables as in

[4] Across all individuals (including those who do not do overtime) men on average work 1.74 (2.46) hours and women 0.89 (2.05) paid (unpaid) hours.

equation 2 except we include household income (equivalised using the OECD equivalence scale) instead of additional household income and wages. We also compare a version of equation 3 which includes the same job characteristics as in equation 2.

Respondents are asked in each wave whether they are satisfied with their amount of leisure time but no such question in relation to hours worked is asked. Since the standard labour supply model assumes an individual allocates their time between leisure and work in order to maximize their utility (which depends on consumption and leisure), deviations from this should be picked up through levels of dissatisfaction with leisure. Respondents are asked on a scale of 1 (Completely dissatisfied) to 7(Completely satisfied) how satisfied they are with their amount of leisure time. We also focus on job satisfaction given there is no question specifically about job hours which has the same scale as the leisure satisfaction variable.

For leisure time satisfaction (equation 4) we include controls for household income (HHI), as in equation 3 (excluding wage and additional household income) since we may expect those with higher income may be able to invest in household production saving measures. We include the same other demographic controls in X as in equation 3. In equation 4, SAT_{it} refers to the level of satisfaction with the amount of leisure time, individual i experiences in time t. Alongside personality, we also include measures for weekly normal, paid and unpaid hours (HOURS). For job satisfaction (equation 5) we include wage (and exclude household income) and job characteristics (as is standard in the job satisfaction literature e.g. Clark, 1997) and include the same other demographic controls, along with personality and hours as in equation 4.

$$SAT_{it} = \beta_1 HHI_{it} + \beta_2 PERS_i + \beta_3 X_{it} + \beta_4 HOURS_{it} + a_i + u_{it} \quad (4)$$

$$JOBSAT_{it} = \beta_1 W_{it} + \beta_2 PERS_i + \beta_3 X_{it} + \beta_4 HOURS_{it} + \beta_5 jobchars_{it} + a_i + u_{it} \quad (5)$$

Individuals report higher satisfaction with job satisfaction than leisure time. Women, on average (4.41) report statistically significantly higher values of satisfaction with leisure compared with men (4.39), whilst reporting statistically significantly higher levels of satisfaction with their job (5.34 compared to 5.17 for men), an established result in the literature (Clark, 1997).

Our measures of personality are fixed; therefore, we cannot use standard within group fixed

effects methods to account for the unobserved individual effect a_i , as the personality measures would be eliminated, we therefore employ a correlated random effects panel approach to estimate equations 2, 4 and 5. The correlated random effects approach is attributed to Mundlak (1978) and consists of including in the model specifications the means of the time varying variables as a proxy for fixed effects (the time invariant unobserved heterogeneity) which in our case are added to equations 2, 4 and 5 (for equation 3 we only have one wave of data). For the overtime dependent variables we utilize correlated random effects tobits to account for the existence of a corner solution as many do not work any overtime hours. Since the time pressure variable is only asked in one wave we cannot employ panel data methods so employ a binary probit, and report average marginal effects.

4. Results

Hours worked

We explore our three weekly hour outcome variables, normal hours, and paid and unpaid overtime and model women and men separately. We report the estimates with and without job characteristics to see how they might mediate the personality effect (to control for sorting into occupation by personality type, as documented by Cobb-Clark and Tan, 2011) and find that the effect of personality generally lessens. The results for the personality variables are reported in table 2 with full results in appendix 4. Details on and statistics for the controls are in appendix 2 and 3.

Across models, we find that personality traits indeed matter to hours worked, (more so for men than women), and in particular conscientiousness and neuroticism (particularly for women). Agreeableness is negatively associated with hours for men; conscientiousness is associated with working more hours for both women and men; extraversion (for men) and openness to experience (for women) are both positively associated with working hours. Neuroticism has indeed a peculiar effect on time allocation: whilst the other four traits behave relatively consistently across paid and unpaid hours, neuroticism is negatively associated with paid hours and positively with overtime unpaid hours. We are particularly interested in unpaid work hours and the more conscientious, neurotics and open to experience do more unpaid hours, with extraverts doing more unpaid hours but only if we exclude job characteristics.

Table 2: Effect of Personality on Work Hours for Women and Men

	Men		Women	
	Without Job Chars	With Job Chars	Without Job Chars	With Job Chars
Dependent variable: Normal Hours				
Agreeableness	-0.246***	-0.149*	-0.211**	-0.089
	[0.087]	[0.082]	[0.105]	[0.091]
Conscientiousness	0.583***	0.432***	0.190*	0.112
	[0.099]	[0.093]	[0.103]	[0.091]
Extraversion	0.159**	0.146**	0.183**	0.074
	[0.075]	[0.070]	[0.078]	[0.070]
Neuroticism	-0.217***	-0.054	-0.296***	-0.183***
	[0.072]	[0.067]	[0.071]	[0.064]
Openness to Experience	-0.072	-0.044	-0.020	0.059
	[0.083]	[0.079]	[0.081]	[0.072]
r-squared	0.0736	0.1556	0.2201	0.3366
Dependent variable: Paid Overtime				
Agreeableness	-0.089***	-0.073***	-0.011	-0.025**
	[0.021]	[0.020]	[0.012]	[0.012]
Conscientiousness	0.142***	0.102***	0.038***	0.025**
	[0.022]	[0.021]	[0.012]	[0.012]
Extraversion	0.037**	0.046***	0.018**	0.013
	[0.017]	[0.017]	[0.009]	[0.009]
Neuroticism	-0.128***	-0.095***	-0.037***	-0.022***
	[0.016]	[0.015]	[0.008]	[0.008]
Openness to Experience	-0.086***	-0.001	-0.007	0.014
	[0.019]	[0.018]	[0.010]	[0.010]
pseudo r-squared	0.0413	0.078	0.0362	0.0541
Dependent variable: Unpaid Overtime				
Agreeableness	0.043*	0.030	-0.032*	-0.010
	[0.024]	[0.023]	[0.019]	[0.018]
Conscientiousness	0.152***	0.141***	0.076***	0.065***
	[0.025]	[0.024]	[0.019]	[0.018]
Extraversion	0.044**	0.013	0.040***	0.021
	[0.019]	[0.018]	[0.014]	[0.013]
Neuroticism	0.147***	0.153***	0.094***	0.077***
	[0.018]	[0.018]	[0.013]	[0.012]
Openness to Experience	0.250***	0.128***	0.142***	0.063***
	[0.021]	[0.021]	[0.015]	[0.014]
pseudo r-squared	0.0774	0.1073	0.0869	0.1151

Robust standard errors in brackets *** p<0.01, ** p<0.05, * p<0.1

Normal hours models are estimated using a linear correlated random effects estimator, whereas overtime models are estimated using a tobit correlated random effects estimator and estimates reported for the tobit are unconditional marginal effects. The regressions for men includes a

sample of 6,054 men (35,981 person-years) and regressions for women include 8,207 women (49,156 person-years). Personal characteristics include ethnicity, age group, marital status, age of the youngest child, other caring responsibilities, highest qualification, log (hourly wage) and additional household income. Job characteristics include firm size, whether permanent job, whether in public sector, managerial duties, occupation. We also include controls for region of residence, year of survey and the means of time varying variables (full results are provided in appendix 4).

Job characteristics and sector of occupation play a big role in determining hours of unpaid overtime: teaching professionals come out top in terms of unpaid overtime, followed by corporate managers. Those with a permanent job, who have managerial duties, and who are employed in the public sector do more unpaid work (consistent with Gregg et al. 2011; Gicheva, 2020). Individuals with a degree are more likely to do more unpaid overtime and those with a higher wage, on average, do fewer normal hours but more unpaid overtime. These findings are consistent with a possible career return to unpaid overtime and working long hours which has been found by other studies (Cortes and Pan, 2019; Goldin, 2014), particularly in high paying sectors (Gicheva, 2013; Goldin, 2014), where it is argued that unpaid overtime is motivated by career concerns (Landers et al., 1996; Bell and Freeman, 2001) and longer hours are used to signal higher ability. To assess the extent to which this may be the case, we split the sample in professional (where career returns are possible) and non-professional occupations. As can be seen in table 3 below, the personality coefficients reveal that it is indeed in professional and managerial occupations that unpaid overtime is associated with personalities that lead to wage premia and career advantage (conscientiousness and extraversion), whilst in nonprofessional occupations where it is unlikely that unpaid overtime can lead to career advantages it is more closely associated with neuroticism and openness to experience.

Table 3: Unpaid overtime hours: Professional and Managerial versus Non-Professional

	Men		Women	
	Pro/man	Non-Pro/man	Pro/man	Non-Pro/man
Agreeableness	0.071*	0.020	-0.054	0.001
	[0.040]	[0.024]	[0.041]	[0.017]
Conscientiousness	0.263***	0.039	0.131***	0.031*
	[0.042]	[0.026]	[0.041]	[0.017]
Extraversion	0.075**	-0.022	0.109***	-0.014
	[0.032]	[0.020]	[0.030]	[0.012]
Neuroticism	0.222***	0.091***	0.144***	0.050***
	[0.031]	[0.018]	[0.029]	[0.011]
Openness to Experience	0.219***	0.062***	0.132***	0.034***
	[0.036]	[0.022]	[0.033]	[0.013]
Observations	13,208	22,773	14,145	35,011
Number of Individuals	2,516	4,400	2,855	6,612
pseudo r-squared	0.041	0.1025	0.0556	0.0843

Robust standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1
Regressions for men includes a sample of 6,054 men (35,981 person-years) and regressions for women include 8,207 women (49,156 person-years)
Includes controls for personal characteristics: ethnicity, age group, marital status, age of the youngest child, other caring responsibilities, highest qualification, log (hourly wage) and additional household income. Job characteristics include: firm size, whether permanent job, whether in public sector, managerial duties, occupation. Includes controls for region of residence, year of survey and the means of time varying variables
Normal hours models were estimated using a linear correlated random effects estimator, overtime models were estimated using a tobit correlated random effects estimator and estimates reported for the tobit are unconditional marginal effects

In all models personality traits (in particular conscientiousness, neuroticism and openness to experience) taken together account for significant effects on labour supply, particularly the supply of overtime hours, and particularly of unpaid overtime.

Time Pressures

Personality effects persist when analysing time pressures (as in Table 4): we find that those who work more hours (although this is not the case for paid overtime) are more likely to report lacking time, especially those who do more unpaid overtime. We can see that conscientiousness is associated with experiencing less time pressures (with this only weakly statistically significant for men) whilst those who are more neurotic and open to experience, experiencing more time pressure, especially neurotics. Extravert men are less likely to report time pressure.

From amongst those personality types who do more unpaid overtime we find that it is the neurotics and open to experience who experience time pressures, whilst the conscientious are less likely to do so suggesting they may experience less adverse effects.

Table 4: Time Pressures by Gender: Probit (Average marginal effects)

	Men		Women	
	Without job chars	With job chars	Without job chars	With job chars
Normal hours	0.018***	0.017***	0.015***	0.016***
	[0.003]	[0.003]	[0.002]	[0.002]
Paid overtime	0.007	0.008	0.004	0.006
	[0.005]	[0.005]	[0.007]	[0.007]
Unpaid Overtime	0.034***	0.034***	0.030***	0.029***
	[0.004]	[0.005]	[0.004]	[0.005]
Personality				
Agreeableness	-0.018	-0.020	-0.017	-0.016
	[0.020]	[0.020]	[0.020]	[0.020]
Conscientiousness	-0.036*	-0.039*	-0.048**	-0.046**
	[0.022]	[0.022]	[0.019]	[0.020]
Extraversion	-0.068***	-0.064***	-0.011	-0.011
	[0.017]	[0.017]	[0.015]	[0.015]
Neuroticism	0.100***	0.100***	0.137***	0.140***
	[0.016]	[0.016]	[0.013]	[0.013]
Openness to Experience	0.046**	0.041**	0.047***	0.046***
	[0.019]	[0.019]	[0.015]	[0.015]
Observations	4,162	4,162	5,618	5,618
pseudo r2	0.063	0.0693	0.0634	0.0692

Robust standard errors in brackets

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

Includes controls for personal characteristics: ethnicity, age group, marital status, age of the youngest child, other caring responsibilities, highest qualification, household income and region of residence

Job characteristics include: firm size, whether permanent job, whether in public sector, managerial duties, occupation.

Dependent variable=1 if the respondent reports they do not have enough time to do everything, 0 otherwise

The time pressure question was only asked in wave 2, so results include only wave 2

Satisfaction

Finally, to establish whether personality variables affect one's ability to allocate time more generally, particular in line with their preferences and to maximise utility, we also consider amount of leisure time satisfaction, along with job satisfaction. Table 5 presents our results.

Consistent with the labour/leisure model, working more hours decreases satisfaction with leisure. Conscientiousness, agreeableness and extraversion are associated with higher satisfaction with both leisure (not agreeableness for women) and job satisfaction. Again, neuroticism stands out as the personality feature that is most negatively associated with satisfaction with leisure and job satisfaction. Men who are more open to experience are less satisfied leisure time, with more open to experience women less satisfied with their jobs. So again we observe that neurotics especially are poorer at allocating their time.

Table 5: Satisfaction with Amount of Leisure Time and Job

	Men		Women	
	Leisure	Job	Leisure	Job
Normal hours	-0.024***	-0.003*	-0.026***	-0.003**
	[0.001]	[0.001]	[0.001]	[0.001]
Paid overtime	-0.021***	0.014***	-0.015***	0.015***
	[0.002]	[0.002]	[0.003]	[0.003]
Unpaid Overtime	-0.029***	-0.003*	-0.029***	-0.010***
	[0.002]	[0.002]	[0.002]	[0.002]
Personality				
Agreeableness	0.039***	0.078***	0.006	0.084***
	[0.014]	[0.014]	[0.014]	[0.013]
Conscientiousness	0.051***	0.064***	0.047***	0.059***
	[0.015]	[0.015]	[0.013]	[0.012]
Extraversion	0.080***	0.059***	0.024**	0.032***
	[0.012]	[0.011]	[0.010]	[0.009]
Neuroticism	-0.140***	-0.129***	-0.178***	-0.107***
	[0.011]	[0.011]	[0.009]	[0.008]
Openness to Experience	-0.055***	-0.023*	-0.016	-0.029***
	[0.013]	[0.013]	[0.010]	[0.010]
Observations	34607	34,607	47,419	47,419
Number of Individuals	6,012	6,012	8,155	8,155
R-squared	0.089	0.0628	0.0939	0.0458

Robust standard errors in brackets

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

Includes controls for personal characteristics: ethnicity, age group, marital status, age of the youngest child, other caring responsibilities, highest qualification and household income.

Job satisfaction includes controls for job characteristics: firm size, whether permanent job, whether in public sector, managerial duties, occupation. And log of wage instead of household income

Results estimated using a linear correlated random effects estimator

Includes individuals who report both leisure and job satisfaction

5. Discussion

Our results suggest that personality traits indeed affect labour supply decisions at the intensive margin, and time allocation more broadly as postulated by Bowles et al. (2001a,b). We find in all models that even once controlling for all the usual labour market constraints personality traits still matter to time allocation and to the satisfaction and pressures experienced: personality traits matter to hours worked, paid and unpaid overtime, experiencing time pressures, and satisfaction with time allocation. We are particularly interested in unpaid overtime and find the personality trats that particularly matter for unpaid overtime are conscientiousness, neuroticism and openness to experience, with neuroticism in particular having the strongest negative effects on those who display the trait in all outcomes observed: it is associated with working fewer normal hours and more unpaid overtime ones, with experiencing more time pressures and being more dissatisfied with both work and leisure.

The economic effects of scoring high on a personality trait and of the combinations of different traits that a person typically holds are important to determine the effect on individual outcomes. To do so, we look at the difference in unpaid overtime hours between individuals scoring the lowest and the highest value (see Appendix 5) for those traits that we found to particularly impact unpaid overtime. For neuroticism a man (woman) scoring 7 would on average work 0.918 (0.462) hours a week more than a man scoring 1 which would amount to 48 (24) of uncompensated work hours a year for an individual scoring 7. For conscientiousness the corresponding effect is 0.846 (0.39) hours for men (women), and for openness to experience it is 0.768 (0.378) hours. Individuals who score high on one of these traits may well also have other personality traits that impact on their unpaid overtime, something which we illustrate in Appendix 6. We focus on individuals classed as scoring highly on a trait relative to the median (following a method used by Nandi and Nicoletti (2014) to illustrate the economic significance of personality wage premia and penalties) to see the impact of other personality traits, focusing on conscientiousness, neuroticism and openness to experience. We find that conscientious men also scoring more highly on agreeableness, extraversion and neuroticism do more unpaid overtime, but this is not the case for women. Conversely, scoring highly on openness to experience and being more neurotic leads to more unpaid overtime for men. These results suggest that some compensation between personality traits may be occurring which is gender-specific as suggested by Risse et al (2018) or perhaps some sorting into tasks (which we are unable to control for with our data) as suggested by Wehner et al (2020). For both women and men being neurotic and more conscientious leads to more unpaid overtime which combined

with the health effects associated with neuroticism cause concern as there are clearly some personality combinations that can lead to being exploited in the labour market.

We can place our results in the context of previously observed disadvantages and advantages of personality in the labour market: our results are consistent with the findings that in more high paying sectors there is a wage return to working longer hours (Cortes and Pan, 2019; Gicheva, 2013; Goldin, 2014), but offer some finer grain perspective and highlights heterogeneities by personality types and gender that drive the ability to reap benefits from working longer unpaid hours. Our conscientiousness results suggest that conscious individuals are better at allocating their time efficiently and hence working more hours may provide an advantage in the labour market and are consistent with studies that have shown a wage return for conscientiousness for women (e.g. Mueller and Plug, 2006; Risse et al., 2018), and some for men (e.g. Furnham and Cheng, 2013; Gensowski, 2018). Past research has found differing effects of openness to experience, studies tend to find openness to experience is negatively related to wages (Gelissen and de Graaf, 2006; Risse et al., 2018), but Heincek and Anger (2010) found openness to experience had a positive impact for women whilst a negative impact for men, and Nandi and Nicoletti (2014) find a positive impact for men, especially at the top of the distribution, however, the advantage can be explained by differences (sorting into) in personal and job characteristics between individuals with low and high openness, such as occupation and education Our results suggest that openness to experience is related to poorer time allocation, especially for men. Those more open may find more demands on their time, as a result of wanting to undertake a variety of new experiences. Neuroticism is related to more unpaid overtime and poor time allocation and this is a group who may not gain from unpaid overtime as neuroticism is consistently shown to be negatively related wages (Nyhus and Pons, 2005; Mueller and Plug, 2006; Heineck and Anger, 2010, Heineck, 2011; Collischon, 2020), which our results with split samples by occupational status also confirm. Both Pencavel (2015) and Collewet and Sauermann, (2017) document a concave relationship between hours and productivity, so those personalities who tend to do more unpaid hours but are less efficient at allocating their time, such as openness and neuroticism, may not be able to extract the wage gains from working long hours.

Conclusions

We find that some personality types are more prone to working longer hours and to experience

time pressures and misallocation of time. Neuroticism features as a particularly important personality aspect that can lead to allocating time in very dissatisfactory way thus impacting on wellbeing, confirming findings of the psychological and medical literature (Lahey, 2009), which considers neuroticism an important public health issue, also in the light of its increase (for historical trends in the US see Twenge, 2000). Our findings might help explain why some personality types are associated with advantages/disadvantages in the labour market, in particular the disadvantage faced by more neurotic types. This is an increasingly important policy issue in the light of evidence of increasing levels of anxiety and other traits associated with neuroticism (such as depression) and declining mental health in the general population (ONS, 2017), together with the persistence of unpaid overtime (TUC, 2017). The association with unpaid overtime is particularly worrying in this sense as this is time associated with both low productivity and adverse health and wellbeing outcomes: if there are innate reasons for being unable to take a proper lunch break and leave at the right time, this raises the issue of whose responsibility it is to ensure this happens. With firms increasingly testing personality as part of the hiring process (Mainert, 2015; Mantell, 2011) it is paramount for both fairness and efficiency reasons that job applicants are not sorted in ways they are not aware of, and that managers wishing to avoid discriminatory practices understand the dangers of allowing employees to routinely carry out overtime work.

In terms of implications for models of labour supply, we find that whilst the effect of most personality traits is consistent with a rational theory of time allocation, we also find that neuroticism is instead associated with inconsistent behaviour (working fewer paid and more unpaid hours), suggesting there may be important heterogeneities based on differential abilities to allocate time that models ought to account for.

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Appendix 1

Personality traits			
Factor (opposite)	**Definition (a person...)**	**Facet (correlated trait adjective)**	**Questions Asked in Understanding Society**
Agreeableness (antagonism)	Needs pleasant and harmonious relations with others	Trust (forgiving) Straightforwardness (not demanding) Altruism (warm) Compliance (not stubborn) Modesty (not show-off)	I see myself as someone who is sometimes rude to others (reverse coded) I see myself as someone who has a forgiving nature I see myself as someone who is considerate and kind to almost everyone
Conscientiousness (lack of direction)	Is willing to comply with conventional rules, norms and standards	Competence (efficient) Order (organized) Dutifulness (not careless) Achievement (thorough) Self-discipline (not lazy) Deliberation (not impulsive)	I see myself as someone who does a thorough job I see myself as someone who tends to be lazy (reverse coded) I see myself as someone who does things efficiently
Extraversion (introversion)	Needs attention and social interaction	Gregariousness (sociable) Assertiveness (forceful) Activity (energetic) Excitement-seeking (adventurous) Positive emotions (enthusiastic) Warmth (outgoing)	I see myself as someone who is talkative I see myself as someone who is outgoing, sociable I see myself as someone who is reserved (reverse coded)
Neuroticism (emotional stability)	Experiences the world as threatening and beyond his/her control	Anxiety (tense) Angry hostility (irritable) Depression (not contented) Self-consciousness (shy) Impulsiveness (moody) Vulnerability (not self- confident)	I see myself as someone who worries a lot I see myself as someone who gets nervously easily I see myself as someone who is relaxed, handles stress well (reverse coded)
Openness to experience	Needs intellectual stimulation, change and variety	Ideas (curious) Fantasy (imaginative) Aesthetics (artistic) Actions (wide interests) Feelings (excitable) Values (unconventional)	I see myself as someone who is original, comes up with new ideas I see myself as someone who values artistic, aesthetic experiences I see myself as someone who has an active imagination

Definition by Hogan and Hogan (2007) as provided in Borghans et al. (2008) Facets obtained from John and Srivastava (1999)

Appendix 2: List of Variables

Variable	Definition	Notes
Dependent variables: Hours Worked		
Normal hours	No. of hours normally worked per week	
Paid overtime hours	No. of paid overtime hours in a normal week	No. of hours worked as paid over time
Unpaid overtime hours	No. of unpaid overtime hours in a normal week	Total over time hours in a normal week - no. of hours worked as paid over time
Total hours	Total hours normally worked per week	Normal hours + paid overtime + unpaid overtime
Personality		
Agreeableness	1(lowest) to 7(highest)	
Conscientiousness	1(lowest) to 7(highest)	
Extraversion	1(lowest) to 7(highest)	
Neuroticism	1(lowest) to 7(highest)	
Openness to Experience	1(lowest) to 7(highest)	
Wage	log of hourly wage (£)	Hourly wage approximated by (usual gross weekly pay/(normal hours + normal paid overtime); gross weekly pay converted from gross monthly pay
Additional monthly household income	Other household income equivalised using the OECD scale	Gross monthly household income-gross monthly individual labour income
Household monthly income	Gross monthly household income equivalised using the OECD scale	
Personal Characteristics		
White British	1=White British; 0=Non-white British	
Age group	25-34 (ref); 35-49; 45-54;55-64	
Marital status	single, never married (ref); married, cohabiting, previously married	
Age of the youngest Dependent Child (ref: none)	none (ref), aged 0-2, aged 3-4, aged 5-11, aged 12-15	

Other caring responsibilities	1=cares for household member or non-resident; 0=no caring responsibilities	
Highest Qualification(ref: None)	None (ref), Degree, other higher, A-level, GCSE	
Job Characteristics		
Permanent	1=permanent job; 0=temporary job	
Public Sector	1=public sector; 0=private sector	
Firm Size (ref: 25-99 employees)	1-24 employees, 25-99 employees (ref.), 100-499 employees, 500+ employees	
Managerial Duties	None(ref), manager, supervisor	
Occupation	Corporate managers and directors; Other managers and proprietors; Science, research, engineering and technology professionals; Health professionals; Teaching and educational professionals; Business, media and public service professionals; Science, engineering and technology associate professionals; Health and social care associate professionals; Administrative and Secretarial occupations (ref); Protective service occupations; Culture, media and sports occupations; Business and public service associate professionals; Caring personal service occupations; Leisure, travel and related personal service occupations; Sales occupations; Customer service occupations; Skilled Trades Occupations; Process, plant and machine operatives; Elementary occupations	1 digit standard occupation classification level with professional and associate professionals at the 2 digit level
Other Dependent Variables		
Time pressure	1=Experience time pressure; 0=no	Obtained from response to in general, i have enough time to do everything; measured on a scale of 1(Strongly agree) to 6(Strongly diasgree); 1=slightly, moderately and strongly disagree; 0-=slightly, moderately and strongly agree
Job satisfaction	1(Completely Dissatisfied) to 7(Completely Satisfied)	
Leisure satisfaction	1(Completely Dissatisfied) to 7(Completely Satisfied)	

Appendix 3: Variable Statistics

	Men (n=35,981)				Women (n=49,156)			
	Mean	Sd	Min	Max	Mean	Sd	Min	Max
Weekly Hours Variables								
Normal	37.86	7.41	0.1	60	29.32	10.12	0.5	60
Paid overtime	1.74	4.34	0	40	0.89	2.85	0	40
Unpaid overtime	2.46	5.15	0	40	2.05	4.70	0	40
Do paid overtime	*0.22*	*0.41*	*0*	*1*	*0.14*	*0.35*	*0*	*1*
Do unpaid overtime	*0.29*	*0.45*	*0*	*1*	*0.27*	*0.45*	*0*	*1*
Paid overtime if >0	*8.05*	*6.04*	*1*	*40*	*6.17*	*4.88*	*1*	*40*
Unpaid overtime if >0	*8.45*	*6.38*	*1*	*40*	*7.45*	*6.33*	*1*	*40*
Controls								
Log(Hourly Wage)	2.62	0.59	-8.37	4.58	2.40	0.56	-7.68	4.59
Additional Monthly Household Income	1,022.84	945.05	0	21,317.88	1,413.72	1,143.47	0	48,063.40
White British	0.89	0.31	0	1	0.89	0.32	0	1
Age Group (ref 25-34)								
Aged 35-49	0.30	0.46	0	1	0.30	0.46	0	1
Aged 45-54	0.32	0.47	0	1	0.33	0.47	0	1
Aged 55-64	0.21	0.41	**0**	1	0.20	0.40	**0**	1

Marital status (ref: single, never married)								
Married	0.66	0.47	0	1	0.60	0.49	0	1
Cohabiting	0.15	0.36	0	1	0.14	0.35	0	1
Previously married	0.07	0.25	0	1	0.14	0.35	0	1
Age of the youngest Dependent Child (ref: none)								
Aged 0-2	0.11	0.32	0	1	0.09	0.28	0	1
Aged 3-4	0.06	0.24	0	1	0.05	0.22	0	1
Aged 5-11	0.16	0.36	0	1	0.18	0.38	0	1
Aged 12-15	0.07	0.26	0	1	0.10	0.30	0	1
Other caring responsibilities	0.13	0.33	0	1	0.18	0.39	0	1
Highest Qualification(ref: None)								
Degree	0.34	0.47	0	1	0.35	0.48	0	1
Other higher	0.13	0.34	0	1	0.16	0.37	0	1
A-level	0.22	0.41	**0**	1	0.18	0.38	**0**	1
GCSE	0.20	0.40	0	1	0.21	0.41	0	1
Other	0.08	0.27	0	1	0.06	0.24	0	1
Region of Residence (ref: South East)								
North East	0.05	0.22	0	1	0.05	0.21	0	1
North West	0.12	0.32	0	1	0.12	0.32	0	1

Yorkshire and the Humber	0.08	0.28	0	1	0.08	0.28	0	1
East Midlands	0.08	0.27	0	1	0.08	0.27	0	1
West Midlands	0.09	0.28	0	1	0.08	0.28	0	1
East of England	0.10	0.30	0	1	0.10	0.30	0	1
London	0.08	0.27	0	1	0.08	0.27	0	1
South West	0.10	0.30	0	1	0.10	0.30	0	1
Wales	0.04	0.21	0	1	0.05	0.21	0	1
Scotland	0.08	0.27	0	1	0.08	0.27	0	1
Northern Ireland	0.04	0.20	0	1	0.04	0.21	0	1
Job Characteristics								
Permanent Job	0.96	0.20	0	1	0.95	0.23	0	1
Public Sector	0.28	0.45	0	1	0.50	0.50	0	1
Firm Size (ref: 25-99 employees)								
1-24 employees	0.28	0.45	0	1	0.32	0.46	0	1
100-499 employees	0.26	0.44	0	1	0.20	0.40	0	1
500+ employees	0.22	0.41	0	1	0.20	0.40	0	1
Managerial Duties (ref: None)								
Manager	0.34	0.47	0	1	0.23	0.42	0	1
Supervisor	0.15	0.35	0	1	0.15	0.36	0	1

Occupation (ref: Administrative and Secretarial occupations)								
Corporate managers and directors	0.16	0.36	0	1	0.09	0.28	0	1
Other managers and proprietors	0.03	0.17	0	1	0.02	0.15	0	1
Science, research, engineering and technology professionals	0.07	0.26	0	1	0.02	0.12	0	1
Health professionals	0.01	0.12	0	1	0.04	0.19	0	1
Teaching and educational professionals	0.05	0.22	0	1	0.09	0.28	0	1
Business, media and public service professionals	0.05	0.21	0	1	0.04	0.20	0	1

Science, engineering and technology associate professionals	0.03	0.17	0	1	0.01	0.10	0	1
Health and social care associate professionals	0.02	0.13	0	1	0.08	0.27	0	1
Protective service occupations	0.03	0.16	0	1	0.01	0.08	0	1
Culture, media and sports occupations	0.01	0.12	0	1	0.01	0.09	0	1
Business and public service associate professionals	0.08	0.26	0	1	0.07	0.25	0	1
Caring personal service occupations	0.12	0.32	0	1	0.02	0.12	0	1
Leisure, travel and related personal service occupations	0.02	0.14	0	1	0.14	0.34	0	1
Sales occupations	0.01	0.11	0	1	0.02	0.12	0	1

Customer service occupations	0.02	0.15	0	1	0.07	0.25	0	1
Skilled Trades Occupations	0.01	0.12	0	1	0.02	0.15	0	1
Process, plant and machine operatives	0.12	0.32	0	1	0.02	0.12	0	1
Elementary occupations	0.10	0.30	0	1	0.08	0.28	0	1

Appendix 4: Full Results for Weekly Hour Model Estimates

	Men			Women		
	Normal	Paid OT	Unpaid OT	Normal	Paid OT	Unpaid OT
Personality						
Agreeableness	-0.149**	-0.073***	0.030	-0.089	-0.025**	-0.010
	[0.082]	[0.020]	[0.023]	[0.091]	[0.012]	[0.018]
Conscientiousness	0.432***	0.102***	0.141***	0.112	0.025**	0.065***
	[0.093]	[0.021]	[0.024]	[0.091]	[0.012]	[0.018]
Extraversion	0.146**	0.046***	0.013	0.074	0.013	0.021
	[0.070]	[0.017]	[0.018]	[0.070]	[0.009]	[0.013]
Neuroticism	-0.054	-0.095***	0.153***	-0.183***	-0.022***	0.077***
	[0.067]	[0.015]	[0.018]	[0.064]	[0.008]	[0.012]
Openness to Experience	-0.044	-0.001	0.128***	0.059	0.014	0.063***
	[0.079]	[0.018]	[0.021]	[0.072]	[0.010]	[0.014]
Log(Hourly Wage)	-2.746***	-1.089***	-1.170***	-3.113***	-0.918***	-0.675***
	[0.309]	[0.065]	[0.083]	[0.227]	[0.036]	[0.060]
Additional Monthly Household Income ('000)	-0.374***	-0.059	-0.037	-0.265***	0.006	-0.000
	[0.065]	[0.045]	[0.041]	[0.045]	[0.017]	[0.023]

Personal Characteristics						
White	0.643**	0.135**	0.370***	-1.540***	-0.145***	0.108**
	[0.277]	[0.068]	[0.076]	[0.289]	[0.037]	[0.053]
Age Group (ref 25-34)						
Aged 35-49	0.129	0.058	-0.040	0.358*	0.009	0.178*
	[0.165]	[0.113]	[0.124]	[0.188]	[0.065]	[0.092]
Aged 45-54	0.453**	-0.042	-0.167	1.330***	0.020	0.303**
	[0.229]	[0.166]	[0.181]	[0.262]	[0.095]	[0.133]
Aged 55-64	0.058	-0.175	-0.444*	0.601*	-0.055	0.090
	[0.308]	[0.221]	[0.243]	[0.333]	[0.124]	[0.176]
Marital status (ref: single, never married)						
Married	0.968***	-0.004	0.475**	-0.013	-0.080	0.194
	[0.271]	[0.184]	[0.206]	[0.285]	[0.101]	[0.148]
Cohabiting	0.735***	0.022	0.289	0.172	-0.064	0.050
	[0.248]	[0.165]	[0.188]	[0.248]	[0.091]	[0.132]
Previously married	0.648**	0.193	0.212	-0.148	0.001	-0.025
	[0.315]	[0.207]	[0.250]	[0.297]	[0.104]	[0.162]
Age of the youngest Dependent Child (ref: none)						
Aged 0-2	-0.380**	-0.275**	-0.504***	-6.775***	-0.444***	-1.022***
	[0.163]	[0.119]	[0.122]	[0.243]	[0.077]	[0.099]
Aged 3-4	-0.251	-0.301**	-0.398***	-6.527***	-0.287***	-0.789***
	[0.182]	[0.135]	[0.142]	[0.247]	[0.083]	[0.115]
Aged 5-11	-0.264	-0.155	-0.298**	-4.104***	-0.182***	-0.455***
	[0.164]	[0.116]	[0.123]	[0.214]	[0.065]	[0.092]
Aged 12-15	0.102	-0.154	-0.166	-1.756***	-0.063	-0.120
	[0.153]	[0.111]	[0.121]	[0.165]	[0.055]	[0.079]
Other caring responsibilities	-0.027	0.091	0.054	-0.476***	-0.019	0.119**
	[0.118]	[0.082]	[0.097]	[0.103]	[0.040]	[0.061]
Highest Qualification(ref: None)						
Degree	2.376**	-0.092	1.896***	3.985***	0.134	1.143**
	[1.293]	[0.552]	[0.900]	[1.328]	[0.319]	[0.642]
Other higher	-0.123	0.320	1.736**	2.596**	0.069	1.025
	[1.204]	[0.545]	[0.888]	[1.284]	[0.294]	[0.625]

A-level	0.337	0.076	1.057	0.645	0.038	0.512
	[1.057]	[0.478]	[0.854]	[1.196]	[0.275]	[0.604]
GCSE	-0.098	0.059	1.103	0.732	0.024	1.166*
	[1.028]	[0.442]	[0.838]	[1.209]	[0.264]	[0.605]
Other	-0.944	-0.237	0.254	-0.287	0.178	0.651
	[0.996]	[0.367]	[0.708]	[0.812]	[0.234]	[0.544]
Job Characteristics						
Permanent Job	2.146***	0.493***	0.563***	2.424***	0.271***	0.490***
	[0.309]	[0.140]	[0.159]	[0.227]	[0.071]	[0.093]
Public Sector	-0.258	0.137	0.285**	0.004	-0.062	0.269***
	[0.181]	[0.102]	[0.113]	[0.157]	[0.050]	[0.074]
Firm Size (ref: 25-99 employees)						
1-24 employees	-0.511**	-0.183**	-0.044	-1.177***	-0.142**	-0.048
	[0.210]	[0.106]	[0.120]	[0.219]	[0.057]	[0.085]
100-499 employees	0.221	-0.065	-0.072	1.043***	0.040	0.089
	[0.192]	[0.106]	[0.117]	[0.221]	[0.065]	[0.090]
500+ employees	0.618**	0.098	-0.244**	1.501***	0.116	-0.004
	[0.241]	[0.133]	[0.140]	[0.273]	[0.078]	[0.105]
Managerial Duties (ref: None)						
Manager	1.788***	-0.167	0.891***	2.943***	0.102	1.011***
	[0.215]	[0.122]	[0.110]	[0.224]	[0.069]	[0.081]
Supervisor	1.079***	0.290***	0.538***	1.870***	0.320***	0.502***
	[0.169]	[0.096]	[0.120]	[0.181]	[0.053]	[0.078]
Occupation (ref: Administrative and Secretarial occupations)						
Corporate managers and directors	1.394***	-0.165	0.772***	1.248***	-0.176	0.589***
	[0.434]	[0.236]	[0.216]	[0.348]	[0.114]	[0.135]
Other managers and proprietors	1.125**	-0.549**	0.816***	1.922***	-0.042	0.197
	[0.616]	[0.305]	[0.277]	[0.543]	[0.145]	[0.195]
Science, research, engineering and technology professionals	1.290***	-0.130	0.644**	1.216**	0.056	0.543**
	[0.471]	[0.291]	[0.261]	[0.540]	[0.203]	[0.233]
Health professionals	0.900	0.582	1.061*	1.453***	0.067	0.102
	[1.061]	[0.515]	[0.548]	[0.518]	[0.152]	[0.210]
Teaching and educational professionals	2.191**	-1.676***	1.447***	2.700***	-0.256	1.353***
	[1.002]	[0.507]	[0.355]	[0.588]	[0.173]	[0.189]
Business, media and public service professionals	0.809**	-0.205	0.757***	1.413***	-0.037	0.279
	[0.472]	[0.298]	[0.250]	[0.445]	[0.158]	[0.170]

Science, engineering and technology associate professionals	1.488**	0.027	0.370	1.366*	-0.153	0.073
	[0.579]	[0.294]	[0.313]	[0.706]	[0.225]	[0.293]
Health and social care associate professionals	-0.137	0.033	0.396	1.583**	0.111	-0.201
	[0.830]	[0.385]	[0.428]	[0.444]	[0.125]	[0.178]
Protective service occupations	4.519**	0.710*	0.550	4.911**	0.324	-0.706
	[1.153]	[0.390]	[0.459]	[1.782]	[0.375]	[0.596]
Culture, media and sports occupations	0.175	-0.399	0.630	-0.893	0.400	0.567
	[1.021]	[0.476]	[0.420]	[1.105]	[0.311]	[0.371]
Business and public service associate professionals	0.525	-0.219	0.524**	1.184**	0.008	0.319**
	[0.428]	[0.248]	[0.226]	[0.321]	[0.106]	[0.131]
Caring personal service occupations	0.773	0.574**	-0.030	-2.450**	0.009	-0.037
	[0.497]	[0.242]	[0.283]	[0.998]	[0.193]	[0.379]
Leisure, travel and related personal service occupations	-1.668	0.540	-0.843*	0.354	0.185*	-0.177
	[1.028]	[0.333]	[0.445]	[0.435]	[0.100]	[0.165]
Sales occupations	-1.193	-0.044	-0.686	-3.885**	-0.322*	-0.617
	[0.992]	[0.415]	[0.631]	[0.921]	[0.195]	[0.394]
Customer service occupations	-3.283**	-0.191	0.031	-4.145**	0.252**	-0.626**
	[0.907]	[0.311]	[0.391]	[0.521]	[0.110]	[0.212]
Skilled Trades Occupations	-0.731	-0.023	-0.442	-0.226	-0.066	0.027
	[0.789]	[0.348]	[0.352]	[0.547]	[0.146]	[0.234]
Process, plant and machine operatives	-0.388	0.760**	-0.644**	1.368	0.107	0.450
	[0.554]	[0.232]	[0.302]	[0.977]	[0.185]	[0.385]
Elementary occupations	-1.778**	0.222	-1.021**	-5.660**	-0.029	-1.132**
	[0.616]	[0.237]	[0.333]	[0.558]	[0.112]	[0.228]
Observations	35,981	35,981	35,981	49,156	49,156	49,156
Number of Individuals	6,054	6,054	6,054	8,207	8,207	8,207

Robust standard errors in brackets

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

Normal hours models were estimated using a linear correlated random effects estimator, overtime models were estimated using a tobit correlated random effects estimator and estimates reported for the tobit are unconditional marginal effects

Includes controls for region, wave dummies and means of the time varying variables

Appendix 5: Difference in Unpaid Overtime between High and Low Values of Personality Traits

	Men	Women
Mean unpaid overtime hours	2.46	2.05
% do unpaid overtime	29.09	27.46
Mean unpaid overtime (hours > 0)	8.45	7.45
Difference in hours between high and low values of trait		
Conscientiousness	0.846	0.39
Neuroticism	0.918	0.462
Openness to Experience	0.768	0.378

We calculate (holding other factors constant) using the coefficients in table 2 the difference in hours between scoring a 7 on a trait and scoring 1 on a trait

Appendix 6: Unpaid Overtime Hours: Tobit Unconditional Marginal Effects

	High Conscientiousness		High Neuroticism		High Openness	
	Men	Women	Men	Women	Men	Women
Agreeableness	0.204***	0.006	-0.035	-0.064**	0.082*	-0.017
	[0.060]	[0.040]	[0.045]	[0.030]	[0.046]	[0.041]
Conscientiousness			0.154***	0.086***	0.052	-0.034
			[0.047]	[0.030]	[0.046]	[0.043]
Extraversion	0.131***	0.036	-0.077**	0.001	0.047	0.061**
	[0.049]	[0.027]	[0.037]	[0.021]	[0.036]	[0.030]
Neuroticism	0.152***	0.025			0.221***	0.038
	[0.046]	[0.024]			[0.033]	[0.028]
Openness to Experience	0.024	0.055*	0.227***	0.019		
	[0.053]	[0.028]	[0.041]	[0.023]		
Observations	5,054	11,275	6,672	14,703	8,920	10,194
Number of Individuals	916	1,893	1,112	2,478	1,564	1,779

We classify individual as scoring high on a trait if they have a value above the median value for that trait, and then estimate the same model as estimated in table 2 for those scoring high on that trait, with the exclusion of that trait.