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IZA DP No. 16886

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ABSTRACT

Does How You Get Paid at Work Affect Your Time off Work? The Relationship between Performance-Related Employment Contracts and Leisure Activities*

Recent research highlights the association of performance-related pay (PRP) and poor health. An uninvestigated potential mechanism is a lower frequency of leisure activities, since PRP incentives longer work hours. This study investigates PRP's effect on a variety of leisure pursuits. After correcting for self-selection, UK data show that PRP workers are less likely to engage in some forms of exercise and spend less time sleeping compared to non PRP workers. In addition, they are more likely to eat out and consume alcohol. Such leisure differences between PRP and salaried workers may negatively affect the health and wellbeing of PRP workers.

JEL Classification: J33, J22, I0

Keywords: performance-related pay, leisure, sleep, health

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Does How You Get Paid at Work Affect Your Time Off Work? The Relationship between Performance-Related Employment Contracts and Leisure Activities

1. Introduction

One way to determine employees' pay is to base it wholly or partially on their performance at work. This system can range from straightforward piece rates to pay arrangements that implement a fixed amount coupled with a commission or bonus upon reaching specific productivity thresholds or pay as a proportion of sales. Bryson *et al*. (2012) estimate that 10-40% of workers in Europe and the US are employed on some form of PRP contract, making it a widely used payment type among employers.

To date, most of the economics literature has focused on the benefits of PRP. The proposition is that PRP aligns the employee's goal to earn more with the employer's goal to increase output. Indeed, research finds that implementing PRP leads to higher productivity at work (Gielen *et al*. 2010; Lazear 2000), higher earnings (Booth and Frank 2010) and higher job satisfaction (Green and Heywood 2008), although this latter finding is found mainly among high-income workers (McCausland *et al*. 2005).

Notwithstanding the above, in the past decade an increasing research literature has investigated whether PRP is related to poor health. Research from panel surveys of the workforce shows that PRP is associated with cardiovascular, digestive and mental health issues (Bender and Theodossiou 2014) and experimental evidence shows that PRP causes greater self-reported stress and higher levels of salivary cortisol, a biomarker for stress (Allan *et al*. 2021). These studies suggest that PRP arrangements are associated with poor health outcomes for workers working under these pay conditions. A number of mechanisms have been proposed from

increased pace of work causing injuries in orde to increase production, increased uncertainty in income streams and even increased drinking and drug use.

One potential pathway may be through work hours. Research on the repercussions of PRP shows that workers, in their attempt to increase pay via the PRP incentives, tend to extend their working hours (Bender and Theodossiou 2014; Green and Heywood 2023; Heywood and Parent 2017; Pouliakas and Theodossiou 2009). In addition, Eriksson and Ortega (2011) provide evidence suggesting that the increased incentive to increase work hours limits the time available to individuals to engage in other activities including leisure activities, exercise and/or sleep. Such activities provide opportunities for rest and restoration away from the demands and the stress generated in the work environment. Indeed, Pressman *et al*. (2009) show that higher engagement in such activities is associated with better physical and psychological health outcomes.

The above findings are the foundation of the present study. The proposition is that if PRP causes individuals to reduce their engagement in activities thought to have positive effects on physical and psychological health, such as leisure activities, exercise, and rest, then it follows that this leads to a further detrimental impact of PRP on health over and above any PRP effects found in the workplace. This paper explores the relationship between PRP and engagement in leisure activities by using data on relevant nonwork activities derived from several waves of the British Household Panel Survey (BHPS) and its replacement, the UK Household Longitudinal Survey (UKHLS).

2. Literature Review

There is a substantial body of literature indicating that workers employed under a PRP regime face an elevated risk of experiencing health problems compared to fixed salary workers. Although PRP incentivises higher productivity at work, it also increases workers' risk-taking at the workplace. Industry-specific research finds workers' compensation insurance premiums are lower after a firm switches from PRP to fixed salaries (Freeman and Kleiner 2005) and injury rates are higher among workers paid by PRP in fertiliser-production (Saha *et al*. 2004). A positive association between PRP and injuries is also found in a large-scale survey of 30,000 European workers across multiple occupations and industries (Bender *et al*. 2012) and in a panel dataset of US workers (Artz and Heywood 2015).

In addition, the uncertain nature of earnings arising from PRP contracts may have a direct effect on the health of PRP workers. Implicit contract theory, as first articulated by Gordon (1974), Baily (1974) and Azariadis (1975) among others, points out that workers dislike wage variability particularly when they have fewer economic resources at their disposal. The potential financial uncertainty of the fluctuating income stream due to PRP can, therefore, cause anxiety and stress. Long periods of stress can lead to wear-and-tear on the body, lowering immune functioning and making workers more susceptible to poor health. Work-related stress may cause issues such as difficulties with sleep (Åkerstedt *et al*. 2002), poorer mental health and worse physical health (Johnson *et al*. 2005). Indeed, PRP is associated with poorer self-reported mental health (Bender and Theodossiou 2014; Thomas *et al*. 2022), higher prescription rates for anti-depressive medication (Dahl and Pierce 2020) and higher levels of fibrinogen, a known biomarker of chronic stress (Andelic *et al*. 2024). These associations could be due to the indirect effect of uncertainty on stress, but there could also be other, indirect links between PRP and stress as suggested next.

2.1 The effects of PRP on time-use

Notwithstanding the above direct effects of PRP on the health of workers there may be additional indirect health effects related to the time use of workers who are employed under PRP contracts. There is a body of literature on the determinants of how people spend their time. Becker (1965) argues time is a scarce resource and therefore time use allocation requires a balance between paid work and the utility derived from non-work activities. Importantly, as Ferranna *et al*. (2023) proposes, time use activities can be distinguished into paid work, unpaid work, personal care and leisure. It follows that engaging in leisure activities does take time and is subject to various constraints including income (Contoyannis and Jones 2004; Grossman 1987), but the individual benefits of such activities include better health outcomes.

Work, age, gender, and wage are important determinants of time use at the individual level. Previous research shows that there are important changes in time allocation occurring after an individual retires (e.g., Ferranna *et al*. 2023) and that although men spend more time on paid work than women, men also spend more time in leisure activities whereas women tend to spend more time doing unpaid work (Sayer 2016). Owen (1971) and Yamada *et al*. (1999) show evidence for a negative relationship between time spent in leisure activities and wages springing from a substitution effect, since higher wages motivate the individual to spend additional time at work leaving less time free for leisure activities. Nevertheless, as Saksiriruthai and Pholphirul (2018) indicate there is also an income effect as higher wages increase income that could cause an increase in demand for leisure time.

Research on the relationship between working in PRP contracts and time use suggests that time spent not working has a higher (shadow) cost to PRP workers than fixed salary workers which

implies a more unfavourable trade-off between work hours and leisure for the workers employed in PRP contacts compared to their fixed salaried counterparts. Thus, PRP workers end up having fewer hours available outside work. Indeed, Eriksson and Ortega (2011) find that men employed in PRP contracts work more and spend fewer hours on leisure activities. In addition to more hours being allocated to paid work, PRP workers have both to work more intensively and face income uncertainty about the level of earnings compared to fixed salary workers suggesting an increased need for the wellbeing benefits of leisure time. Furthermore, this income uncertainty has been shown by Cadsby *et al*. (2019) to incentivise the risk averse towards more leisure activities rather than increased effort.

Indeed, Bender and Theodossiou (2014) find that PRP workers are more likely to work longer hours than their fixed salary counterparts, *ceteris paribus*. Green and Heywood (2023) find evidence that among managers in Germany, higher working hours are due to a worker sorting effect rather than due to the payment contract. Yet, surveys of the labour force in the US suggest that there is a direct effect of PRP on working hours, independent of managerial status (Artz and Heywood 2023). Given this link of PRP and longer hours, it suggests an indirect link between PRP and poor health given the research in Wong *et al*. (2019) who provide a meta-analysis pointing to evidence of an association between working overtime or long hours and insufficient sleep and cardiovascular disease.

These conditions of employment elevate stress which may also lead PRP workers to engage with unhealthy activities, such as smoking, in their effort to cope with the elevated stress. Thus, Cottini *et al*. (2023) finds that workers who sort themselves into PRP self-report more work effort and are more susceptible to stress and both Artz *et al*. (2021) and Baktash *et al*. (2022)

have found that workers receiving PRP are more likely to consume more alcohol and use illicit drugs than those on fixed pay, which may in turn lead to further health deterioration.

2.2 Benefits of leisure activities

The benefits of leisure activities on physical health and wellbeing are well known in the medical literature (Wendel-Vos *et al*. 2004). Individuals who spend more time doing exercise are more likely to have better physical health across a variety of conditions in addition to better quality of life, better mood states (Penedo and Dahn 2005) and better mental health (Saxena *et al*. 2005) and happiness (Gimenez-Nadal and Molina 2015). There is also evidence suggesting that sports and physical activity lead to personal well-being and social integration (Wankel 1993; Wankel and Berger 1990).

Non-physical leisure activities are also thought to promote health and well-being. Literature on coping with stress provides evidence suggesting that such leisure activities can function as a coping mechanism against stressful events, by allowing for self-protection, self-restoration and personal transformation (Kleiber *et al*. 2004). The literature shows benefits among older adults of specific activities, such as dancing (Joseph and Southcott 2019) and gardening (Scott *et al*. 2015). Brajša-Žganec *et al*. (2010) suggest that leisure activities improve subjective well-being through socialisation and improved positive emotions. This is in line with Kuykendall *et al*. (2015) who report that the frequency and diversity of leisure activities is a stronger predictor of subjective well-being than time spent doing any one specific leisure activity.

The physiological benefits of adequate sleep on health are well established in the relevant medical and psychological literature. Short sleep duration is associated with poor health

(Steptoe *et al*. 2006) and with a range of negative health outcomes, including higher BMI (Taheri *et al*. 2004) and with conditions such as diabetes (Yaggi *et al*. 2006).

Sleep duration is affected by a range of socio-demographic and lifestyle factors. Men are likely to sleep more than women after controlling for work time, having young children is associated with lower sleep duration (Hamermesh and Pfann 2022) and sleep has a non-linear relationship with wages such that the highest levels of wages are associated with individuals who have moderate levels of sleep duration but wages are lower for those with low or high levels of sleep duration (Gibson and Shrader 2014), a finding that implies that individuals may trade sleep duration in favour of having time for other activities. Indeed, Basner *et al*. (2007) and Biddle and Hamermesh (1990) using data from the American Time Use Survey find that hours spent at work is strongly associated with sleep duration, finding that as work hours increase, sleep duration decreases.

The literature briefly described above suggests that activities outside of work can have a strong impact on workers' quality of life and health. Individuals in employment normally engage in leisure activities after working hours as a way of coping with work-related stress (Trenberth and Dewe 2002). However, PRP employees who are incentivised to spend more time working to maximise their earnings, also have an incentive to reduce sleep duration, to spend less time outside of work and to forego activities that could be good for their mental and physical health compared to their fixed contract counterparts. In addition, although working under a PRP contract is more stressful than fixed salary work as previously mentioned above, those working under a PRP contract have less time to engage in leisure activities, hence reducing time spent in beneficial coping mechanisms. In summary, PRP incentivises workers to spend less time in leisure. This reduction in leisure activities can have important detrimental implications for the

workers' health. To the knowledge of the authors there has been no research investigating this PRP-leisure time activity relationship.

A methodological issue when examining this relationship using survey data is that it cannot be assumed that the causality runs from PRP to leisure activities. One might argue that even if a correlation between working on a PRP contract and leisure activity is established, this might be an outcome of the self-selection of individuals who dislike leisure activities such as exercising to opt into a PRP contract as they might find working relatively more pleasurable. Furthermore, unobserved innate individual characteristics might also affect the relationship. For instance, workaholics or risk takers might exhibit a higher tendency to opt into PRP pay. In view of this, the study takes account of the self-selection using instrumental variable estimation utilising a similar set of instrumental variables as in Canyon *et al*. (2001), Heywood *et al*. (1997) and Artz and Heywood (2015).

In summary, the aim of the current paper is to examine the link between PRP and leisure activities. The overriding hypothesis is that there is a difference in the time spent on leisure activities and the types of leisure activities between PRP and fixed salary workers. However, although working longer hours may limit the amount of leisure time available for PRP workers, previous literature has also shown that those in PRP contracts are more likely to eat and drink out (Bender and Theodossiou 2014) as well as use alcohol and drugs (Artz *et al*. 2021). Consequently, although PRP workers are likely to spend less time than fixed salary workers on many of the leisure activities, a reverse relationship may be the case for some of the leisure activities. Hence, the relationship between PRP and leisure is estimated after controlling for work hours.

3. Methodology

The hypothesis to be investigated in this study is that PRP contracts by providing to workers incentives to increase work hours, induce them to decrease time spent in leisure and thus lowers the likelihood of them engaging in time consuming leisure activities. The following estimating equation is, therefore, used:

$$L_i = X_i\beta + \delta PRP_i + \varepsilon_i, \quad (1)$$

where for individual i, L is a leisure activity, X is a set of relevant covariates which are assumed to affect leisure choices, PRP is the dummy variable capturing the case of an individual being employed in a PRP contract and ε is a random error term. The δ term measures the relationship between PRP and the particular leisure activity.

However, in investigating the link between PRP and leisure activity, the issue of self-selection arises. For example, the same characteristics which lead a worker to choose to be paid by performance may also affect his or her choices regarding leisure time or leisure activities. This is most clearly illustrated from a health perspective – workers who are risk-takers or workaholics may both prefer a PRP job and very little or no exercise or social interactions. The unobserved characteristics which affect sorting into a PRP job may also determine how workers spend their free time. This self-selection leads to a potential bias on the estimated δ.

In view of the above in a first stage the individual's choice into PRP employment is estimated as follows:

$$PRP_i = X_i\beta + Z_i\gamma + \mu_i. \quad (2)$$

where X is a set of relevant covariates identical to equation 1, and Z is a set of instrumental variables which identify the individual's choice in selecting a PRP contract. These instrumental variables should be correlated with PRP, but they should not correlate with the individual's

leisure choices (Equation 1). In this study one or two instrumental variables in each equation are used. One instrument is the share of PRP workers in each of the 74 3-digit occupations for each wave, as used in other labour market studies on PRP (Artz and Heywood 2015; Artz *et al.* 2021). The rationale is that implementing PRP in the workplace is feasible only if the performance of workers can be easily monitored. Hence, if particular occupations are more suited for such monitoring of performance, it should be expected that they should also have a large share of PRP workers.

The second instrument used is whether PRP workers are employed in a firm with 25 employees or less, or they are employed in a moderate-to-large firm that employs more than 25 workers. The rationale here is that, as Conyon *et al*. (2001), Heywood *et al*. (1997) and Gonzalez *et al*. (2022) suggest, due to a considerable initial cost of setting up PRP monitoring systems, it should be expected that such systems would be implemented in larger firms as they are more likely to be able to amortise these costs compared to smaller firms.

Equations (1) and (2), are estimated simultaneously in an endogenous treatment framework using maximum likelihood. Depending on the definition of the leisure variable (see below), ordinary least square (OLS), probit or ordered probit are utilised using the Stata commands `etregress`, `eprobit` or `eoprobit`.

4. Data

One of the persistent challenges in research on the effect of performance pay on non-labour market outcomes (such leisure activities) is obtaining datasets which record respondents' payment contracts, relevant socio-demographic variables and information about the outcome of interest. Fortunately, the British Household Panel Survey (BHPS) and its replacement, the

UK Household Longitudinal Survey (UKHLS) provide this information (University of Essex 2023). The BHPS is a nationwide panel survey from 1991 to 2009. A significant portion of the respondents opted to continue taking part in the BHPS successor, the UKHLS. In addition to a core set of variables that is recorded every year, the BHPS records PRP in every year starting in Wave 8. The UKHLS records PRP in every other year. The relevant PRP question is the same across all waves, namely '*Does your pay include performance-related pay?*' Obviously, the responses include different forms of PRP, including piece rates, commissions, bonuses, profit sharing and other forms of PRP. Hence, their effect on the individual's time use and leisure may vary and it should be expected that this might bias the results towards finding no significant effect of PRP on the respective dependent variable.

Unlike PRP, information about leisure activities and time use is recorded relatively infrequently in the two surveys. Eighteen leisure variables from the BHPS Wave 18 and UKHLS Waves 2, 9 and 10 are constructed and further two aggregated variables from BHPS Wave 18 are generated (see Table 1). Employed individuals between 18 and 65 years of age are included in the sample. Details about the selected outcome variables are given in the following sections.

4.1 BHPS Wave 18 – leisure activities

A question in the BHPS Wave 18 asks the respondents to report how frequently they engage with each of ten leisure activities over the past 12 months. Responses are coded on a Likert scale ranging from 1 = "At least once a week" to 5 = "Never/almost never". The leisure activities concern how often respondents play sport/walking/swimming, go to watch live sport, go to the cinema, go to a live performance, have a meal out, go for a drink out, work in the garden, do DIY, attend evening classes, or attend local groups. The variables are recoded so that higher values indicate a higher frequency.

The frequency with which individuals engage in leisure activities vary in such a way that in some measures, such as physical activity, they are highly skewed towards high frequency across the full sample whereas others, such as attending live performances, are performed far less frequently. Furthermore, some respondents split their leisure time between a range of activities, whereas others focus on one activity more intensely. This makes any statistical comparisons between subgroups inconsistent. In view of this, the variables are recoded into binary variables where 1 indicates at least once a month or more frequently and 0 indicates less than once per month. These are then summed into two composite count variables as follows: First, "Physical Activity" (ranging from 0-3) is the sum of three items that involve physical activity: play sport/swimming/walking, work in the garden, and performing DIY. Second, we create another count variable for 'All Activities' (ranging from 0-8) which includes all physical, social or cognitive leisure activities (play sports/watch live sports/go to the cinema/go to a live performance/work in the garden/do DIY/attend evening classes/attend local groups). In addition, drinking and eating out are separately investigated since drinking and eating out are social activities, but their relationship with health is less clear because any health benefits of the social time may be counteracted by negative health effects of increased alcohol or calorie consumption. After dropping observations due to missing values, the sample includes 6,259 individuals.

4.2 UKHLS Wave 2 – culture and sports

The UKHLS Wave 2 includes 19,738 respondents after dropping missing values. Respondents are asked about frequency of engagement with a different set of leisure activities. The respondents are presented with sets of activities and asked to indicate if they have had engaged in one or more of the activities on the list over the past 12 months.

The first question prompts respondents to reveal if they have participated in at least one out of 14 cultural activities, including dancing, painting and reading for pleasure. If individuals indicate that they have engaged in at least one or more of the activities in a follow up question they are asked the frequency of their engagement over the last 12 months on a Likert scale from 1 ("At least once a week") to 5 ("Once in past year").

The second question asks respondents to reveal if they have attended one or more cultural events out of 14 options, including events such as seeing a film at the cinema, attending plays or art exhibitions. If individuals indicate that they have engaged in at least one cultural event in a follow up question are asked least one cultural event, they are asked to rate their frequency of attendance using the same Likert scale as in the first question. For the purposes of this analysis, the Likert scale measures are converted into dummy variables in which individuals who have indicated that they have engaged with an activity or attended an event are recoded into binary variables where 1 indicates at least once a month or more frequently and 0 indicates less than once per month.

The third question refers to participation in sporting activities. It includes 30 low-to-high intensity sporting activities such as football, boxing and fishing. Individuals who indicate that they have participated in at least one activity over the past 12 months are asked to indicate the frequency of their engagement on a Likert scale from 1 ("3+ times a week") to 6 ("Once in past year"). The variables are recoded into dummy variables, in which individuals who have indicated that they have engaged with at least one activity are recoded into binary variables where 1 indicates at least once a week or more frequently and 0 indicates less than once per week. All three of these variables are recoded so that higher values indicate higher frequency.

4.3 UKHLS Wave 9 – time spent on physical activity and watching TV

In Wave 9 respondents are asked to indicate how many minutes they typically spent doing physical activity and they are asked questions about watching TV. Unfortunately, in the UKHLS, PRP is only recorded in even waves. Therefore, the Wave 9 sample is cross referenced with Wave 10 to include only those individuals who take part in both waves and who indicate that they are in the same job in Wave 10 as in Wave 9. In this set up, the individual's PRP status in Wave 10 is most likely the PRP status in Wave 9. Under this reasonable assumption, the study is able to exploit the information on leisure activity in Wave 9 of 9,283 respondents.

Wave 9 includes three questions on time spent engaging in physical activity and one question on time spent watching TV. Respondents are asked to indicate how many hours and minutes that typically spent on engaging in vigorous and moderate physical activities per week. For the purposes of analysis, hours are converted into minutes and participants who report doing no physical activity are coded as zero minutes. Respondents are also asked how many hours of TV they typically watch per day.

4.4 UKHLS Wave 10 – minutes of sleep and satisfaction with leisure time

The Wave 10 analysis sample includes 12,614 employed respondents between 18-65 years old where there are no missing values. Respondents are asked to indicate the number of hours and minutes of sleep per night. For this study the hours are converted into minutes. Respondents are also asked to indicate the level of their satisfaction with their leisure time on a scale from 1 ("Completely dissatisfied") to 7 ("Completely satisfied").

4.5 Other covariates

A number of socio-demographic variables available in all waves are included in the analysis as controlled variables. These include age, gender, ethnicity, region of residence, marital status, education level, income, number of children and two-digit occupation. Both age squared and monthly income squared are included in all regressions to allow for nonlinear relationships. Following Lejuez *et al*. (2003), current smoking status is included as a proxy for risk-preference in all analyses and the availability of a question asking whether individuals have had ever smoked that is available in Wave 2 is also used. As it is the case for the endogenous choice models these control variables are included in the leisure equation 1 and the reduced form equation 2.

The primary aim of the current study is to examine whether PRP leads to engagement in fewer leisure activities. However, in the main results presented below, working hours are not included in the covariate set in order to highlight the role of PRP in total on leisure activities. However, as a robustness check, results are presented to see if PRP has an effect independent upon leisure activities after controlling for working hours. However, these results should be interpreted with caution due to the issues of endogeneity associated with hours worked and PRP.

5. Results

In line with several studies (Artz and Heywood, 2015; Bender *et al*., 2012; Bender and Theodossiou, 2014), descriptive statistics (Table 2) show that employees are more likely to be in fixed salary than PRP contracts in all four waves of the dataset. The percentage of PRP workers is between 13% and nearly 18%. PRP workers are also more likely to be female, married, white and reside in England. In the BHPS Wave 18 data, the highest attained education

qualification is most commonly GCSEs, whereas in UKHLS Waves 2, 9 and 10 the distribution is skewed towards a degree attainment. The mean age of respondents ranges from 39.8 – 43.3 years across the waves. The mean monthly income increases from £1807.40 in Wave 18 to £1972.22 in Wave 10. The mean number of children is 0.6 across all years.

The first step to this investigation is to examine whether those who are in PRP work more hours. Independent t-tests show that PRP workers are more likely to work more hours in a typical week than fixed salary workers as shown in Table 3. The PRP-fixed salary differences in hours range between 3.0 and 4.1 hours per week. Each of these differences are statistically significant in simple t-tests, confirming earlier findings (Artz and Heywood 2023; Bender and Theodossiou 2009; Green and Heywood 2023; Heywood and Parent 2017; Pouliakas and Theodossiou 2009) where those in PRP contracts work more hours on average. These differences remain statistically significant even after removing part-time workers from the analysis, with the exception of Wave 18 where the effect has the same sign, but it turns out to be statistically non-significant. In view of this evidence, namely that PRP workers are more likely to work more hours, there should be less time available for leisure for them compared to fixed salary workers.

Given these differences, the analysis turns now to estimating the effect of working in PRP on time use after endogeneity is taken into account. The regressions of each wave are presented separately.

5.1 BHPS Wave 18 – leisure activities

Table 4 shows the estimated ordered probit regressions[1] modelling the self-selection into PRP. In these regressions either or both the share of PRP workers across occupations (coefficients between 3.92 and 4.37) and the firm size (coefficients between 0.08 and 0.13) are included as covariates. PRP workers turn out to be significantly less likely to go to the cinema (coefficient of -0.46) or watch a live performance (-0.53). However, PRP workers are more likely to eat out (1.05) and drink out (0.97), a finding consistent with Bender and Theodossiou (2014) and Artz *et al*. (2020). PRP workers are also more likely to be engaged in sports (1.35), watch live sports (0.74), do gardening (0.91)[2] and do DIY and maintenance work (0.96). Eating and drinking out are considered leisure activities but this behaviour might also be a consequence of someone having less time to engage in home cooking. Finaly, there is no significant difference between PRP and fixed salary workers in the frequency of attending evening classes (0.03) or local groups (-0.38).

Interestingly, linear regressions of the composite measures show that PRP is a significant predictor of the (log of the) aggregate measure of physical, social and cognitive leisure activities (-0.66). This suggests that PRP workers are less likely to participate in leisure activities in general (Table 5). Yet, the PRP effect on the (log of the) physical activity composite measure (0.05) is not statistically significant – a finding that indicates that PRP workers are no more or less likely to engage in physically active leisure activities compared to their fixed salary counterparts.

[1] Full results from all regressions are available from the authors.
[2] Point 4 and 5 on the Likert scale of the gardening variable included only a small number of individuals per cell. Consequently, these two points were combined to allow the ordered probit regression to converge.

5.2 UKHLS Wave 2 – culture and sports

As in BHPS Wave 18, both occupation ratio (coefficients between 3.52-3.53) and firm size (coefficients between 0.14-0.15) have a statistically significant effect on self-selecting into PRP (see Table 6). PRP workers are more likely to participate in sports activities (0.32), but there is no difference in their likelihood of participating in at least one cultural hobby (0.08) or attending cultural events (-0.14).

5.3 UKHLS Wave 9 – time spent on physical activity and watching TV

In line with the regressions above, the occupation ratio (coefficients from 3.39-3.42) and firm size (coefficients from 0.24-0.25) have a significant effect on self-selection into PRP (Table 7). Although the results from Wave 2 suggest that PRP workers engage with high-intensity sports more frequently than fixed salary workers, in Wave 9 it is found that PRP workers do not spend more time on (log of) vigorous activities (0.43) compared to fixed salary workers, but they do spend significantly fewer (log of) minutes on moderate (-2.06) activities. The final leisure variable, (log of) hours typically spent watching TV, does not differ between PRP and fixed salary respondents (-0.03).

5.4 UKHLS Wave 10 – minutes of sleep and satisfaction with leisure time

Table 8 shows that the occupation ratio (coefficients between 2.89-3.25) and firm size (0.19) have a statistically significant effect on self-selection to PRP. PRP workers are more likely to sleep fewer minutes per night than fixed salary workers (-57.53). However, there was no difference between PRP and fixed salary workers in their ratings of satisfaction with the amount of leisure time that they enjoy (-0.36).

5.5 Robustness Check: controlling for work hours

As a robustness check, the analysis turns now to examine the effect of PRP on leisure after controlling for work hours, hence in the above regression models, the hours worked per week are added as an additional covariate. There are three key takeaways from the regressions shown in Table 9 that report the coefficients on PRP and weekly work hours as a covariate. First, it tends to make the relationships found in the list of leisure activities in Table 4 no longer statistically significant. The only ones remaining statistically significant are a negative effect of PRP on going to the theatre or a concert (at the 5% level) and a marginally significant positive effect of PRP on eating and drinking. This suggests that the main mechanism linking PRP with most of this list of leisure activities is the increase in working hours (and associated decrease in leisure time) that PRP generates.

A second difference is that while there was no statistical relationship between PRP and the satisfaction with leisure previously, with the control for weekly hours, there is now a statistically significant negative relationship of PRP on satisfaction with leisure. Thus, this suggests that there may be some inherent element of PRP that is associated with reduced leisure satisfaction independent of work hours.

Finally, it is notable that the relationship between sleep and PRP remains negative after controlling for working hours, with a reduction in sleep of nearly an hour per night. This is above the effect that the extra work hours have on sleep, which is also negative, again suggesting an effect of PRP on sleep that is independent of the increased work hours that PRP generates.

5.6 Discussion

Overall, the results of this study suggest that there are differences in how PRP workers choose to spend their time after work in comparison to fixed salary workers. It is found that PRP workers more often engage in high-intensity sports (both in BHPS Wave 18 and UKHLS Wave 2) and they watch live sports more frequently than fixed salary workers. During PRP conditions in laboratory settings it is shown that several personality traits, such as extraversion (Fulmer and Walker 2015), need for achievement (Vecchio 1982) and risk tolerance (Cadsby *et al*. 2016), are associated with positive outcomes, namely higher productivity and higher satisfaction. Although the data used in this study do not include personality traits, this may explain the finding that PRP workers are more likely engage in specific, more intense sports activities compared to fixed salary workers. Importantly, this does not appear to extend to physical activity in general, as no difference in overall vigorous activity is found and PRP workers spend significantly less time on moderate physical activity during the week[3]. It seems then that PRP workers prioritise some physical activities over others and the choice does not equate to a higher overall level of physical activity.

Furthermore, PRP workers spend less time on some socially scheduled cultural activities, such as attending the cinema and live performances, but spend more time on activities that are often done at home in solitude, such as DIY and gardening. In line with previous research PRP workers are more likely to eat out (Bender and Theodossiou 2014) and drink out (Artz *et al*. 2021; Baktash *et al*. 2022). Although the above are leisure activities in moderation, they are arguably unhealthy in excess over long periods – a behaviour that is consistent with their use as coping strategies when working in stressful jobs (Carney *et al*. 2000). Lack of moderate

[3] In early stages of analysis two variables measuring frequency of low-intensity sports and walking activities were included in the paper. However, correcting for endogeneity was difficult and although identifying self-selection from the nonlinearity led to results suggesting that PRP respondents were less likely to engage in either activity, we have chosen to not present the results here.

physical exercise and higher rates of eating and drinking and lower hours of sleep per night (as it is revealed in the analysis of BHPS Wave 10 data) or low engagement with relaxing leisure activities requiring some prior arrangements (such as going to live performances) point to a detrimental impact of PRP on health.[4]

6. Conclusion

The aim of this paper is to examine how working in PRP contracts affects time spent outside of work, after controlling for self-selection into PRP. Previous research shows that there are differences in health outcomes between workers on PRP contracts compared to workers on fixed salary contracts. Workers on PRP are prone to exhibit poorer cardiovascular and digestive health (Bender and Theodossiou 2014), mental health (Dahl and Pierce 2020) and higher levels of cortisol (Allan *et al*. 2021) compared to their fixed salary counterparts. Although there are many different pathways through which PRP can negatively affect health, one reason may be that employees in PRP are incentivised to work more hours, leaving less time for leisure or sleep. Pressman *et al*. (2009), Basner *et al*. (2007) and Biddle and Hamermesh (1990), among others show that reduction of adequate sleep duration and low engagement in leisure activities causes deterioration of physical and mental health. The above motivated this paper that aims to explore the effects PRP employment on leisure activities by using a number of relevant non work activities.

The paper shows that PRP workers work more hours per week, even after removing those in part-time employment and overall engage less in many leisure activities and sleep fewer

[4] As a further robustness check, self-reported health status was included as a regression to take into account the potential limitations that poor health might have on leisure time and intensity. The results are qualitatively similar to the results presented here and are available from the authors, though as with the hours regressions, since previous literature has found a strong link between PRP and poor health, these results should be interpreted with caution.

minutes per night. It may be that the inherently stressful nature of PRP work causes workers to engage less with leisure though it is prudent to interpret the latter result cautiously due to endogeneity as hours worked may be influenced by the choice of leisure activities.

The current paper shares some of the limitations which are commonly found when using survey data. First, the leisure variables used are restricted to those available in the datasets utilised namely, the BHPS and UKHLS, and the availability of these leisure activities differs across survey waves. Furthermore, respondents drop out and new respondents enter during the relevant time periods so results across cross-sections correspond to a slightly different samples, although the socio-demographic breakdown of each sample wave shows that the sample characteristics remain remarkably similar over the four years.

Second, the datasets do not provide granular information about the type of PRP contract. The most straightforward form of PRP contract is payment on piece rate (e.g. pay by unit of production/output), but PRP contracts can also be based on meeting performance thresholds, commission or it might PRP combined with a partial fixed salary. However, if income uncertainty is a main driver of chronic stress among PRP workers, pay that is wholly dependent on performance is likely to be more stressful. If this is the case, then leisure may be particularly affected in these workers and the results of this paper underestimate the impact of PRP as it also includes less stressful variants of PRP contracts.

In summary, to the knowledge of the authors there has been no research to date examining the effect of PRP employment on leisure. This paper sheds light on this issue and show that there is a range of activities that PRP workers are less likely to engage in, including fewer minutes of moderate physical activity and sleep, both of which are known to have a negative impact on

physical and mental health. Consequently, PRP may not only be detrimental to health due to work intensity at the workplace, but it also has an impact on the choices workers make on how time is spent outside the workplace that affect health. This is an indirect effect that has not been adequately addressed in the literature.

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Tables and figures

Table 1. List of leisure variables

Variable	Wave	Variable type	Levels of measurement	Timeframe
Play sport	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	Past 12 months
Watch sport	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Go to cinema	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Go to theatre or concert	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Eat out	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Drink out	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Gardening	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Doing DIY	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Evening classes	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Local groups	BHPS Wave 18	Likert scale	1 = “Never/almost never”, 5 = “At least once a week”	
Count of Physical activities	BHPS Wave 18	Count	0-3	
Count of All activities	BHPS Wave 18	Count	0-8	
Participate in cultural activity	UKHLS Wave 2	Binary	0 = "Not frequent", 1 = "Frequent"	
Attend cultural event	UKHLS Wave 2	Binary	0 = "Not frequent", 1 = "Frequent"	
Participate in sports activity (all)	UKHLS Wave 2	Binary	0 = "Not frequent", 1 = "Frequent"	
Vigorous exercise (mins)	UKHLS Wave 9	Numerical	-	Last week
Moderate exercise (mins)	UKHLS Wave 9	Numerical	-	
Watching TV (hours)	UKHLS Wave 9	Numerical	-	Not specified
Satisfaction with leisure	UKHLS Wave 10	Likert scale	1 = “Completely satisfied”, 7 = “Completely dissatisfied”	
Sleep (mins)	UKHLS Wave 10	Numerical	-	Last month

Table 2. Demographic information for all four samples

	BHPS Wave 18	**UKHLS Wave 2**	**UKHLS Wave 9**	**UKHLS Wave 10**
Total *n*	*6,259*	*19,738*	*9,283*	*12,614*
PRP	12.4%	16.1%	17.7%	17.4%
Currently not smoking (Wave 2; Has never smoked)	77.8%	45.6%	88.0%	87.3%
Male	47.1%	43.6%	45.1%	44.4%
Not married	46.3%	46.0%	42.8%	45.5%
Education - low	41.3%	34.3%	26.5%	24.7%
Education - mid	28.1%	23.5%	22.0%	22.8%
Education - high	30.7%	42.2%	51.5%	52.5%
White ethnicity	97.3%	89.6%	86.5%	86.3%
Resident in England	55.2%	75.8%	77.7%	79.1%
Resident in Scotland	18.3%	10.0%	9.0%	8.7%
Resident in Wales	16.5%	7.4%	6.4%	6.1%
Resident in Northern Ireland	10.0%	6.8%	6.9%	6.2%
Mean age	39.8	40.6	43.3	42.3
Mean monthly income	£1807.40	£1607.99	£1962.59	£1972.22
Mean number of children	0.6	0.6	0.6	0.6

Table 3. Average Difference in Weekly Hours for PRP and Fixed Salary Workers

Sample	Average PRP Hours	Average Fixed Salary Hours	Difference (t-statistic)
BHPS Wave 18	36.0	32.4	3.6 (8.36***)
UKHLS Wave 2	35.9	31.8	4.1 (19.45***)
UKHLS Wave 9	35.6	32.6	3.0 (10.66***)
UKHLS Wave 10	35.7	32.3	3.4 (13.33***)

Note: Statistical significance indicated with * $0.05 > p < 0.10$, ** $0.01 > p < 0.05$, *** $p < 0.01$.

Table 4. Selected results from ordered probit with self-selection regression coefficients for BHPS Wave 18

	Play sport	Watch sport	Go to cinema	Go to theatre/ concert	Eat out	Drink out	Gardening	Doing DIY	Evening classes	Local groups
Instrument - % PRP across occupation	-	4.14*** (0.46)	4.27*** (0.46)	4.27*** (0.45)	4.02*** (0.44)	3.92*** (0.46)	4.11*** (0.45)	-	4.37*** (0.46)	4.35*** (0.46)
Instrument - Firm size	0.08* (0.04)	-	0.12** (0.05)	0.13*** (0.05)	0.11** (0.05)	0.12** (0.05)	0.10** (0.05)	0.09* (0.05)	0.12** (0.05)	-
PRP	1.35*** (0.10)	0.74*** (0.21)	-0.46** (0.21)	-0.53*** (0.20)	1.05*** (0.11)	0.97*** (0.15)	0.91*** (0.17)	0.96*** (0.12)	0.03 (0.32)	-0.38 (0.34)
Predicted probability	*60.73%*	*7.38%*	*1.63%*	*0.38%*	*16.14%*	*26.43%*	*21.44%*	*12.17%*	*16.68%*	*4.03%*

Note: Standard errors in parentheses. The first two rows are instruments from the self- selection regression while the 'PRP' row reports the coefficient on PRP in the leisure regression. The bottom row indicates probability of doing activity "at least once a week". Statistical significance indicated with * $0.05 > p < 0.10$, ** $0.01 > p < 0.05$, *** $p < 0.01$. Other variables in these and all regressions include: gender, age, age squared, marital status, ethnicity, education level, region of residence, occupation, log of monthly income, number of children in household and smoking status.

Table 5. Selected OLS regression coefficients for the log of count variables in BHPS Wave 18 controlling for self-selection

	Physical activities	All activities
Instrument - % PRP across occupation	4.40***	4.39***
	(0.45)	(0.46)
Instrument - Firm size	0.11**	0.11**
	(0.05)	(0.05)
PRP	0.11*	0.10
	(0.06)	(0.09)
Mean	*0.85*	*1.08*

Note: Standard errors in parentheses. The first two rows are instruments from the self-selection regression while the 'PRP' row reports the coefficient on PRP in the leisure regression. Statistical significance indicated with * 0.05> p < 0.10, ** 0.01> p < 0.05, *** p < 0.01.

Table 6. Selected Probit regression coefficients for UKHLS Wave 2 correcting for self-selection

	Participate in cultural activity	Attend cultural event	Participate in sports activity (all)
Instrument - % PRP across occupation	-	3.52***	3.53***
		(0.25)	(0.25)
Instrument - Firm size	0.14***	0.15***	0.15***
	(0.03)	(0.03)	(0.03)
PRP	0.08	-0.14	0.32**
	(0.21)	(0.15)	(0.14)
Predicted probability	*66.21%*	*20.88%*	*38.83%*

Note: Standard errors in parentheses. The first two rows are instruments from the self-selection regression while the 'PRP' row reports the coefficient on PRP in the leisure regression. Bottom row indicates probability of doing activity "at least once a month". Statistical significance indicated with * 0.05> p < 0.10, ** 0.01> p < 0.05, *** p < 0.01.

Table 7. Selected OLS regression coefficients for UKHLS Wave 9 controlling for self-selection

	(log of) vigorous exercise	(log of) moderate exercise	(log of) TV hours
Instrument - % PRP across occupation	3.39*** (0.37)	-	3.42*** (0.37)
Instrument - Firm size	0.24*** (0.04)	0.25*** (0.04)	0.24*** (0.04)
PRP	0.43 (0.66)	-2.06*** (0.38)	-0.03 (0.06)
Mean	*2.75*	*2.95*	*1.22*

Note: Standard errors in parentheses. The first two rows are instruments from the self-selection regression while the 'PRP' row reports the coefficient on PRP in the leisure regression. Statistical significance indicated with * 0.05> p < 0.10, ** 0.01> p < 0.05, *** p < 0.01.

Table 8. Selected OLS regression coefficients for UKHLS Wave 10 controlling for self-selection

	Satisfaction with amount of time for leisure	Sleep per night (mins)
Instrument - % PRP across occupation	3.25*** (0.29)	2.89*** (0.27)
Instrument - Firm size	0.19*** (0.03)	-
PRP	-0.36 (0.40)	-57.53*** (5.21)
Mean	*4.52*	*410*

Note: Standard errors in parentheses. The first two rows are instruments from the self-selection regression while the 'PRP' row reports the coefficient on PRP in the leisure regression. Statistical significance indicated with * 0.05> p < 0.10, ** 0.01> p < 0.05, *** p < 0.01.

Table 9. Selected results controlling for endogeneity and work hours

Leisure Measure	Coefficient on PRP (standard error)	Coefficient on weekly hours (standard error)
BHPS Wave 18		
Play Sport	0.012 (0.527)	-0.008*** (0.002)
Watch Sport	0.066 (0.325)	3.0E-4 (0.002)
Go to cinema	-0.098 (0.316)	0.004* (0.003)
Go to theatre or concert	-0.719** (0.289)	0.002 (0.003)
Eat out	0.490* (0.271)	-0.009*** (0.002)
Drink out	0.561* (0.297)	8.9E-4 (0.002)
Gardening	-0.057 (0.309)	-0.009*** (0.002)
Doing DIY	0.421 (0.397)	-2.6E-4 (0.002)
Evening classes	0.142 (0.306)	-0.009*** (0.002)
Local groups	0.074 (0.445)	-0.008*** (0.003)
UKHLS Waves 2, 9 and 10		
Participate in cultural activity	-0.041 (0.211)	-0.007*** (0.001)
Attend cultural event	-0.175 (0.149)	-0.008*** (0.001)
Participate in sports activities	0.299** (0.135)	-0.006*** (0.001)
Vigorous exercise (log minutes)	-0.116 (0.262)	-0.004** (0.002)
Moderate exercise (log minutes)	0.508 (0.646)	-2.5E-4 (0.003)
Watching TV (log hours)	-0.044 (0.612)	-0.001 (0.001)
Satisfaction with Leisure	-1.009** (0.474)	-0.018*** (0.002)
Sleep	-55.69*** (5.18)	-0.370*** (0.007)

Notes: Covariates are the same as in Tables 4-7 in the paper. Statistical significance indicated with * $0.05 > p < 0.10$, ** $0.01 > p < 0.05$, *** $p < 0.01$