**Appendix**

**Appendix A Item pool in English\***

|  |
| --- |
| **My job… [0= “does not apply”; 1= „I do not agree“ to 7= „I agree“]** |
|  allows me to learn new things. |
|  gives me the possibility to improve my skills in the future. |
|  offers high levels of variation. |
|  requires me to do multiple things at the same time. |
|  implies that I get interrupted often. |
|  is mentally demanding. |
|  allows me to work from home. |
|  puts me under time pressure. |
| **How often in your job do you have… [0= “does not apply”; 1= „never“ to 7= „very often“]** |
|  a positive working climate? |
|  high job security? |
|  flexible working times ? (e.g., arrive earlier, go home later, plan own breaks) |
|  clearly defined routines and processes? |
|  a high degree of autonomy? |
|  the responsibility to train others? |
|  the responsibility for vacation planning? |
|  the responsibility for planning breaks? |
|  the possibility to influence time management? |
|  the possibility to influence working speed? |
|  motivation? |
|  holidays? |
|  stress? |
| **How important is it in your job that you… [0= “does not apply”; 1= „not important“ to 7= „very important“]** |
|  work in a precise way? |
|  adapt to the rhythm of machines? |
|  are flexible? |
|  are innovative (e.g., have new ideas, develop something)? |
|  perform monotonous tasks? |
| **How often in your job do you… [0= “does not apply”; 1= „never“ to 7= „very often“]** |
|  use the telephone? |
|  use the internet? |
|  write emails? |
|  take an active part in discussions or negotiations? |
|  use a foreign language? |
|  deal with different cultures? |
|  deal with new technologies? |
|  have to become acquainted with new technologies? |
|  compare data with predefined standards? |
|  develop new concepts? |
|  convince others about products, services, or ideas? |
|  entertain customers? |
|  follow orders? |
|  do something meaningful? |
|  experience pride? |
|  feel overstrained |
|  not feel challenged enough? |
|  feel that there is a match between you and your job? |
|  Like the leadership? |
| **How complex is your job compared to other jobs?** **[0= “does not apply”; 1= „never“ to 7= „very much“]** |
| **Please think about how complex your job is compared to other jobs. On what level does your job require that you… [0= “does not apply”; 1= „very low“ to 7= „very high“]** |
|  speak? |
|  read and understand texts? |
|  write texts? |
|  apply expertise and stay up-to-date? |
|  measure something? |
|  build in, fix, or install things? |
|  monitor machines? |
|  operate vehicles or machines? |
|  produce or adapt technologies/ devices? |
|  apply technical expertise? |
|  repair or maintain machines/ devices? |
|  work with computers? |
|  program something? |
|  apply logical thinking? |
|  evaluate the quality of something? |
|  do quality control? |
|  apply mathematical skills? |
|  work in a scientific way? |
|  control budgets and finances? |
|  concentrate on something? |
|  memorize multiple things at the same time? |
|  acquire information? |
|  document information? |
|  process information? |
|  interpret information (e.g., messy handwriting, patterns on a weather radar)? |
|  analyze data or information? |
|  detect something (e.g., ball on the field, music between noise, military vehicles in city traffic)? |
|  think I a three-dimensional way? |
| **On what level does your job require that you… [0= “does not apply”; 1= „very low“ to 7= „very high“]** |
|  define your own working tasks? |
|  develop goals and strategies? |
|  take decisions? |
|  solve problems? |
|  organize yourself and choose your work focus? |
|  do time management? |
|  plan working processes or activities? |
|  analyze a company? |
|  do administrative work? |
|  act service-oriented? |
|  represent your employer? |
|  consult others? |
|  analyze information/ data for others? |
|  communicate with colleagues or superiors? |
|  negotiate with others? |
|  are responsible for staff? |
|  instruct employees? |
|  coordinate working activities of others? |
|  supervise working processes? |
|  are responsible for choosing working materials? |
|  build teams? |
|  Take care about relationships? |
|  act in a way that is socially sensitive? |

\* This is not an official translation.

**Appendix B Final Questionnaire**

|  |  |
| --- | --- |
| **Original Item (German)** | **Translation (short)** |
| **Mental Workload** |
| Mein Job ist geistig fordernd. | Mentally demanding job |
| Mein Job setzt mich regelmäßig unter Zeitdruck. | Time pressure |
| Wie komplex ist Ihr aktueller Job? | Complexity |
| **Verbal Demands** |
| Auf welchem Niveau verlangt Ihr aktueller Job, dass Sie… |  |
| Informationen interpretieren (z.B. eine unordentliche Handschrift, Muster auf dem Wetterradar)? | Interpret information (level) |
| Daten und Informationen analysieren? | Analyze information (level) |
| Fachwissen anwenden und auf dem neusten Stand bleiben? | Apply expertise/ up-to-date (level) |
| Texte verfassen (schreiben)? | Write texts (level) |
| **Information Load** |
| Auf welchem Niveau verlangt Ihr aktueller Job, dass Sie… |  |
| Informationen be- und verarbeiten? | Process information (level) |
| sich Informationen beschaffen? | Acquire information (level) |
| Informationen dokumentieren? | Document information (level) |
| viele Dinge im Gedächtnis behalten? | Memorize multiple things (level) |
| Texte lesen und verstehen?  | Understand texts (level) |
| Bedeutung von Informationen/Daten für andere auswerten? | Analyze for others (level) |
| **Extended Job Control** |
| Wie häufig haben Sie in Ihrem aktuellen Job… |  |
| die Möglichkeit das Zeitmanagement zu beeinflussen? | Influence time management |
| flexible Arbeitszeiten? | Flexible working hours |
| die Verantwortung für die eigene Urlaubsplanung? | Vacation planning |
| die Verantwortung eigene Pausen zu planen? | Planning breaks |
| die Möglichkeit die Arbeitsgeschwindigkeit zu beeinflussen? | Influence working speed |
| ein hohes Maß an Unabhängigkeit? | Independence |

**Appendix C Confirmatory Factor Analysis of the Final Questionnaire**



**Appendix D Item Analysis (Item Response Theory)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Coefficient** | **Standard Error** | **z** | **P>z** | **[95% Conf. Interval]** |
| **„Mentally demanding job“** |
| Discrimination | 1.69 | 0.18 | 9.29 | 0 | [1.33, 2.05] |
| Difference |
| >=1 | -2.99 | 0.33 | -9.06 | 0 | [-3.64, -2.34] |
| >=2 | -2.80 | 0.30 | -9.30 | 0 | [-3.39, -2.21] |
| >=3 | -2.41 | 0.25 | -9.64 | 0 | [-2.90, -1.92] |
| >=4 | -1.86 | 0.19 | -9.74 | 0 | [-2.23, -1.48] |
| >=5 | -1.31 | 0.14 | -9.11 | 0 | [-1.59, -1.03] |
| >=6 | -0.65 | 0.11 | -6.13 | 0 | [-0.86, -0.44] |
| 7 | 0.20 | 0.10 | 2.07 | 0.04 | [0.01, 0.40] |
| **„Time pressure“** |
| Discrimination | 0.54 | 0.12 | 4.7 | 0 | [0.32, 0.77] |
| Difference |
| >=1 | -6.29 | 1.39 | -4.54 | 0 | [-9.01, -3.58] |
| >=2 | -4.45 | 0.96 | -4.62 | 0 | [-6.33, -2.56] |
| >=3 | -2.81 | 0.62 | -4.53 | 0 | [-4.02, -1.59] |
| >=4 | -1.5 | 0.38 | -3.96 | 0 | [-2.25, -0.76] |
| >=5 | -0.57 | 0.25 | -2.3 | 0.02 | [-1.05, -0.08] |
| >=6 | 0.54 | 0.24 | 2.24 | 0.03 | [0.07, 1] |
| 7 | 1.99 | 0.46 | 4.34 | 0 | [1.09, 2.89] |
| **„Complexity“** |
| Discrimination | 1.27 | 0.15 | 8.64 | 0 | [0.99, 1.56] |
| Differcence |
| >=1 | -4.61 | 0.71 | -6.47 | 0 | [-6.01, -3.21][-4.32, -2.64][-3.59, -2.26][-2.74, -1.74][-1.54, -0.91][-0.37, 0.06][0.72, 1.3] |
| >=2 | -3.48 | 0.43 | -8.12 | 0 |
| >=3 | -2.92 | 0.34 | -8.6 | 0 |
| >=4 | -2.24 | 0.25 | -8.82 | 0 |
| >=5 | -1.22 | 0.16 | -7.63 | 0 |
| >=6 | -0.15 | 0.11 | -1.38 | 0.17 |
| 7 | 1.01 | 0.15 | 6.74 | 0 |
| **„Interpret Information (level)“** |
| Discrimination | 0.95 | 0.13 | 7.54 | 0 | [0.7, 1.2] |
| Difference |
| >=1 | -1.37 | 0.21 | -6.45 | 0 | [-1.78, -0.95][-0.87, -0.29][-0.39, 0.14][-0.11, 0.42][0.43, 1.07][1, 1.87][1.86, 3.21] |
| >=2 | -0.58 | 0.15 | -3.86 | 0 |
| >=3 | -0.13 | 0.13 | -0.93 | 0.35 |
| >=4 | 0.16 | 0.14 | 1.16 | 0.25 |
| >=5 | 0.75 | 0.16 | 4.58 | 0 |
| >=6 | 1.44 | 0.22 | 6.49 | 0 |
| 7 | 2.54 | 0.34 | 7.38 | 0 |
| **„Analyze information (level)“** |
| Discrimination | 1.69 | 0.17 | 10.01 | 0 | [1.36, 2.03] |
| Difference |
| >=1 | -1.27 | 0.14 | -9.11 | 0 | [-1.55, -0.1][-1.01, -0.58][-0.77, -0.37][-0.41, -0.04][0.02, 0.4][0.55, 1.01][1.37, 2.04] |
| >=2 | -0.79 | 0.11 | -7.14 | 0 |
| >=3 | -0.57 | 0.1 | -5.61 | 0 |
| >=4 | -0.22 | 0.09 | -2.35 | 0.02 |
| >=5 | 0.21 | 0.1 | 2.16 | 0.03 |
| >=6 | 0.78 | 0.11 | 6.79 | 0 |
| 7 | 1.7 | 0.17 | 9.87 | 0 |
| **„Apply expertise/ up-to-date“** |
| Discrimination | 1.66 | 0.18 | 9.44 | 0 | [1.31, 2] |
| Difference |
| >=1 | -2.99 | 0.32 | -9.35 | 0 | [-3.62, -2.36][-2.82, -1.9][-2.39, -1.61][-1.89, -1.26][8-1.4, -0.88][-0.75, -0.35][0.11, 0.5] |
| >=2 | -2.36 | 0.24 | -10.02 | 0 |
| >=3 | -2.0 | 0.2 | -10.11 | 0 |
| >=4 | -1.58 | 0.16 | -9.72 | 0 |
| >=5 | -1.14 | 0.13 | -8.68 | 0 |
| >=6 | -0.55 | 0.1 | -5.39 | 0 |
| 7 | 0.3 | 0.1 | 3.04 | 0.002 |
| **„Write texts (level)“** |
| Discrimination | 2.1 | 0.2 | 10.39 | 0 | [1.7, 2.49] |
| Difference |
| >=1 | -2.22 | 0.2 | -11.12 | 0 | [-2.61, -1.82][-1.86, -1.3][-1.5, -1.02][-1.26, -0.83][-0.9. -0.53][-0.3, 0.04][0.44, 0.82] |
| >=2 | -1.58 | 0.14 | -11.11 | 0 |
| >=3 | -1.26 | 0.12 | -10.34 | 0 |
| >=4 | -1.04 | 0.11 | -9.47 | 0 |
| >=5 | -0.71 | 0.1 | -7.42 | 0 |
| >=6 | -0.13 | 0.09 | -1.5 | 0.13 |
| 7 | 0.63 | 0.1 | 6.44 | 0 |
| **„Process information (level)“** |
| Discrimination | 2.57 | 0.25 | 10.31 | 0 | [2.08, 3.06] |
| Difference |
| >=1 | -1.996 | 0.17 | -12.01 | 0 | [-2.32, -1.67][-1.98, -1.43][-1.71, -1.22][-1.35, -0.94][-0.95, -0.59][-0.39, -0.08][0.39, 0.73] |
| >=2 | -1.7 | 0.14 | -12.16 | 0 |
| >=3 | -1.47 | 0.12 | -11.84 | 0 |
| >=4 | -1.15 | 0.11 | -10.77 | 0 |
| >=5 | -0.77 | 0.09 | -8.49 | 0 |
| >=6 | -0.23 | 0.08 | -2.94 | 0.003 |
| 7 | 0.56 | 0.09 | 6.33 | 0 |
| **„Acquire information (level)“** |
| Discrimination | 2.43 | 0.24 | 9.95 | 0 | [1.95, 2.91] |
| Difference |
| >=1 | -3.23 | 0.38 | -8.58 | 0 | [-3.97, -2.49][-2.73, -1.92][-2.35, -1.67][-1.97, -1.39][-1.54, -1.06][-0.81, -0.46][0.12, 0.45] |
| >=2 | -2.32 | 0.21 | -11.23 | 0 |
| >=3 | -2.01 | 0.17 | -11.53 | 0 |
| >=4 | -1.68 | 0.15 | -11.45 | 0 |
| >=5 | -1.3 | 0.12 | -10.8 | 0 |
| >=6 | -0.63 | 0.09 | -7.03 | 0 |
| 7 | 0.29 | 0.08 | 3.44 | 0.001 |
| **„Document information (level)“** |
| Discrimination | 2.2 | 0.21 | 10.38 | 0 | [1.78, 2.61] |
| Difference |
| >=1 | -2.11 | 0.19 | -11.36 | 0 | [-2.48, -1.75][-1.98, -1.4][-1.62, -1.12][-1.22, -0.8][-0.9, -0.53]8-0.26, 0.07][0.47, 0.85] |
| >=2 | -1.69 | 0.15 | -11.44 | 0 |
| >=3 | -1.37 | 0.13 | -10.88 | 0 |
| >=4 | -1.01 | 0.11 | -9.5 | 0 |
| >=5 | -0.71 | 0.09 | -7.56 | 0 |
| >=6 | -0.09 | 0.08 | -1.14 | 0.26 |
| 7 | 0.66 | 0.1 | 6.81 | 0 |
| **„Memorize multiple things (level)“** |
| Discrimination | 1.42 | 0.16 | 8.78 | 0 | [1.1, 1.73] |
| Difference |
| >=1 | -4.81 | 0.83 | -5.78 | 0 | [-6.45, -3.18][-4.46, -2.69][-3.63, 2.29][-3.23, -2.08][-2.16, -1.39][-0.91, -0.45][0.17, 0.6] |
| >=2 | -3.58 | 0.45 | -7.91 | 0 |
| >=3 | -2.96 | 0.34 | -8.71 | 0 |
| >=4 | -2.66 | 0.3 | -8.98 | 0 |
| >=5 | -1.78 | 0.2 | -9.08 | 0 |
| >=6 | -0.68 | 0.12 | -5.81 | 0 |
| 7 | 0.38 | 0.11 | 3.47 | 0.001 |
| **„Understand texts (level)“** |
| Discrimination | 1.97 | 0.2 | 9.68 | 0 | [1.57, 2.37] |
| Difference |
| >=1 | -2.82 | 0.29 | -9.87 | 0 | [-3.38, -2.26][-2.5, -1.73][-2.18, -1.5][-1.76, -1.2][-1.37, -0.9][-0.8, -0.43][0.09, 0.44] |
| >=2 | -2.12 | 0.2 | -10.74 | 0 |
| >=3 | -1.84 | 0.17 | -10.69 | 0 |
| >=4 | -1.48 | 0.14 | -10.27 | 0 |
| >=5 | -1.13 | 0.12 | -9.38 | 0 |
| >=6 | -0.61 | 0.1 | -6,36 | 0 |
| 7 | 0.27 | 0.09 | 2,93 | 0.003 |
| **„Analyze for others (level)“** |
| Discrimination | 1.47 | 0.15 | 9.68 | 0 | [1.18, 1.77] |
| Difference |
| >=1 | -1.36 | 0.15 | -8.87 | 0 | [-1.66, -1.06][-0.98, -0.53][-0.5, -0.1][-0.09, 0.31][0.24, 0.66][0.63, 1.13][1.63,2.48] |
| >=2 | -0.76 | 0.12 | -6.52 | 0 |
| >=3 | -0.3 | 0.1 | -2.94 | 0.003 |
| >=4 | 0.11 | 0.1 | 1.05 | 0.29 |
| >=5 | 0.45 | 0.11 | 4.13 | 0 |
| >=6 | 0.88 | 0.13 | 6.9 | 0 |
| 7 | 2.05 | 0.22 | 9.51 | 0 |
| **„Influence time management“** |
| Discrimination | 0.74 | 0.12 | 6.03 | 0 | [0.5, 0.98] |
| Difference |
| >=1 | -2.89 | 0.49 | -5.95 | 0 | [-3.84, -1.94][-2.95, -1.45][-1.94, -0.87][-1.03, -0.28][-0.16, 0.49][0.76, 1.76][1.57, 3.15] |
| >=2 | -2.2 | 0.38 | -5.78 | 0 |
| >=3 | -1.41 | 0.27 | -5.15 | 0 |
| >=4 | -0.65 | 0.19 | -3.39 | 0.001 |
| >=5 | 0.16 | 0.17 | 0.97 | 0.33 |
| >=6 | 1.26 | 0.25 | 4.95 | 0 |
| 7 | 2.36 | 0.4 | 5.85 | 0 |
| **„Flexible working hours“** |
| Discriminination | 0.44 | 0.11 | 3.97 | 0 | [0.22, 0.65] |
| Difference |
| >=1 | -4.37 | 1.1 | -3.97 | 0 | [-6.53, -2.21][-5.06, -1.7][-3.84, -1.25][-3.23, -1.01][-2.14, -0.54][-0.83, 0.22][0.46, 2.04] |
| >=2 | -3.38 | 0.86 | -3.95 | 0 |
| >=3 | -2.54 | 0.66 | -3.85 | 0 |
| >=4 | -2.12 | 0.57 | -3.73 | 0 |
| >=5 | -1.34 | 0.41 | -3.27 | 0.001 |
| >=6 | -0.31 | 0.27 | -1.15 | 0.25 |
| 7 | 1.25 | 0.41 | 3.09 | 0.002 |
| **„Vacation planning“** |
| Discrimination | 0.64 | 0.12 | 5.25 | 0 | [0.4, 0.88] |
| Difference |
| >=1 | -1.59 | 0.34 | -4.64 | 0 | [-2.26, -0.92][-1.13, -0.25][-0.47, 0.26][-0.21, 0.53][0.26, 1.15][0.64, 1.77][1.33, 3.06] |
| >=2 | -0.69 | 0.22 | -3.09 | 0.002 |
| >=3 | -0.1 | 0.19 | -0.56 | 0.58 |
| >=4 | 0.16 | 0.19 | 0.85 | 0.39 |
| >=5 | 0.71 | 0.23 | 3.1 | 0.002 |
| >=6 | 1.2 | 0.29 | 4.17 | 0 |
| 7 | 2.19 | 0.44 | 4.97 | 0 |
| **„Planning breaks“** |
| Discrimination | 0.61 | 0.12 | 5.09 | 0 | [0.37, 0.84] |
| Difference |
| >=1 | -1.93 | 0.41 | -4.73 | 0 | [-2.73, -1.13][-1.28, -0.33][-0.67, 0.12][-0.29, 0.47][0.13, 1.01][0.48, 1.55][1.43, 3.34] |
| >=2 | -0.8 | 0.24 | -3.31 | 0.001 |
| >=3 | -0.28 | 0.2 | -1.38 | 0.17 |
| >=4 | 0.09 | 0.2 | 0.46 | 0.65 |
| >=5 | 0.57 | 0.22 | 2.56 | 0.01 |
| >=6 | 1.01 | 0.27 | 3.71 | 0 |
| 7 | 2.38 | 0.49 | 4.9 | 0 |
| **„Influence working speed“** |
| Discrimination | 0.57 | 0.12 | 4.89 | 0 | [0.34, 0.79] |
| Difference |
| >=1 | -4.73 | 0.98 | -4.83 | 0 | [-6.65, -2.81][-4.99, -2.11][-3.16, -1.28][-1.71, -0.54][-0.44, 0.38][0.59, 1.84][2.01, 4.78] |
| >=2 | -3.55 | 0.73 | -4.84 | 0 |
| >=3 | -2.22 | 0.48 | -4.62 | 0 |
| >=4 | -1.13 | 0.3 | -3.78 | 0 |
| >=5 | -0.03 | 0.21 | -0.16 | 0.87 |
| >=6 | 1.21 | 0.32 | 3.83 | 0 |
| 7 | 3.39 | 0.71 | 4.81 | 0 |
| **„Independence“** |
| Discrimination | 0.39 | 0.11 | 3.49 | 0 | [0.17, 0.6] |
| Difference |
| >=1 | -7.02 | 2.03 | -3.46 | 0.001 | [-10.99, -3.05][-9.05, -2.53][-6.05, -1.68][-3.79, -0.97][-1.58, -0.13][0.47, 2.47][1.83, 6.68] |
| >=2 | -5.79 | 1.66 | -3.48 | 0.001 |
| >=3 | -3.86 | 1.12 | -3.46 | 0.001 |
| >=4 | -2.38 | 0.72 | -3.31 | 0.001 |
| >=5 | -0.85 | 0.37 | -2.3 | 0.02 |
| >=6 | 1.47 | 0.51 | 2.88 | 0.004 |
| 7 | 4.25 | 1.24 | 3.44 | 0.001 |