

## Additional file 1

**Article title:** Working Conditions and State of Health of Employees Working Indoor and Outdoor with Varying Levels of Physical Demand: Insights from the 2024 BIBB/BAuA Employment Survey

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**Table 1** Item codes and descriptions from the 2024 BIBB/BAuA Employment Survey, categorized by job demands (physical, environmental, intensity, working time), job resources (autonomy, social support), and health outcomes. Scales categorized according to Meyer & Siefer [29, 30]. Descriptions translated from German

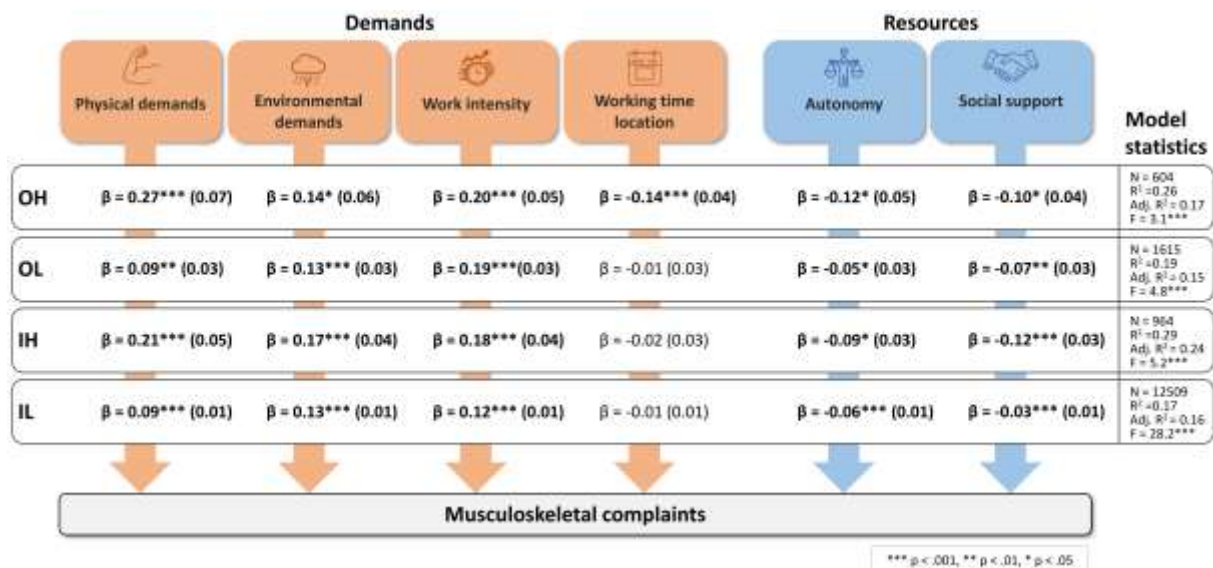
| Item                                   | Description                                                                                                                                  |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Physical demands (4 Items)</b>      |                                                                                                                                              |
| F600_01                                | Working while standing.                                                                                                                      |
| F600_03                                | Lifting and carrying loads weighing more than 20 kg for male; 10 kg for female.                                                              |
| F600_07a                               | Performing tasks with your hands that require a high degree of dexterity, rapid sequences of movements, or considerable strength.            |
| F600_07d                               | Working in a squatting or kneeling position.                                                                                                 |
| <b>Environmental demands (6 Items)</b> |                                                                                                                                              |
| F600_04                                | Working in smoke, dust, or around gases or vapors.                                                                                           |
| F600_05                                | Working in cold, heat, wet conditions, humidity, or drafts.                                                                                  |
| F600_06                                | Working with oil, grease, dirt, grime.                                                                                                       |
| F600_12                                | Working in noisy conditions.                                                                                                                 |
| F600_12a                               | Working amid distracting noises.                                                                                                             |
| F600_13                                | Dealing with infectious agents, e.g., bacteria or viruses.                                                                                   |
| <b>Work intensity (7 Items)</b>        |                                                                                                                                              |
| F410                                   | Do you generally feel up to the demands of the workload or the amount of work, or do you feel rather overwhelmed or rather under-challenged? |
| F411_01                                | Work under intense deadline or performance pressure.                                                                                         |
| F411_06                                | Being disturbed or interrupted at work, e.g., by coworkers, poor materials, machine malfunctions, or phone calls.                            |
| F411_09                                | Keep track of different tasks or processes simultaneously.                                                                                   |
| F411_12                                | Push yourself to the limits of your abilities.                                                                                               |
| F411_13                                | Work very quickly.                                                                                                                           |

| <b>Item</b>                                 | <b>Description</b>                                                                                       |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------|
| F411_16                                     | Unable to cope with the amount of information generated by your work.                                    |
| <b>Working time location (3 Items)</b>      |                                                                                                          |
| F220                                        | Do you usually work on Saturdays at least once a month?                                                  |
| F223                                        | Do you usually work on Sundays at least once a month?                                                    |
| F209                                        | Are your working hours usually between 7 a.m. and 7 p.m.?                                                |
| <b>Autonomy (6 Items)</b>                   |                                                                                                          |
| F700_02                                     | Being able to plan and organize one's own work.                                                          |
| F700_03                                     | Influence on the assigned workload.                                                                      |
| F700_05                                     | Having a say in what is to be achieved at work.                                                          |
| F700_06                                     | Being able to decide for yourself when to take a break.                                                  |
| F411_18                                     | You are solely responsible for checking your work results.                                               |
| F411_19                                     | Have to decide for yourself how the work is done.                                                        |
| <b>Social support (5 Items)</b>             |                                                                                                          |
| F700_10                                     | Feeling part of a community at work.                                                                     |
| F700_11                                     | How often do you feel that the cooperation between you and your colleagues is good?                      |
| F700_12                                     | How often do you receive help and support for your work from colleagues when you need it?                |
| F700_13                                     | How often do you receive help and support for your work from your immediate supervisor when you need it? |
| F700_14                                     | How often does your immediate supervisor praise and recognize you when you do a good job?                |
| <b>Musculoskeletal complaints (8 Items)</b> |                                                                                                          |
| F1500_01                                    | Lower back pain, lumbar pain                                                                             |
| F1500_02                                    | Pain in the neck and shoulder area                                                                       |
| F1500_03a                                   | Pain in the arms                                                                                         |
| F1500_03b                                   | Pain in the hands                                                                                        |
| F1500_04                                    | Pain in the hip                                                                                          |
| F1500_05                                    | Pain in the knees                                                                                        |
| F1500_06a                                   | Swollen legs                                                                                             |
| F1500_06b                                   | Pain in the legs, feet                                                                                   |
| <b>Psychosomatic complaints (11 Items)</b>  |                                                                                                          |
| F1500_07                                    | Head ache                                                                                                |
| F1500_08                                    | Heart pain, stabbing pains, pain, or tightness in the chest                                              |

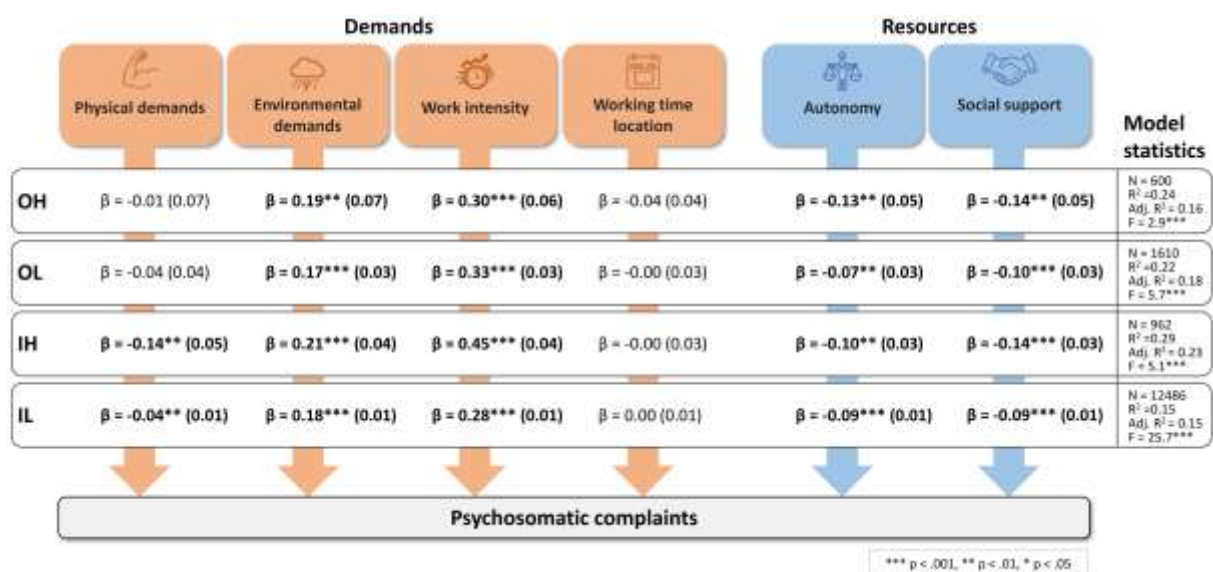
| Item     | Description                               |
|----------|-------------------------------------------|
| F1500_09 | Shortness of breath                       |
| F1500_13 | Skin irritation, itching                  |
| F1500_14 | Nighttime sleep disturbances              |
| F1500_15 | General tiredness, fatigue, or exhaustion |
| F1500_16 | Stomach or digestive problems             |
| F1500_17 | Hearing loss, tinnitus                    |
| F1500_18 | Nervousness or irritability               |
| F1500_19 | Depression                                |
| F1500_20 | Dizziness                                 |

**Table 2** Descriptive statistics for all dependent variables across specific occupational sub-groups

| Variables                  | Elderly care<br>(within IH group) |          | Education and Social<br>Work<br>(within OH group) |          | Horticulture<br>(within OH group) |          |
|----------------------------|-----------------------------------|----------|---------------------------------------------------|----------|-----------------------------------|----------|
|                            | <i>M (SD)</i>                     | <i>n</i> | <i>M (SD)</i>                                     | <i>n</i> | <i>M (SD)</i>                     | <i>n</i> |
| <b>Demands</b>             |                                   |          |                                                   |          |                                   |          |
| Physical Demands           | 3.22 (0.79)                       | 63       | 2.47 (1.15)                                       | 78       | 2.95 (1.01)                       | 38       |
| Environmental Demands      | 2.03 (1.21)                       | 64       | 2.81 (1.17)                                       | 79       | 2.76 (1.38)                       | 38       |
| Work Intensity             | 4.48 (1.55)                       | 63       | 3.49 (1.79)                                       | 79       | 1.89 (1.94)                       | 38       |
| Working Time Location      | 2.63 (0.58)                       | 64       | 0.39 (0.79)                                       | 79       | 0.32 (0.53)                       | 38       |
| <b>Resources</b>           |                                   |          |                                                   |          |                                   |          |
| Autonomy                   | 3.37 (1.58)                       | 63       | 3.56 (1.36)                                       | 78       | 3.45 (1.74)                       | 38       |
| Social Support             | 2.94 (1.64)                       | 64       | 3.68 (1.35)                                       | 74       | 3.47 (1.23)                       | 36       |
| <b>Complaints</b>          |                                   |          |                                                   |          |                                   |          |
| Musculoskeletal Complaints | 4.05 (1.96)                       | 64       | 3.22 (2.29)                                       | 79       | 3.03 (2.21)                       | 38       |
| Psychosomatic Complaints   | 3.98 (2.39)                       | 64       | 3.90 (2.69)                                       | 79       | 2.30 (1.87)                       | 37       |



**Fig. 1** Regression models examining the associations of job demands and resources with musculoskeletal complaints across four occupational groups (OH, OL, IH, IL) using continuous scales. Values presented are standardized beta coefficients ( $\beta$ ) with heteroscedasticity-consistent standard errors (HC3) in parentheses. Bold values indicate significance. All models were adjusted for age, gender, weekly working hours, job tenure, educational attainment, employment status, and job requirement level. Model statistics are provided on the right. *Note:* the sample sizes (n) differ from the primary models utilizing dichotomized scales due to the omission of item F410 from the work intensity scale, as its response format is not ordinal



**Fig. 2** Regression models examining the associations of job demands and resources with musculoskeletal complaints across four occupational groups (OH, OL, IH, IL) using continuous scales. Values presented are standardized beta coefficients ( $\beta$ ) with heteroscedasticity-consistent standard errors (HC3) in parentheses. Bold values indicate significance. All models were adjusted for age, gender, weekly working hours, job tenure, educational attainment, employment status, and job requirement level. Model statistics are provided on the right. *Note:* the sample sizes (n) differ from the primary models utilizing dichotomized scales due to the omission of item F410 from the work intensity scale, as its response format is not ordinal