

# When would creative R&D employees like to work?

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## Abstract

**Purpose** – This paper seeks to identify which types of creative R&D employees prefer which daily and weekly working schedules.

**Design/methodology/approach** – The paper builds on an original repeated survey of creative R&D employees from Estonia, and presents multinomial logit regression estimates based on a sample of 153 individuals from eleven entities.

**Findings** – The probability of women preferring their weekly work to be concentrated in 3-4 days is 20 percentage points higher than in men, and the case is similar for less-educated creative R&D employees. The more educated prefer the standard five-day working week. Men have a stronger preference for their week of work to be dispersed over 6-7 days. Sleep patterns appear to relate to working time preferences as morning type individuals have a stronger preference for a working day with fixed start and end times. Those who sleep seven hours or more per day prefer the standard five-day working week more, while employees who sleep less than seven hours favour more a working week of 6-7 days. Employees who desire more creativity intensity at work have a stronger preference for irregular daily working hours, as do those with poorer general health.

**Originality/value** – The results indicate that individual characteristics have a significant impact on the preferences for working time arrangements. Similar working time regulations for all employees appear outdated therefore, and may make work inefficient and harm individual wellbeing, at least for creative R&D employees.

**Keywords:** Working time, Flexibility, R&D jobs, Sleep, Creativity

**Paper type:** Research paper

**JEL codes:** O32, M50, O15

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## Introduction

It is readily apparent that people have different preferences for their working time arrangements. Some complain that weekends are too short and would prefer to get their work done in just three or four days, while others may not wish to distinguish clearly between their work and leisure time and would rather combine both at their discretion at any time of the day or any day of the week. While some favour fixed start and end times for the working day, there are many who like to work at irregular hours. The neoclassical labour supply assumes in general that employees are free to choose their working hours to suit their preference between labour and leisure. This proposition does not appear to hold fully however, as the rigidity of statutory and employers' working time regulations limits the freedom of employees to choose the working hours they really want, resulting in a mismatch between their preferences and actual working time (see e.g. Reynolds, 2003; Stier and Lewin-Epstein, 2003; Virkebau and Hazak, 2017; Böheim and Taylor, 2004). Whether an employee is reasonably able to align their actual working time with their preferences may depend on their individual characteristics.

As conflicts between the organisation of working time and the time use preferences of employees may lead to unwanted employee turnover (Nabe-Nielsen et al., 2010), declines in productivity (Konrad and Mangel, 2000; Gaultney and Collins-McNeil, 2009; Hazak et al., 2017), or harm to individual well-being and health (Bell et al., 2012; Hazak et al., 2016), employers should be keen to introduce working plans that consider individual preferences when doing so has a net positive effect on productivity and the sustainability of operations. Reducing the mismatch in working hours can help organisations retain the employees they have recruited and trained, and could give them a broader competitive advantage in the labour market. What kind of working time arrangements should be offered to which employees remains an area of study that is as yet little explored.

Moreover, reducing conflicts in working time arrangements may have a positive socio-economic impact in general. Enhancing the competitive advantages of intellectual capital in order to achieve and sustain economic growth, and capturing the intellectual potential of society have become essential challenges in modern knowledge-based economies (refer to e.g. Männasoo and Meriküll, 2014; Avarmaa et al., 2013; Männasoo et al., 2018). As innovation builds on human capital it is important that the employees who create and use the knowledge can work in a suitable environment. How the daily and weekly working time of creative employees in R&D is organised may therefore make a significant contribution to how efficiently the creative potential of these employees is used. This paper contributes to the field by seeking to identify which types of employee prefer which daily and weekly working schedules. The study uses data from our original repeated survey among Estonian creative R&D employees with a sample of 153 individuals from eleven entities. Although this study is based on a limited sample, it appears to be the first to map the working time preferences of creative R&D employees. The results of this pilot study are useful for employers and regulators in designing working time arrangements, and it points to interesting paths for research in future studies using broader samples from other countries and industries.

## Literature

In a knowledge economy, organisation of work has an important effect on job autonomy of employees, which in turn is key for the creation and use of knowledge. Work arrangements need to change in line with the underlying technological innovation to realise productivity gains from these inventions (Powell and Snellman, 2004). Tan (2017) argues in his recent theoretical framework that innovation by employees is improved when there is increased freedom at work as the reduction in the employer's control over the outcomes of innovative work motivates the employee to create innovation in a longer perspective as the outcomes are shared more fairly within the organisation than they are when the innovation is immediately captured by the employer with limited freedom and strict control. In their literature review paper, Deci and Ryan (1987) conclude that job autonomy tends to support creative activities in innovative jobs. Focusing on jobs that involve creativity, Amabile et al. (2002) highlight the finding that increasing time pressure and stress are the key variables that negatively affect creative work outcomes, claiming that strict work schedules magnify the adverse effect of those factors that suppress creativity. Flexibility in working time can be therefore clearly seen as one of the important factors contributing to a suitable work environment in creative jobs, as employees are allowed to adjust their working time according to their individual preferences and work at times of their peak productivity.

Most empirical research findings strongly contradict the traditional neoclassical view of a labour market in which employees are free to choose their work and leisure time, while working schedules appear not to be determined solely by the labour supply (Otterbach, 2010). Reynolds (2003) describes how the majority of US employees have mismatches between their actual working hours and the hours they desire, with the discrepancies going both ways as some want to work more and others less, depending on age, gender, family structure, income, chances of promotion, and part or full-time status. Stier and Lewin-Epstein (2003) find from a sample from 22 countries that the mismatch in working hours is present for a significant number of employees, while their time preferences are affected by both individual characteristics like age, gender, education and income level, and by country-level measures like the rate of economic growth, inflation and inequality.

Several studies have looked at how far employees can alter their working schedules in practice. Böheim and Taylor (2004) examine data from the British Household Survey and find that overall employees do have some autonomy over their working hours, but these opportunities are strongly restricted by the formal and informal regulations set by their employers. Interestingly, they find that some groups of employees, such as those who change jobs often and males who work part-time, are able to adjust their working time more than others are. This could suggest that individuals are forced to change jobs or switch to part-time work in order to have their preferred working schedule. Additionally, older and more highly educated employees are more likely to be able to adjust their working time, while Böheim and Taylor (2003) show that being academically successful increases the probability of overemployment and reduces the probability of under-employment. Böheim and Taylor (2004) also claim that about 40% of full-

time employees would prefer to work a different – and mostly lower – number of working hours than they actually do. This can be explained by companies in general not being willing to offer jobs with few working hours because of the fixed costs of recruiting and managing employees. Reynolds and Aletraris (2010) study the mismatch in working hours using data from the US National Survey of Families and Households and highlight that the mismatch in hours is a threat to the efficiency and safety of companies because of the adverse effects it has on the well-being of employees. They find that the mismatch between actual and desired working hours tends to persist over a long time and that employees are more likely to be able to solve an underemployment mismatch than an overemployment one, while overemployment is more common for men.

Using a Time Competition Survey of 30 Dutch organisations, van Echtelt et al. (2006) arrive at a similar conclusion of employees spending more hours at work than they would prefer to. They note that employers have an incentive to hire employees for a large number of working hours and employees are usually not in a position to bargain about this number of hours. The result is a structural effect of employees being forced to work more than they want to. Importantly, they note that even if employees are offered flexible working schedules, employers could still arrange work in such a way that the actual use of flexible options remains limited.

Otterbach (2010) uses data from the International Survey Program covering 21 countries to investigate constraints on preferred working hours in a comparative international context. There are crucial differences between countries in how individuals prefer to work and the variances can be attributed to a large extent to the labour market situation in the given country. However, age remains an important individual factor across countries with older employees wanting more flexible working arrangements.

Several studies have investigated how the mismatch in hours impacts health. Bell et al. (2012) find from the British Household Panel Survey and German Socio-economic Panel Survey that overemployment has negative effects on employee health, even when the actual hours are relatively short. They stress that reducing the mismatch should increase the motivation and productivity of employees while reducing absenteeism caused by health issues. Moen et al. (2011) find that greater schedule control and reduced work-family conflict for employees result in positive changes in their health and in measures of well-being.

Konrad and Mangel (2000) examine whether companies that have given flexibility to employees to help them balance their demand for work and personal life are more productive. Their results indicate that the impact on productivity depends on the type of employee, as companies with a higher proportion of professionals and female employees tend to gain more from the adoption of work-life programmes, while companies employing larger numbers of professionals are also more likely to adopt extensive work-life programmes.

Nabe-Nielsen et al. (2013) investigate which factors employees prioritise when given the chance to schedule their work shifts. Although their intervention study included a specific sample of caregivers and employees in financial sector call centres, the results show that family life and leisure time activities were given high priority by a vast majority of the study population in setting their working time preferences, while gender, age, education and cohabitation status

played a significant role in the setting of priorities. Presser (1995) explores the determinants of nonstandard work schedules using a monthly survey of 57 thousand households in the USA, conducted in May 1991 by the US Bureau of the Census. Working outside standard work hours and days was common for both men and women, and was largely driven by work characteristics. Employees in service industries were especially likely to work nonstandard hours. Married people, both men and women, tended to work less at weekends and on variable days, while married women were less likely than others to work nonstandard daytime hours. Having children only affected the working hours of women, and the direction of the effect depended on the age of the children. Nabe-Nielsen et al. (2010) find from a sample of 173 Danish employees working in care for the elderly that an extensive number of consecutive working days, long working days, night work and irregular working hours were in general less preferred, while their studies demonstrate once again that individual characteristics impact the preferences greatly. Employees who had mismatches between their preferences and their actual schedule were more likely to leave the job. Further, Mumford (2000) highlights in his study that promoting flexible work schedules, telecommunicating, and self-defined work plans is likely to contribute to innovation.

Only a few empirical studies have considered R&D employees. In addition to the Amabile et al. (2002) study and the Deci and Ryan (1987) literature review paper referred to above, Eaton (2003), surveying biotechnology firms, Kelliher and Anderson (2008), studying a large UK software company, and Shalley et al. (2000) find support to the finding that increased job autonomy supports creative R&D work. Coenen and Kok (2014) investigate new product development in the technology sector in Belgium and arrive at a similar conclusion that flexibility in work options has a positive impact on creative work results. Nätti et al. (2012) find that the nature of knowledge work leads creative employees to work extended hours and make tradeoffs with family life. Kivistö et al. (2008) suggest that the extended working hours in creative work could lead to reduced sleep hours, which in turn may have an adverse effect on both work outcomes and individual wellbeing.

Individual preferences for work time arrangements could be driven by circadian rhythms and whether the individual is of a morning or evening type with different preferences for waking up and bedtime, which in turn impact their preferences for working time. Paine et al. (2006) stress that morningness-eveningness preference is quite a stable characteristic, while Gaultney and Collins-McNeil (2009) show that although insufficient sleep has a significant adverse effect on productivity, quality of life, and health and safety, individual sleep patterns are still largely ignored by employers. Given this, it is beneficial for both employees and employers to allow working schedules which take the circadian rhythms of employees into consideration, as well-rested employees are likely to be healthier, happier and more productive (Gaultney and Collins-McNeil, 2009).

In general, plenty of empirical studies have demonstrated the important role played by individual characteristics like age, gender, family status and size, education, health and sleep patterns in shaping working time preferences. Numerous studies have shown that labour markets are not perfect in terms of allowing employees to work at the time they would prefer,

and empirical support has been found for a significant mismatch in hours. As the current literature demonstrates, this mismatch tends to have adverse effects for both the employer and the employee. Moreover, there have been no studies on the individual drivers of preferences for different working schedules among creative R&D employees, while they are crucial for the creation of knowledge in the modern economy (Power and Snellman, 2004). To help address these issues and find practical solutions, this paper contributes to the literature by seeking to identify which individual and job characteristics are related to which type of preferences for working schedules among creative knowledge employees.

## Data and Methodology

This study builds on an original survey conducted among creative R&D employees in Estonia that was repeated in two waves in Spring-Summer 2015 and Winter 2016. The sample was set up from the latest available national R&D data retrieved from Statistics Estonia. The Statistics Estonia criteria consider an employee to be engaged in R&D when at least 10% of their working time is allocated to R&D tasks. To capture those with creative tasks, the sample used in this study accepts only the category “researchers” from among R&D employees and excludes “technicians” and “supporting staff”, as their work may not be creative. Over the years 2010-2014, the number of creative R&D employees in Estonia ranged between 4.1 and 4.6 thousand full time equivalent. Further exclusions have been made by omitting those employees who were working in higher education and healthcare, as the schedules of teaching and medical procedures interfere significantly with the working time patterns that this study is focused on. In addition, employees of microenterprises were excluded. After these exclusions, the population of interest for this study comprises approximately 1.0 thousand creative R&D employees who work for 23 employers, both private companies and public research institutes. Eleven of these employers agreed to participate in the study.

The study was run in two waves so that any potential differences in responses might be revealed between the time of the year with most daylight in the first wave in Spring-Summer 2015, and the season with the least daylight in Winter 2016. Mann-Whitney U tests (Mann and Whitney, 1947) on the working time preference variables showed that the differences in the responses of the respondents who recurred in the two waves were statistically insignificant, and so data from both waves of the survey have been pooled for this study. Which of the responses of recurring participants to use for the econometric analysis was selected randomly. Furthermore, inconsistent and irrelevant responses were eliminated. The final sample comprises 153 employees, representing about 15 per cent of the total population of 1.0 thousand. Of these, 54 worked in R&D companies or institutes with 32 in the public sector and 22 in the private, 43 were in the product or IT development units at banks, 35 worked in the technology industry, and 21 were in IT.

The employees in the population were approached after their employer had given consent for them to participate in the study. This meant the individuals in the population could not be included in the sample if their employer did not agree to let them participate. Another selection

bias may incur in relation to completion or non-completion of the survey by a respondent. These potential selection biases are addressed to some extent by weighting the sample, bringing it into alignment with the characteristics of the population for the respondent's gender and the employer's sector of activity. Standard errors for employers have been clustered in the econometric models to account further for dependencies in clusters by employers.

There were 90 questions in the questionnaire, covering various aspects of the organisation of work, results of work, employee wellbeing, job satisfaction, sleep patterns, health and other socio-demographic characteristics. The participation of the employees who were invited to complete the online electronic survey was voluntary and confidential.

There are two dependent variables used in this study, both representing discrete categorical responses to the survey questions about (1) daily (variable *daypreference*) and (2) weekly (variable *weekpreference*) working time preferences (see Table 1).

**Table 1. Dependent variables**

Dependent variable / Survey question and response categories	All: N	Men: 87	Women: 66
<i>daypreference:</i>			
When would your workday start and end if you could choose it freely by yourself?			
1: Workday would start and end at a fixed time	27	17	10
2: Workday would start at a fixed time, but end irregularly	35	18	17
3: Workday would start irregularly, but end at a fixed time	4	1	3
4: There would be a regular part of the workday, which would start and end at a fixed time and an irregular part of the workday which would differ from day to day	33	18	15
5: Regular workday cannot be defined as my workload would differ considerably from day to day (for example, working 4 hours on one day and 12 hours on the other)	54	33	21
<i>weekpreference:</i>			
How would you prefer to work in case you could freely divide your workload within a week?			
1: With high concentration on 1-2 days a week	7	1	6
2: With high concentration on 3-4 days a week	91	45	46
3: By a common standard of 5 days a week	39	15	24
4: With a dispersed workload on 6-7 days a week	16	5	11

Explanatory variables were selected from the literature (see the summary of the literature in the previous section). The creativity intensity of work (variable *creative*) reflects the share of their total working time that the employee wants to spend on creative work, with the aim of distinguishing between employees with different expectations for how their working time should be divided between creative work and administrative and other non-creative tasks. Age, gender, number of family members and years of education reflect the important socio-demographic characteristics of the employee, and the health factor controls for their general health. The score of the Reduced Morningness-Eveningness Questionnaire (rMEQ, by Adan and Almirall, 1991) shows the type of sleep regimen the employee has, and their average daily hours of sleep (variable *sleephours*) have been included to capture another angle of individual sleep patterns. The explanatory variables

are outlined in Table 2 along with descriptive statistics, and Appendix A1 provides histograms of some of the key variables.

**Table 2. Explanatory variables and description of the sample** (mean and standard deviation shown for continuous and ordered variables; percentage of respondents shown for binary and categorical variables)

Variable	Description	All:	Men:	Women:
		Mean/ (Std. Dev.)	Mean/ (Std. Dev.)	Mean/ (Std. Dev.)
		<b>N 153 (100%)</b>	<b>87 (57%)</b>	<b>66 (43%)</b>
creative	Employee desired share of creative work in total working time (%)	71.70 (20.49)	71.18 (21.03)	72.38 (19.90)
age	Age in years	38.76 (11.51)	37.72 (12.19)	40.12 (10.48)
gender	Male (=1) vs female (=0)	57%	100%	100%
family	Employee reported number of people living together with the employee	1.66 (1.46)	1.72 (1.54)	1.58 (1.36)
education	Years of education starting from primary education	16.58 (2.66)	15.96 (2.85)	17.39 (2.14)
fhealth	General health condition factor with overall Kaiser-Meyer-Olkin measure of sampling adequacy of the factor 0.6; comprising (1) "Do you have high blood pressure or have you ever used medicine for high blood pressure?" (yes=1); (2) "Do you suffer or have you suffered from diseases that significantly affect your mental fatigue?" (5-level Likert type scale, "Never"=1, "Often"=5); (3) "Does your disease or injury interrupt you while doing your daily job?" (5-level Likert type scale, "No obstacles"=1, "Not able to work"=5); (4) "How many workdays have you been absent from work due to disease or medical examination in the past 12 months?"(5-level scale, "None" = 1, "100-365 days" = 5); (5) Body-Mass Index (continuous)	0.00 (0.81)	0.05 (0.81)	-0.07 (0.81)
meq	rMEQ score, 1...25 scale ranging from "Definitely an evening type" to "Definitely a morning type"	14.73 (3.53)	14.98 (3.57)	14.39 (3.49)
sleephours	Employee reported average sleeping hours per day on the scale:			
	"Less than 6 hours" (base)	7%	6%	8%
	"6-7 hours" (=2)	50%	49%	50%
	"7-8 hours" (=3)	38%	39%	36%
	"8-9 hours" (=4)	6%	6%	6%
	"over 9 hours" (=5)	0%	0%	0%

Since the dependent variables represent non-ordered discrete categories, multinomial logit maximum likelihood estimations have been used as the econometric modelling approach. The models are outlined in Appendix A2, where Model 1 represents the baseline model for daily working time preferences (dependent variable *daypreference*) and Model 4 for weekly preferences (dependent variable *weekpreference*). For robustness tests, *sleephours* were excluded from Models 2 and 5, and *creative* from Models 3 and 6 because of potential endogeneity issues (see e.g. Zaitouni and Ouakouak (2018) for a discussion on the complex interactions between creativity and organisational context). To control for unobserved employer-specific dependencies, standard errors have been adjusted for eleven clusters representing the eleven employers in the sample.

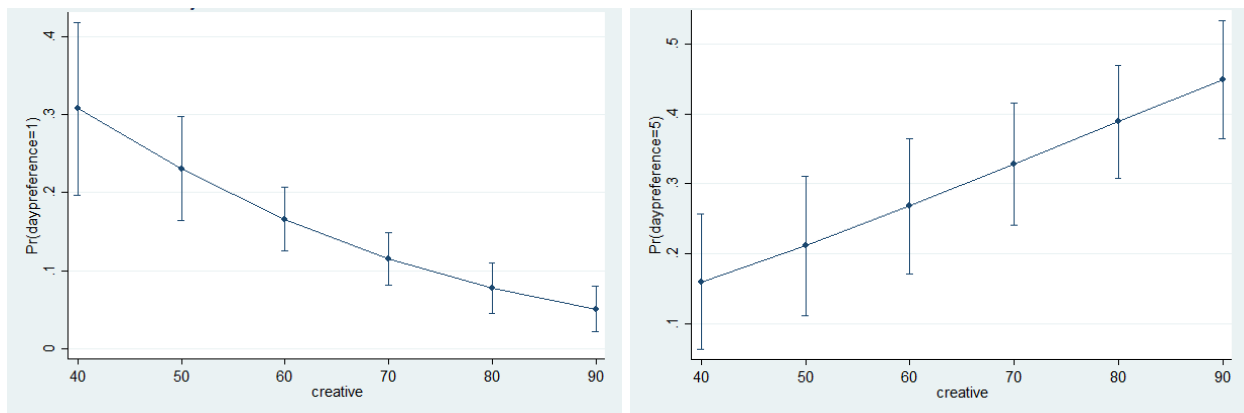


## Results

Quantitative results of the six multinomial logit models are presented in Appendix A2.

We find that the level of creativity intensity that R&D employees desire in their work is strongly related to both their daily and their weekly working time preferences. Employees who wanted a higher share of creative work are significantly less likely to prefer a working day with a fixed start and end time. As a corollary those creative R&D employees who are willing to spend more time on administrative and other non-creative tasks have a significantly stronger preference for a working day with a fixed start and end time than do those who would like to dedicate more time to creative tasks. These results are outlined in Figure 1, where the left panel illustrates the decline in the probability of an employee preferring a working day with a fixed start and end time along with the increase in the creativity intensity of work that they want. The right panel of Figure 1 shows that the higher the level of creativity intensity that the employee would like in their work, the higher the likelihood of them being willing to work with irregular daily schedules.

**Figure 1. Probabilities of an employee preferring working days to start and end (1) at a fixed time (daypreference=1; left panel) and (2) at irregular times (daypreference=5; right panel) for different levels of desired creativity intensity of work (with 90% confidence intervals, other variables at means)**



The modelling results (see Models 4 and 5 in Appendix A2) reveal that those wanting a higher level of creativity intensity in their work have a significantly stronger preference for weekly work concentrated in 3-4 (or 6-7) days rather than the usual five days of the working week. Or equally, the more tolerant the creative employee is of administrative and other non-creative work, the more tolerant they are of the standard working week of five days.

Younger employees appear to have a stronger preference for a working day with irregular start and end times while older employees prefer their working day to have a fixed start and end time (see Models 1 and 2 in Appendix A2). The study provides evidence that older employees are more likely to prefer a working week spread over 6-7 days rather than the standard five-day working week.

In alignment with the literature, we find gender differences in working time preferences. However, we find support for gender effects in weekly working time preferences, but not in daily preferences. The probability of women preferring a working week concentrated in 3-4 working days is 20 percentage points higher than the probability for men, while men are 4.5 percentage points more likely than women to prefer a working week spread over 6-7 days (see the marginal gender effects in Table 3).

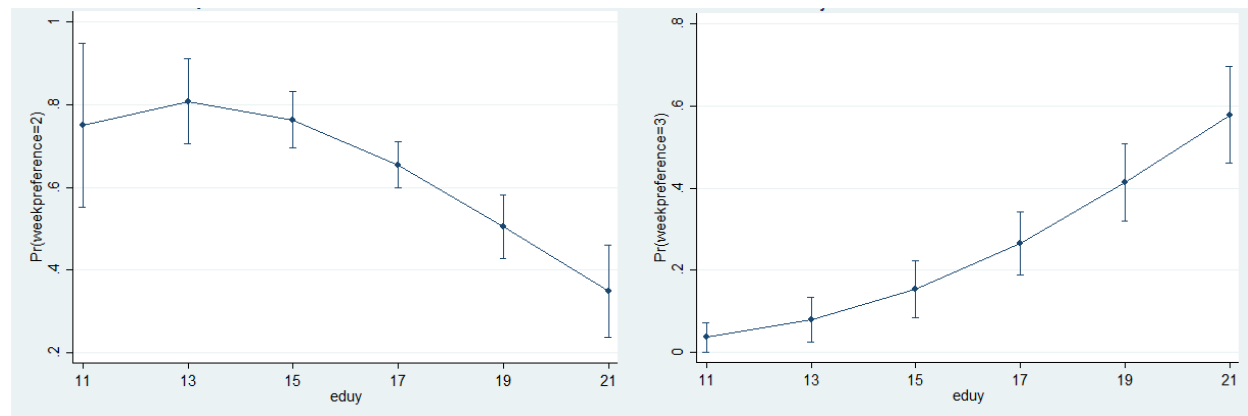
**Table 3. Average marginal gender effects in the weekpreference estimates**

Dependent variable: <i>weekpreference</i> =	1	2	3	4
gender (Male=1)	0.010	-0.202**	0.146	0.045***
	(-0.015)	(0.091)	(0.092)	(0.027)

Note: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

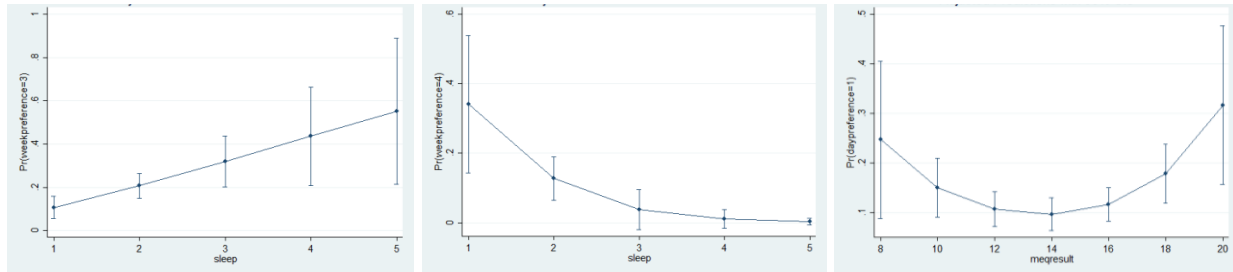
Educational level appears to have a significant effect on weekly working time preferences. While more educated creative R&D employees prefer more strongly the standard five-day working week, a working week concentrated in 3-4 days (or spread over 6-7 days) has a higher probability of being preferred by those who are less educated. This is illustrated in Figure 2.

**Figure 2. Probabilities of an employee preferring a working week of 3-4 days (*weekpreference=2*; left panel) and 5 days (*weekpreference=3*; right panel) for different years of education (with 90% confidence intervals, other variables at means)**



This study reveals that sleep patterns are related to daily and weekly working time preferences. A working week spread over 6-7 working days is preferred more by those who sleep less, while those who sleep seven hours or more appear to prefer more the standard five-day working week. These results are illustrated in Figure 3.

**Figure 3. Probabilities of an employee preferring a working week of 5 days (*weekpreference=3*; left panel) and 6-7 days (*weekpreference=4*; middle panel) for different levels of average daily hours of sleep; probabilities of an employee preferring working days to start and end at a fixed time (*daypreference=1*; right panel) for different levels of morningness-eveningness (with 90% confidence intervals, other variables at means)**



In line with past research, the study shows that morning type and evening type individuals have different working time preferences. Morning type people appear to have a stronger preference than others for working days that have a fixed start and end time (right panel of Figure 3). Employees with poorer general health appear to have a stronger preference for irregular daily working hours.

## Discussion

The findings of this study that the more creative work the employee would prefer to do, the less likely it is that they would like to have a fixed start and end time for each working day and the less tolerant they are of the standard working week of five days, may be useful for managers in designing work schedules for creative employees. Employees who want a lot of creativity intensity in their work may need to be given more flexibility in choosing the most appropriate times to realise their creative potential. Meeting the flexitime preferences for employees who want a higher share of creative work may lead to increased innovativeness, as suggested by Mumford (2000), who noted that promoting flexitime is likely to contribute to innovation as the outcomes of creative efforts are uncertain and employees need freedom of time for exploring options. These findings fit well with the theoretical framework by Tan (2017), suggesting that innovation by employees is improved when there is increased freedom at work and less control over the work process by the employer. Flexibility in choosing working hours is an important form of job autonomy and increased autonomy has been found to support creative work in previous studies (Deci and Ryan, 1987; Shalley et al., 2000). Managers of R&D employees might discover that offering freedom in choosing daily and weekly working time in creativity intensive R&D jobs may benefit both the employer and the employee.

As the paper reveals that younger employees have a stronger preference for working days with irregular start and end times, employers may wish to take these preferences into account when designing working time arrangements in creative R&D jobs. The effects of age can be

explained by generational differences, as younger employees may not perceive the standard nine-to-five working day as a norm and may be more willing to explore flexible working time arrangements. Moreover, the nature of work itself, and creative knowledge work in particular, has changed considerably in recent decades and younger professionals entering the workforce might be more able to adapt to those changes by using more flexible working time to improve their individual competitiveness in the creative R&D labour market. This once again suggests that flexibility in working time arrangements can have an important role for employers who want to attract and retain young and highly educated staff.

The study shows that female R&D employees would prefer to get their work done in 3-4 days rather than in the standard five days, while men have a stronger preference than women for a working week spread over 6-7 days. Although direct comparison with previous studies is hard because of differences in the industries and jobs covered, Nabe-Nielsen et al. (2013) found for example when investigating the factors that employees consider when scheduling their work that female employees are more likely to prioritise having consecutive time off. Also, Ruubel and Hazak (2018) show gender differences in knowledge employees' actual, contractual and desired working schedules. Moreover, as Konrad and Mangel (2000) find that companies with a higher proportion of professionals and female employees tend to gain more in productivity from the adoption of flexible work options, in the interest of both improved R&D output and individual wellbeing, employers should account for gender differences in preferences for work arrangements.

More educated employees have a stronger preference for the standard five-day working week than do their less educated colleagues. The five-day working week arrangement is also preferred by those who sleep seven or more hours per day, while those who sleep less appear to have greater preference for the working week being spread over 6-7-days. This may be because they are more tired and so they cannot achieve the creative work outcomes they want over longer regular working days. The finding that morning type people have a stronger preference for working days that have a fixed start and end time may relate to the standard timing of work, typically from nine to five, being much better aligned with the preferences of morning types than with those of their evening type colleagues. Employees with poorer general health appear to have a stronger preference for irregular daily working hours. Intuitively, employees with poorer health may have more health related time restrictions, which make it harder for them to cope with fixed start and end times.

Overall, individual characteristics have a strong impact on the working time arrangements that creative R&D employees prefer. It appears to be unwise to have similar working time regulations for all employees. Providing specific types of working time arrangements, like fixed daily and weekly schedules, may attract specific types of employees to a job while being unattractive for others. Working time arrangements that ignore the individual preferences of the employee may make work results less efficient and could harm the wellbeing of employees, at least in the case of the creative R&D employees covered by this study. Further studies on larger samples from different countries would be an interesting path for future research on these important matters of organising work in modern knowledge-intensive societies.

## Conclusions

This paper investigates which types of creative knowledge employees would like to work under which daily and weekly schedules. The paper presents multinomial logit regression estimates, using data from our original repeated survey of Estonian creative R&D employees on a sample of 153 individuals from eleven entities.

The paper reveals that the more creative work the employee would prefer to do, the less likely it is that they would like to have a fixed start and end time for each working day. Moreover, the more reluctant the creative employee is to do administrative and other non-creative tasks, the less tolerant they are of the standard working week of five days. These findings may be useful for managers in designing work schedules for R&D employees, highlighting that employees who want a lot of creativity in their work may need to be given more flexibility in choosing the most appropriate times to realise their creative potential.

This study finds that younger employees have a stronger preference for working days with irregular start and end times. Employers may wish to take these preferences into account when designing working time arrangements in R&D to make the jobs more attractive to younger employees. The paper shows that female R&D employees would prefer to get their work done in 3-4 days rather than in the standard five days, letting them keep the rest of the week for family and other commitments. Men, however, have a stronger preference than women for a working week spread over 6-7 days, revealing that their demand for days free of paid work is lower than that of women.

Moreover, the study demonstrates that sleeping hours and morningness-eveningness type of the employee are linked to the preference for specific daily and weekly working time arrangements. These findings highlight that the standard timing of work, typically from nine to five, may be much better aligned with the preferences of morning types than with those of their evening type colleagues.

Knowing the characteristics and time preferences of an individual better, and, moreover, the linkages between them, may give employers a valuable insight when they are designing working time arrangements of R&D employees. Working time arrangements that ignore the individual preferences of the employee may make work results less efficient and could harm the wellbeing of employees, at least in the case of the creative R&D employees covered by this study.

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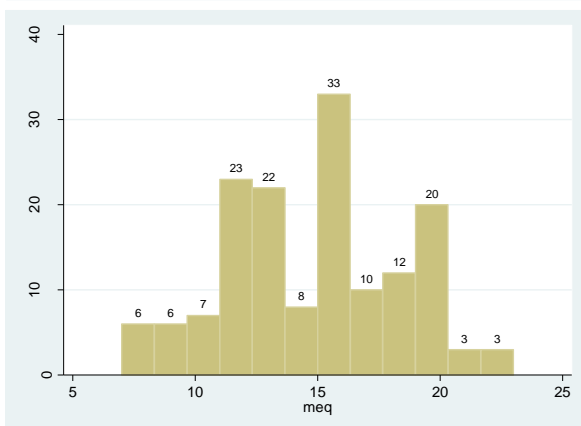
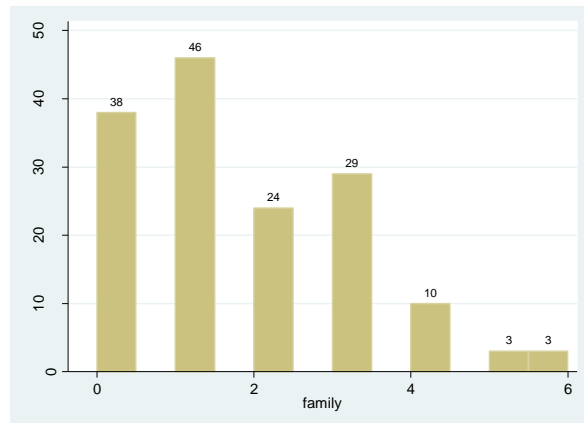
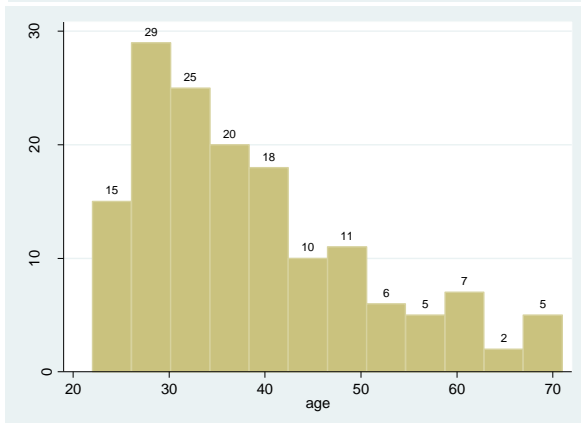
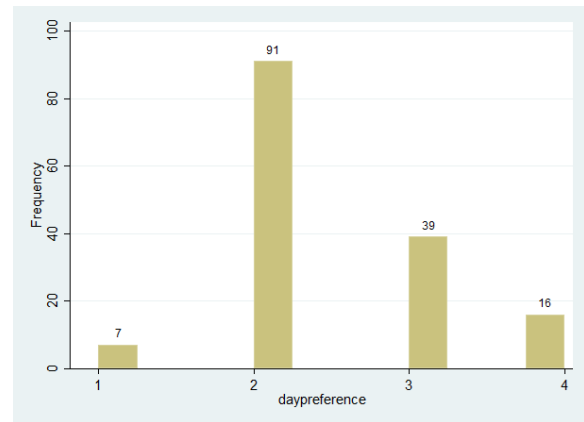
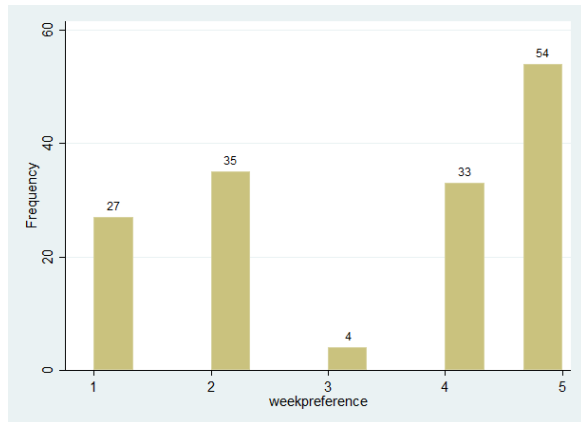
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# Appendix

## A1. Histograms



**Table A2. Multinomial logit regression estimates of daypreference and weekpreference**

	Model 1: daypreference				Model 2: daypreference				Model 3: daypreference						
	1	2	3 <sup>‡</sup>	4	5	1	2	3 <sup>‡</sup>	4	5	1	2	3 <sup>‡</sup>	4	5
creative	0.025**	-0.047	0.040***	0.056***		0.026**	-0.043	0.041***	0.056***						
	(0.012)	(0.075)	(0.016)	(0.012)		(0.112)	(0.071)	(0.016)	(0.012)						
age	-0.021	-0.448	-0.027	-0.036*		-0.021	-0.439	-0.025	-0.036*		-0.016	-0.378**	-0.015	-0.018	
	(0.015)	(0.313)	(0.019)	(0.021)		(0.016)	(0.325)	(0.018)	(0.021)		(0.017)	(0.171)	(0.019)	(0.024)	
gender (Male=1)	0.042	-3.37***	0.074	-0.283		0.032	-3.229	0.071	-0.296		0.104	-3.393***	0.177	-0.157	
	(0.490)	(1.243)	(0.696)	(0.315)		(0.490)	(2.267)	(0.717)	(0.304)		(0.537)	(0.607)	(0.724)	(0.313)	
family	0.256	2.057	0.220	0.225		0.254	1.853	0.225	0.221		0.193	1.140	0.137	0.110	
	(0.204)	(1.368)	(0.214)	(0.160)		(0.207)	(1.286)	(0.221)	(0.156)		(0.201)	(0.798)	(0.199)	(0.146)	
education	0.132	-0.610**	0.111	0.016		0.130	-0.624	0.111	0.017		0.163*	-0.551***	0.162**	0.076	
	(0.116)	(0.310)	(0.083)	(0.083)		0.116	(0.426)	(0.084)	(0.082)		(0.088)	(0.157)	(0.082)	(0.071)	
fhealth	-0.707	-1.265	-0.300	0.038		-0.719	-1.187	-0.313	0.029		-0.751*	-1.729***	-0.368	-0.016	
	(0.472)	(1.218)	(0.595)	(0.361)		(0.452)	(1.967)	(0.588)	(0.350)		(0.453)	(0.611)	(0.582)	(0.336)	
meq	0.838**	2.591	1.665**	0.685		0.810**	1.837	1.576*	0.685		0.709*	1.223	1.526*	0.525	
	(0.366)	(3.574)	(0.838)	(0.618)		(0.325)	(4.274)	(0.836)	(0.667)		(0.377)	(1.522)	(0.795)	(0.557)	
meq <sup>2</sup>	-0.032**	-0.120	-0.060**	-0.025		-0.031**	-0.093	-0.057*	-0.025		-0.027*	-0.058	-0.055**	-0.020	
	(0.013)	(0.158)	(0.030)	(0.022)		(0.012)	(0.187)	(0.0297)	(0.023)		(0.014)	(0.066)	(0.028)	(0.020)	
sleephours	-0.106	-0.773*	-0.243	-0.004							-0.226	-0.736	-0.399	-0.215	
	(0.450)	(0.469)	(0.327)	(0.370)							(0.456)	(0.630)	(0.339)	(0.339)	
constant	-8.269***	9.795	-13.94**	-6.582		-0.83***	12.289	-13.95**	-6.529		-6.013***	13.218	-11.001	-2.364	
	(2.928)	(16.030)	(6.888)	(5.333)		(2.825)	(15.051)	(6.874)	(5.250)		(2.029)	(10.629)	(6.714)	(4.181)	
No of obs		153					153					153			
Pseudo R <sup>2</sup>		0.1388					0.1368					0.0862			
pseudo-log-likelihood			-187.6***					-188.0***					-199.0***		

	Model 4: weekpreference				Model 5: weekpreference				Model 6: weekpreference			
	1 <sup>‡</sup>	2	3	4	1 <sup>‡</sup>	2	3	4	1 <sup>‡</sup>	2	3	4
creative	0.101	0.018*		0.034	0.010	0.019**		0.042**				
	(0.064)	(0.010)	base outcome	(0.021)	(0.064)	(0.009)	base outcome	(0.021)				
age	-0.430	-0.002		0.058**	-0.037	-0.002		0.059*	-0.031	0.001		0.070**
	(0.038)	(0.022)		(0.029)	(0.037)	(0.022)		(0.031)	(0.020)	(0.018)		(0.029)
gender (Male=1)	1.535	-0.931*		0.037	1.883	-0.943*		-0.0180	0.983	-0.899		0.119
	(2.274)	(0.558)		(0.741)	(2.367)	(0.573)		(0.770)	(1.607)	(0.555)		(0.780)
family	-0.236	-0.050		-0.174	-0.180	-0.027		-0.036	-0.417**	-0.067		-0.190
	(0.217)	(0.157)		(0.163)	(0.235)	(0.142)		(0.168)	(0.193)	(0.151)		(0.152)
education	-0.923***	-0.352***		-0.202***	-0.896	-0.348***		-0.2231***	-0.797***	-0.230***		-0.121
	(0.245)	(0.076)		(0.075)	(0.245)	(0.072)		(0.079)	(0.185)	(0.072)		(0.010)
fhealth	1.189***	-0.027		-0.228	1.240***	-0.074		-0.054	0.999**	-0.054		-0.257
	(0.373)	(0.270)		(0.615)	(0.425)	(0.282)		(0.570)	(0.483)	(0.278)		(0.591)
meq	1.250	0.395		0.365	1.898***	0.361		0.265	1.520**	0.371		0.320
	(0.943)	(0.356)		(0.607)	(0.651)	(0.422)		(0.594)	(0.672)	(0.345)		(0.637)
meq <sup>2</sup>	-0.043	-0.013		-0.016	-0.065***	-0.012		-0.014	-0.052***	-0.012		-0.015
	(0.029)	(0.012)		(0.023)	(0.019)	(0.014)		(0.023)	(0.018)	(0.011)		(0.024)
sleephours	0.108	-0.471*		-1.646**					-0.047	-0.487*		-1.723**
	(0.554)	(0.279)		(0.727)					(0.408)	(0.279)		(0.680)
constant	-4.124	4.418		-0.061	-9.295	3.382		-3.232	0.713	4.917		1.130
	(7.736)	(3.113)		(4.365)	(7.321)	(2.939)		(3.316)	(4.341)	(3.049)		(4.574)
No of obs		153				153				153		
Pseudo R <sup>2</sup>		0.2363				0.2060				0.1977		
pseudo-log-likelihood			-128.3**				-133.4**				-134.8***	

Note: \* p<0.10, \*\* p<0.05, \*\*\* p<0.01; significance of pseudo-log-likelihoods is based on the Wald's chi; <sup>‡</sup>daypreference=3 had only four observation as a result of which the results in this category are considered irrelevant; <sup>‡</sup>weekpreference=1 had only seven observation as a result of which the results in this category are considered irrelevant