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N°5 OCTOBER 2024

BETTERWORK

WELL-BEING AND HEALTH AT WORK

N° 28 NEWS FROM THE
QUALITY OF WORK INDEX

Quality of work INDEX LUXEMBOURG

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WHAT TYPES OF WORKING TIME ORGANISATION AND CONSTRAINTS FOR EMPLOYEES IN LUXEMBOURG?

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LA VOIX DES SALARIÉS DEPUIS 100 ANS.

Employees can have different combinations of different working time characteristics (e.g. number of overtime hours, atypical working hours, little rest between working days). In this newsletter, employees are categorised into five different groups based on nine working time characteristics using the statistical method of latent class analysis, which show different configurations of these characteristics: *"low working time demands, high control", "medium working time demands, high control", "high working time demands, high control", "low working time demands, low control", "high working time demands, low control".*

In particular, employees in the youngest age category (between 16 and 34 years), employees who live in Luxembourg, employees in a managerial position and employees who never work from home or work less than several times a month are disproportionately often in the group with the most unfavourable working time requirements *"high demands, low control".*

Employees in the *"low demands, high control"* group have the best average scores on all well-being dimensions, while employees in the *"high demands, low control"* group have the worst average scores on all dimensions.

The most important factors associated with group affiliation include age, education level, whether people regularly work from home and the extent to which they have to work under time pressure.

1. Working time patterns

Various working time demands, such as a high number of working hours, shift work, little rest between two working days (e.g. less than 11 hours) and atypical working hours influence mental and physical health and well-being (e.g. Amiri, 2023; Brauner et al, 2019; Descatha et al, 2020; Lee et al, 2017; Sun et al, 2018; Torquati et al, 2019; Wang et al, 2021). Concurrently, many studies show that control over working hours has a connection with mental and physical health (e.g. Nijp et al., 2012; Shifrin & Michel, 2022; Shiri et al., 2022).

While these aspects have long been studied mainly in isolation, a small but growing number of studies are using so-called person-centred methods like cluster analysis and latent class analysis to investigate how specific combinations of working time characteristics weigh on the health and well-being of employees (Brauner et al., 2019; Fan et al., 2019; Garraio et al., 2023). A key advantage of these new approaches, which focus on recognising working time patterns, is the ability to identify complex interactions between different working time characteristics. In addition, this helps to better determine the frequency of certain working time patterns. Person-centred methods make it possible to identify specific groups of employees who experience different combinations of working time conditions. This approach allows for a better understanding of individual stress patterns and paves the way for targeted interventions. In particular, it is possible to identify which groups of employees suffer from particularly unfavourable working time conditions and who would benefit from increased working time control.

This newsletter uses the statistical method of latent class analysis to identify different groups of employees with different working time characteristics. The next step is to analyse how these groups differ in terms of demographic variables. Subsequently, the most important factors associated with group membership are examined using a multi-nomial logistic regression model. The final step is to analyze the correlation between group membership and various dimensions of well-being.

Data from the *Quality of Work Survey* (QoW; wave 2023; Sischka & Steffgen, 2023; Steffgen et al., 2020) – an annual representative survey of employees from Luxembourg – is used for this purpose (for details, see the Method box).

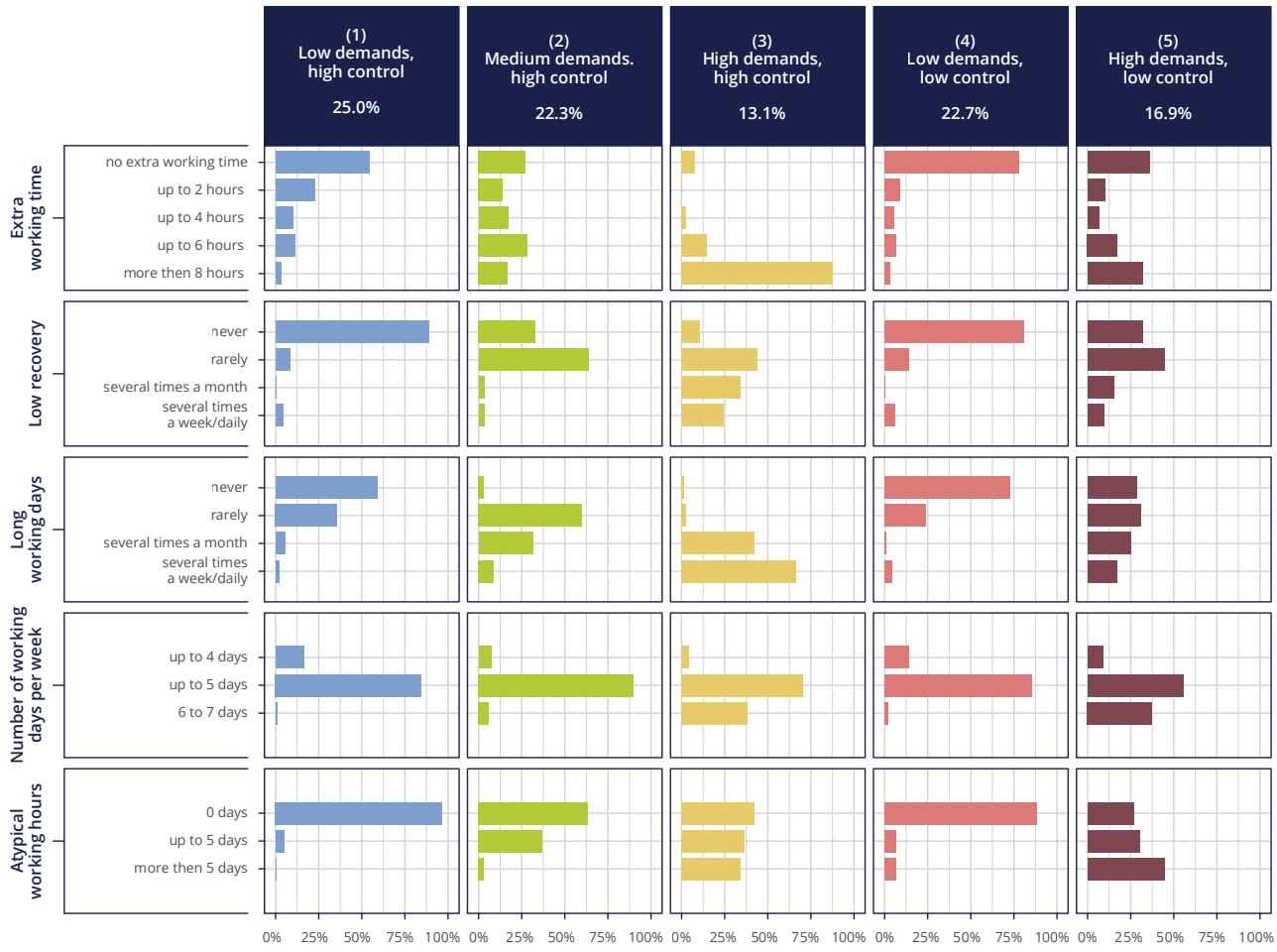
2. Groups of employees with different working time patterns

Figure 1 shows the groups identified by the latent class analysis with regard to the different working time characteristics. Employees in the first group *"low demands, high control"* – which accounts for 25.0% of respondents – report lower working time demands with a high degree of control over their working time compared to the other groups. They have less extra working time, regular rest and work predominantly in fixed working time arrangements. The second group *"medium demands, high control"* – in which 22.3% of respondents fall – shows a moderate workload with median working time demands and also high control. Working hours tend to be stable, but there are more long working days and some-

In this newsletter, only the masculine generic is used for the purpose of clarifying the text. It refers to any gender identity and thus includes both female and male persons, transgender persons as well as persons who do not feel they belong to either gender or persons who feel they belong to both genders.

times atypical working hours. Employees in the third group *"high demands, high control"* have both high working time demands and high control over their working hours. They have a high number of extra working hours, longer working hours and more flexible working time arrangements. In the fourth group *"low demands, low control"*, working time demands are low, but control over working time is also limited. There is less extra working time, but also little influence on the organisation of working hours and moderate difficulties in taking time off at short notice. The fifth group *"high demands, low control"* has high working time demands with little control over working hours. Employees in this group have a significant amount of overtime, frequently changing working hours and few opportunities to determine their own working hours or to change working hours.

Figure 1: Groups of employees with different working time patterns



Note: Data from QoW 2023, figures in per cent.

Figure 1: Groups of employees with different working time patterns (suite)

Note: Data from QoW 2023, figures in per cent.

3. Working time patterns differentiated by demographics

Figure 2 shows the different groups differentiated according to various demographic characteristics. Compared to male employees, female employees are more frequently in the *"low demands, low control"* group and less frequently in the *"high demands, high control"* group. A breakdown by age shows that employees between the ages of 16 and 34 are more frequently in the *"high demands, low control"* group, which is characterised by the highest working time demands with the least control over working hours – compared to employees in other age groups. There are only minor differences between employees with/without a partner and with/without children. Employees who live in Luxembourg are disproportionately represented in the group *"high demands, low control"* – compared to employees who live in other countries. In contrast, employees living in Germany are more frequently in the *"high demands, high control"* group.

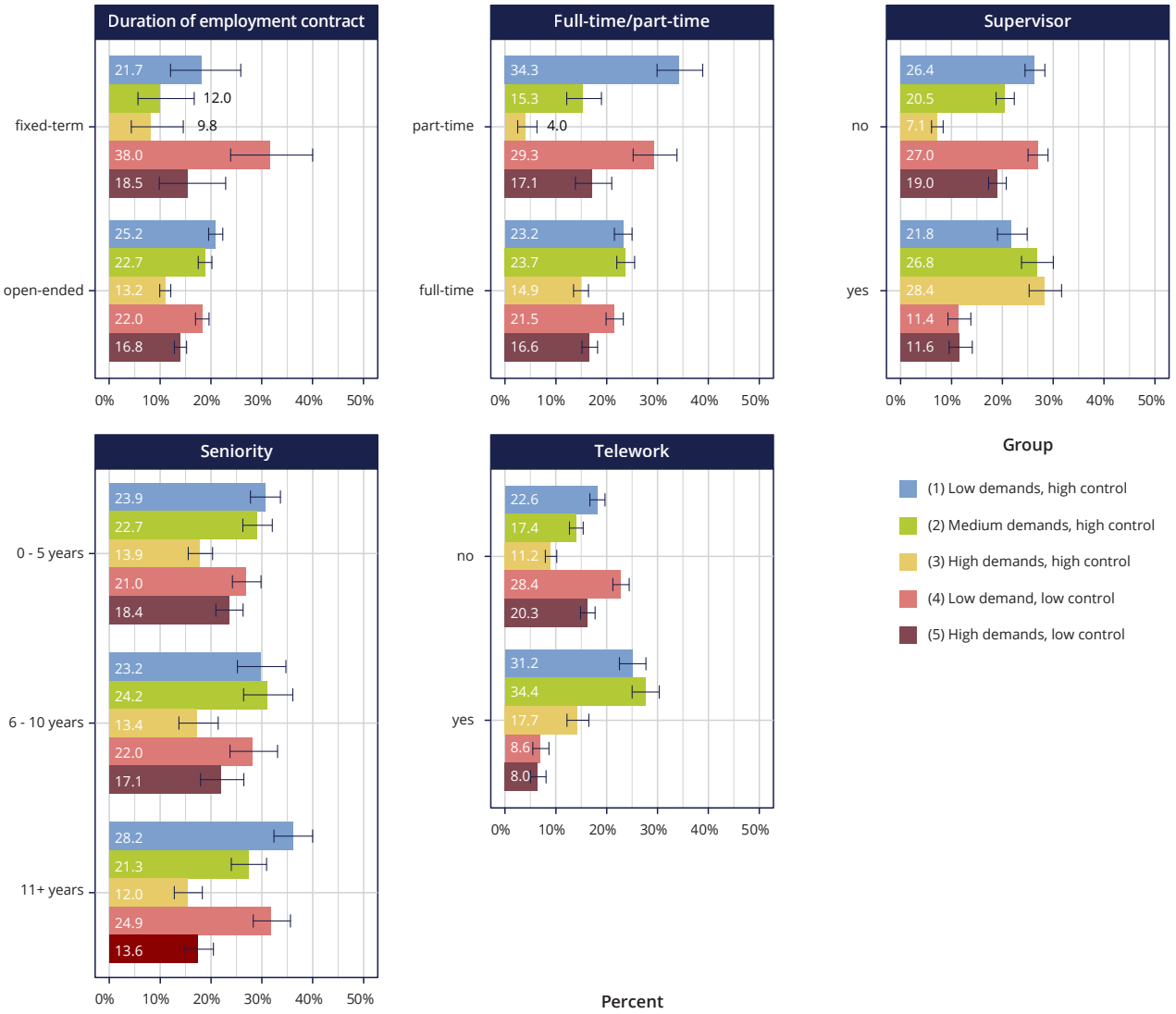
Figure 2: Working time patterns differentiated by demographics

Note: Data from QoW 2023; percentages with 95% confidence interval.

4. Working time patterns differentiated according to occupational characteristics

Figure 3 shows the different groups set off according to various job characteristics. Employees who only have a fixed-term contract are more frequently in the *"low demands, low control"* group and less frequently in the *"medium demands, high control"* group – compared to employees with a permanent contract. Parttime employees are more often in the two groups with low working time requirements *"low demands, high control"* and *"low requirements, low control"* compared to full-time employees. In turn, employees in a supervisory position are less frequently in the groups with low working time control – compared to employees without a supervisor position. There are no substantial differences when set off by years of employment. Employees who work from home at least several times a month are more frequently in the groups with high control compared to employees who never work from home or work less than several times a month.

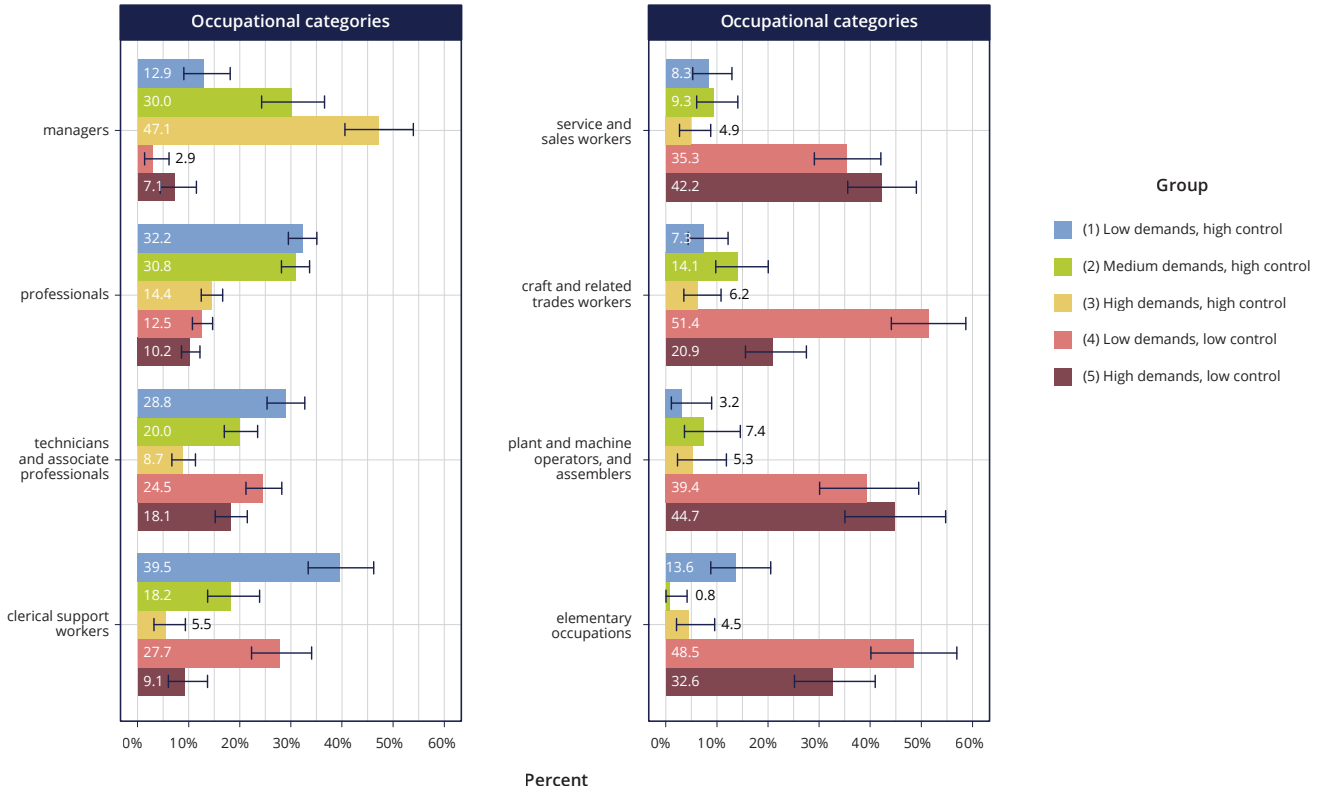
Figure 3: Working time patterns differentiated by occupational characteristics (I)



Note: Data from QoW 2023; percentages with 95% confidence interval.

Figure 4 shows the various groups set off by occupational group. Managers are disproportionately in the groups *"medium demands, high control"* and *"high demands, high control"* and very rarely in the groups with low control – compared to employees in other occupational groups. Employees in academic professions, technicians and office workers are more frequently in the two groups *"low demands, high control"* and *"medium demands, high control"* compared to employees in other occupational groups. Workers in service occupations, craftsmen, plant operators and unskilled labour are predominantly in the low control groups.

Figure 4: Working time patterns differentiated by occupational characteristics (II)

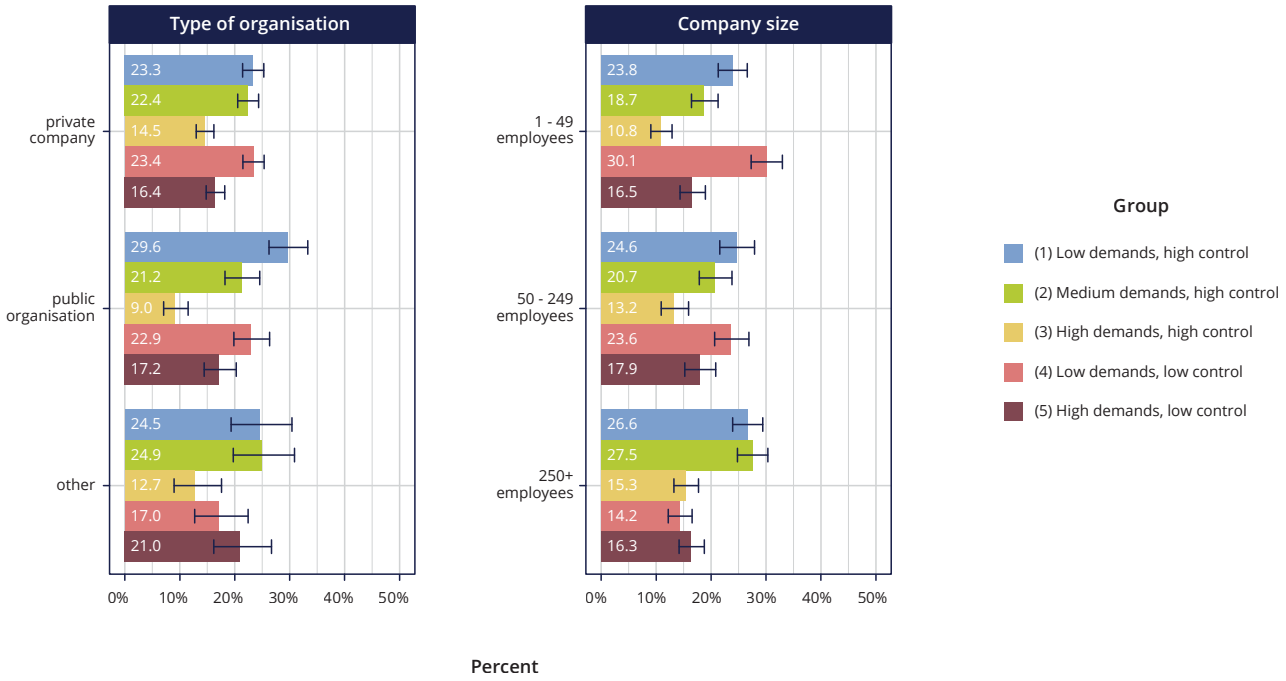


Note: Data from QoW 2023; percentages with 95% confidence interval.

5. Working time patterns set off by organisational characteristics

Figure 5 shows the different groups set off by various organisational characteristics. Employees who work in a private company are less often in the *"low demands, high control"* group and more often in the *"high demands, high control"* group compared to employees in public organisations. Company size also has an influence on group membership. Employees who work in companies with 250 employees or more are less likely to be in the *"low demands, low control"* group and more likely to be in the *"medium demands, high control"* group compared to employees in companies with fewer employees.

Figure 5: Groups of employees with different working time patterns differentiated by organisational characteristics



Note: Data from QoW 2023; percentages with 95% confidence interval.

6. What explains the affiliation to different working time patterns?

Table 1 shows the results of a multinomial logistic regression model with membership of the *"high demands, low control"* group as a phenomenon to be explained. The table shows which variables have an influence on group membership of the *"high demands, low control"* group, depending on which group is selected as the reference group.

Employees who are older, have a higher level of education, work from home and have less time pressure are more likely to be in the *"low demands, high control"* group compared to the *"high demands, low control"* group.

Employees who are older, have a higher level of education, are supervisors, work from home and have less time pressure are more likely to be in the *"medium demands, high control"* group as opposed to the *"high demands, low control"* group.

Male employees and employees who are older, have a higher level of education, work full-time, are supervisors and work from home are more likely to be in the *"high demands, high control"* group as opposed to the *"high demands, low control"* group.

Employees who are older, work in smaller organisations and have less time pressure are more likely to be in the *"low demands, high control"* group compared to the *"high demands, low control"* group.

Table 1: Multinomial regression model - Group: high requirements, low control

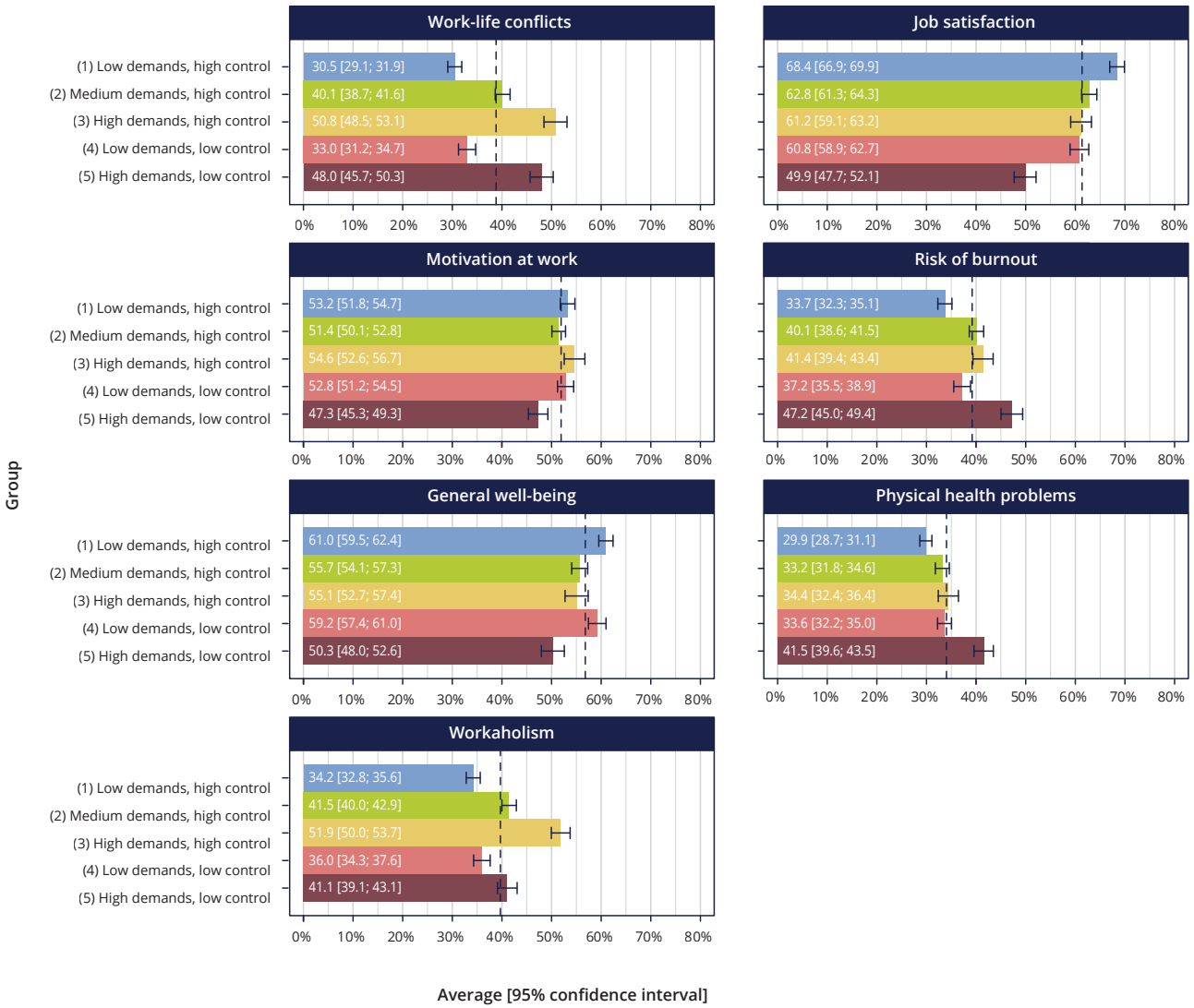
	Reference group: (1) Low demands, high control		Reference group: (2) Medium demands, high control		Reference group: (3) High demands, high control		Reference group: (4) Low demands, low control	
	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR	Coef. (SE)	OR
Intercept	-1.50* (0.59)		0.90 (0.62)		4.51*** (0.91)		-2.07*** (0.59)	
Gender (ref: male)	0.12 (0.17)	1.12	0.33* (0.17)	1.39	0.47* (0.20)	1.59	0.06 (0.17)	1.06
Age	-0.03*** (0.01)	0.97	-0.03*** (0.01)	0.97	-0.03*** (0.01)	0.97	-0.03*** (0.01)	0.97
Education ISCED level 3 - 4 (ref.: ISCED level 1 -2)	-0.08 (0.24)	0.92	-0.21 (0.27)	0.81	-0.05 (0.36)	0.95	0.30 (0.22)	1.35
Education ISCED level 5 - 8 (ref.: ISCED level 1 - 2)	-0.96*** (0.24)	0.38	-1.20*** (0.26)	0.30	-1.34*** (0.34)	0.26	0.10 (0.22)	1.10
Volume of employment (ref.: part-time)	0.36+ (0.22)	1.44	-0.28 (0.23)	0.75	-0.90** (0.34)	0.41	0.16 (0.22)	1.17
Supervisor (ref: no supervisor)	-0.33+ (0.20)	0.72	-0.66*** (0.19)	0.52	-1.61*** (0.21)	0.20	0.32 (0.21)	1.38
Company size: 50 - 249 employees (ref.: 1 - 49 employees)	0.18 (0.20)	1.20	0.30 (0.20)	1.35	0.27 (0.24)	1.31	0.26 (0.20)	1.30
Company size 250+ employees (ref.: 1 - 49 employees)	0.00 (0.19)	1.00	0.00 (0.19)	1.00	0.08 (0.22)	1.08	0.62*** (0.19)	1.87
Home office (ref: no home office)	-0.98*** (0.20)	0.38	-1.30*** (0.21)	0.27	-1.14*** (0.24)	0.32	0.19 (0.23)	1.21
Time pressure	0.74*** (0.09)	2.09	0.31*** (0.10)	1.37	-0.18 (0.12)	0.84	0.61*** (0.10)	1.84

*Note: QoW 2023 data; + p < .1 * p < .05; ** p < .01; *** p < .001; Coef: regression coefficient; SE: standard error; OR: odds ratio. Treatment of missing values: Listwise deletion; n = 2,641.*

7. Work-life conflict and well-being dimensions according to working time patterns

Figure 6 shows the relationship between group membership and work-life conflict as well as various dimensions of well-being, including job satisfaction, work motivation, burnout, general well-being and health problems. Employees in the *"low demands, high control"* group have on average the lowest values for work-life conflict, the highest values for job satisfaction and general well-being and the lowest values for burnout and health problems. The *"medium demands, high control"* group has average values for work-life conflicts, above-average values for job satisfaction and average values for the remaining dimensions. In contrast, the *"high demands, high control"* group has the highest values for work-life conflicts, above-average values for work motivation and average values for the other well-being dimensions. At the same time, this group has the highest levels of workaholism. Employees in the *"low demands, low control"* group score below-average values for work-life conflicts, above-average values for general well-being and below-average values for burnout. In terms of job satisfaction, work motivation and health problems, however, this group shows average values. The *"high demands, low control"* group achieved above-average values for work-life conflicts and the lowest values for all well-being dimensions.

Figure 6: Work-life conflict and well-being dimensions according to working time patterns



Note: QoW 2023 data; mean values of the scales ranging from 0 to 100 with 95% confidence interval. The dotted grey line represents the overall mean value of the respective scale.

8. Summary

Using the statistical method of latent class analysis, five groups of employees were identified who have different configurations of working time characteristics: Employees in the *"low demands, high control"* group have low working time demands (e.g. little extra working time, hardly any long working days) and high control over their working time. The *"medium demands, high control"* group has moderate working time demands and also high control. Employees in the *"high demands, high control"* group have both high working time demands (e.g. high number of extra work hours, frequent long working days) and high control over their working time. In the *"low demands, low control"* group, the working time demands are low, but the influence on organisation of working time is also low. The *"high demands, low control"* group also has high working time demands with little control over working hours.

In particular, employees between the ages of 16 and 34, those with Luxembourg as their country of residence, persons in a managerial position, employees who never work from home or who do so less than several times a month, as well as employees in service professions, craftsmen, plant operators and unskilled workers are disproportionately represented in the group with the most unfavourable working time requirements *"high demands, low control"*.

The most important factors associated with group membership include age, level of education, how regularly a person works from home and the extent to which work has to be done under time pressure.

Group membership is highly correlated with the extent of work-life conflicts and the well-being of employees. Employees in the group with the least favourable working time requirements *"high demands, low control"* have above-average work-life conflicts, the lowest job satisfaction and work motivation, the lowest general well-being, as well as the highest burnout level and the most health problems. In contrast, employees in the *"high demands, high control"* group show the highest values for workaholism and work-life conflicts.

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Method

For the *"Quality of work Index"* study on the work situation and quality of work of employees in Luxembourg, around 1,500-2,700 interviews (CATI; CAWI) have been conducted annually since 2013 by Infas (since 2014) on behalf of the Chambre des salariés Luxembourg and the University of Luxembourg (Table 1). The findings presented in this report relate to the 2023 surveys (Sischka & Steffgen, 2023).

Table 2: Methodological background of the QoW survey

Objective of the survey	To investigate the situation and quality of work of employees in Luxembourg
Conception, Implementation and analysis	University of Luxembourg: Department of Behavioural and Cognitive Sciences, Chambre des salariés Luxembourg, since 2014 Institut infas, previously TNS-ILRES
Type of survey	Telephone survey (CATI) or online survey (CAWI; since 2018) in Luxembourgish, German, French, Portuguese or English
Sample size	2023: 2,732
Note on *"Latent class analysis"*	*"Latent class analysis"* attempts to summarise the multivariate distribution of values of a series of indicators (here: indicators on working time conditions) by identifying a number of subpopulations (called classes) (McLachlan & Peel, 2000). When deciding on the number of classes, both content-related (interpretability, consistency with theoretical considerations) and statistical (classification diagnostics, Fit indices) criteria should be taken into account (Masyn, 2013). The Akaike Information Criterion (AIC; Akaike, 1987), the Bayesian Information Criterion (BIC; Schwartz, 1978), the sample-corrected Bayesian Information Criterion (aBIC; Sclove, 1987) and the Lo-Mendell-Rubin's adjust-ed Likelihood Ratio Test (LMR-LRT; Lo et al., 2001) are used as criteria for determining the number of classes. Smaller values of AIC, BIC, aBIC indicate a better model fit. A significant LMR-LRT indicates that the more complex model (more classes) should be favoured over the less complex model. Furthermore, the number of classes is also determined by the ease with which results can be interpreted and assuming a sufficiently high number of cases per class. In addition, the entropy is also determined for each class solution. Entropy is a general measure of the classification accuracy of the entire sample across all classes (Masyn, 2013) and can assume values between 0 and 1, with 1 representing a perfect classification. For an introduction to latent class analysis, see Masyn (2013), Weller et al. (2020) or Sischka et al. (2024). For technical details of the latent class analysis presented here, see Sischka & Steffgen (2023).

Working time conditions

Variable	Item formulation	Note on the scales
Extra working time	How many hours does your contractual weekly working time comprise? Based on the last 12 months, how many hours do you work on average per week?	Difference between actual and contractual working hours per week
Short recovery time	How often do you have less than 11 hours between the end of one working day and the start of the next?	
Long working days	How many times a month do you work 10 hours or more a day?	
Number of working days per week	Based on the last 12 months, how many days do you work on average per week?	
Atypical working hours	How many days a month do you work in the evening from 7 pm, or at night from 10 pm or on the weekend?	
Changes to working hours	How often do your working hours change?	
Difficulty in getting free	How difficult is it for you to take an hour off during working hours to take care of personal or family matters?	
Determine your own working hours	To what extent can you determine your own working hours?	
Working time arrangement	How are your working hours organised?	

Work-life conflict & well-being scales

Scale	Number of items	Cronbach's alpha	Note on the scales
Work-life conflict	3	0.80	The well-being scales are calculated using the unweighted mean value of the associated individual indicators, which assume values between 1 (e.g. *"never"* and 5 (e.g. *"almost always"*. The scale values are then standardised to values between 0 and 100, e.g: [((original scale value - 1) / 4) * 100].
Job satisfaction	3	0.83	
Work motivation	3	0.74	
Burnout	6	0.87	
General Well-Being (WHO-5)	5	0.90	
Health problems	7	0.78	
Workaholism (work addiction)	4	0.71	

Explanations of the predictor variables

Variable/Scale	Item formulation	Categories
Home office	How often do you work at the following locations: ... In your own home (home office)	0 (= never/rarely), 1 (several times a month/several times a week/daily)

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