

Confidential

1 **Associations Between Work Characteristics, Engaged Well-Being at Work, and Job**
2 **Attitudes – Findings from a Longitudinal German Study**

3

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16 Text: X words

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21 **Abstract**

22 **Objective and aims:**

23 The Job Demand & Resources (JD-R) model suggests work characteristics are related to
24 mental well-being and work engagement. Previous work describes the development of a new
25 construct 'engaged well-being at work' (EWB) that combines measures of both. The extent to
26 which changes in measures of this construct are responsive to changes in job demands and
27 resources and are associated with changes in job-related attitudes has not been established.

28 **Data and Methods:**

29 Longitudinal employee-level data from three waves of the German Linked Personnel Panel
30 were used. Categories of EWB were created and logistic and linear fixed effects regression
31 analyses explored longitudinal associations between changes in EWB category for participants
32 over a three-year period a) with changes in job demands and resources, and b) with changes
33 in job-related attitudes such as job commitment and satisfaction and turnover intentions.

34 **Results:**

35 While job resources were generally associated with increased odds for a change into a
36 healthier and/or more engaged category of EWB, job demands reduced them. Job resources
37 were more strongly related to higher EWB ($OR_{range} = 1.22 - 1.61$) than job demands ($OR_{range} =$
38 $0.79 - 0.96$). Especially psychological job demands showed associations with improved EWB
39 ($OR = 0.79$). A change from the least desirable category 'disengaged strain' to any other
40 category of EWB was associated with greater odds by up to 20.6 % for increased commitment
41 and job satisfaction and lower odds for turnover intentions.

42 **Discussion:**

43 The results suggest that improving work characteristics, especially job resources, could
44 increase employees' EWB, emphasizing the importance of job characteristics in creating a
45 healthy workplace. Because EWB seems to be associated with job attitudes, an improvement
46 of this indicator would be relevant for both employees and employers.

47 **Keywords:**

48 mental well-being; work engagement; employees; job characteristics; job attitudes;
49 workplace health

50 **Introduction**

51

52 A recent press release by the DAK, a major German health insurance company, reported that
53 days of sick leave due to mental health impairments have been continuously increasing since
54 the start of recording and reached an all-time high in 2020 (1). In this year, an additional factor
55 is adding to this problem: The COVID-19 pandemic is not only decreasing mental health (e.g.
56 2, 3) but also puts hardship on the economy, resulting in alarmingly high unemployment rates
57 (4). These developments increase the need to focus on both improving workplace mental
58 health and work engagement to maintain productivity, preferably at low costs for employers
59 (5). Both mental well-being and work engagement are associated with better work-related
60 outcomes. Employees with higher mental well-being are more productive and less often
61 absent from work (6) and greater work engagement may lead to higher performance and
62 innovativeness (7, 8) as well as greater task performance and financial returns (9). Therefore,
63 it is essential for employers to find ways in which they can improve both mental well-being
64 and work engagement.

65

66 According to the well-established JD-R model (for reviews see 10, 11), both mental well-being
67 and work engagement can be influenced by physical, psychological, social, or organizational
68 aspects of the workplace, that either “require sustained physical and/or psychological effort
69 and are therefore associated with certain physiological and/or psychological costs” (i.e. job
70 demands, 10) or “that are functional in achieving work goals, reduce job demands and the
71 associated physiological and psychological costs, or stimulate personal growth, learning, and
72 development” (i.e. job resources, 10). Both, summarized as work characteristics, appear to
73 affect mental health and engagement through different psychological pathways: the health-
74 impairment process and the motivational process (10). Supporting the first, multiple studies
75 showed that mainly job demands were associated with mental health-related outcomes such
76 as burnout (12), exhaustion (13), or absence duration (14). Supporting the latter, job resources
77 seem to predict motivational outcomes such as work engagement (12), or absence frequency
78 (14).

79

80 In line with previous attempts to combine mental health and work engagement within the
81 model (15-17), recent research (REF Draft 1, in press) indicates that mental well-being and

82 work engagement are correlated but distinct factors that form a two-dimensional space.
83 Within this frame, four categories were defined in which employees can be divided: engaged
84 well-being, disengaged well-being, engaged strain, and disengaged strain (Table 1). Within
85 these nominal categories, engaged well-being could be considered the most desirable state
86 (high mental health and work-engagement), while disengaged strain would be the least
87 desirable. Moreover, the study REF EWB Draft 1, in press has shown, that employees can
88 change their status of engaged well-being over time, moving from one category to another.
89 Thus, the construct of engaged well-being (EWB) might be helpful not only to monitor changes
90 in this two-dimensional space over time but also in establishing factors to enhance such a
91 change.

92

93 *The Present Study*

94 Since the construct of EWB (step 1 in Figure 1) is fairly new, it has not yet been established
95 which workplace factors might affect it. Thus, this study aims to explore long-term
96 relationships between work characteristics and EWB (step 2, Figure 1).

97 Furthermore, associations of EWB and job-related attitudes (turnover intentions, job
98 satisfaction, and commitment) will be examined (step 3, Figure 1).

99

100 ---- *Figure 1* ----

101

102 **Data and Methods**

103

104 ***Data***

105

106 The Linked Personnel Panel (LPP) is a longitudinal panel that links employer and employee
107 information. Employer-level information are, for example, human resource culture or
108 management instruments, while employee-level information include data on work-related
109 resources and demands, health status, and sociodemographic characteristics (for more
110 information see 18, 19-21). The LPP was initiated by the German Federal Ministry of Labor and
111 Social Affairs (BMAS) and administered at the Institute for Employment Research (IAB). Data
112 access to the LPP was provided via on-site use at the Research Data Centre (FDZ) of the
113 German Federal Employment Agency (BA) at the IAB and subsequent remote data access.

114 Currently, the LPP comprises three waves (wave 1213, 1415, and 1617, 22). It is representative
115 of private German companies that are moderate- to large-sized (≥ 50 employees) in the
116 manufacturing and service sectors (21).

117

118 Overall, the first wave (2012/2013) comprises data from 7,508 employees and 1,219
119 companies, while in the second wave (2014/2015) 7,282 employees and 771 companies were
120 interviewed, and 6,779 employees and 846 companies participated in the third wave
121 (2016/2017). Due to the longitudinal design of our analyses, one inclusion criterion was
122 participation in at least two of the three waves. Further criteria include being between the
123 age of 20 to 65 and providing valid data on all study variables used in the regression analysis
124 (see below), leading to an analytical sample of $n=4,038$ employees (76.4% of all panel cases).
125 Figure 2 provides a more detailed overview of how we arrived at our analytical sample. The
126 Ethics Committee of the Medical Faculty of the University of Heidelberg approved the use of
127 the LPP for secondary data analysis (2018-514N-MA). All participants provided informed
128 consent.

129

130 ---- *Figure 2* ----

131

132 **Measures**

133

134 *Mental Well-Being*

135

136 The WHO-5 Well-Being Questionnaire (version 1998) is a commonly used and validated
137 instrument to measure mental well-being (23, 24). The five items assess whether during the
138 last two weeks employees felt 'cheerful and in good spirits', 'calm and relaxed', 'active and
139 vigorous', 'fresh and rested', and whether their daily life was filled with things that interested
140 them. Responses were rated on a 6-point Likert scale with 0 representing 'at no time' and 5
141 representing 'all of the time'. The sum of the five items multiplied by four was used for the
142 overall mental well-being index ranging from 0 to 100. Higher values of the scale indicate a
143 better assessment of one's well-being.

144

145 *Work Engagement*

146

147 The Utrecht Work Engagement Scale (UWES-9) was used to measure work engagement (25-
148 27). Work engagement is defined as a positive, fulfilling, work-related state of mind that is
149 characterized by vigor, absorption and dedication (26). The nine items comprise statements
150 like 'When I get up in the morning, I feel like going to work' (see Appendix A for full
151 questionnaire). All items are measured on a five-point Likert scale with 1 equaling 'never' and
152 5 equaling 'daily' and a mean score across all nine items was calculated. The score ranges from
153 1 to 5 and a higher score indicating more work engagement.

154

155 *Engaged Well-Being (EWB)*

156

157 EWB was based on employees' assessments of both their mental well-being and work
158 engagement. The separation into the four categories engaged well-being, disengaged well-
159 being, engaged strain, and disengaged strain was based on a cluster analysis described in
160 previous work **EWB Part1**. A value of ≥ 51 in the WHO-5 is indicative of good mental well-being
161 and was used to distinguish between good mental well-being vs. strain (23). High work
162 engagement was defined as the top 60% ($UWES-9 \geq 3.7$) and disengagement as the lowest
163 40% ($UWES-9 < 3.7$, REF EWB Paper 1). The resulting categories are displayed in Table 1. Even
164 though the categories are merely nominal, it can be assumed that engaged well-being is the
165 most desirable, since it reflects both the highest degree of well-being and work engagement.
166 Accordingly, disengaged strain should be least desirable.

167

168 ---- *Table 1* ----

169

170

171 *Work Characteristics*

172

173 Several work characteristics assessed in the LPP were classified as either job resources or job
174 demands based on results of a factor analysis. The resources comprised: work autonomy and
175 diversity, supervisory support and organizational goals, fairness, development and job
176 promotion, and teamwork (see Table B1 in Appendix B for description, Cronbach's alpha, and
177 factor loadings). Job demands comprised psychological demands, physical demands, and

178 social demands (see Table B2 for description, Cronbach`s alpha, and factor loadings). All items
179 were measured on a 5-point Likert scale – a higher value indicating either more resources or
180 higher demands.

181

182 *Job Attitudes*

183

184 Employee commitment -the relative strength of an employee`s identification with and
185 involvement in an organization - was measured using a short form questionnaire (21, 28). This
186 questionnaire includes six items measuring affective commitment on a five-point Likert scale
187 (1 `does not apply at all`; 5 `fully applies`). The items comprise the statements like `This
188 organization has a great deal of personal meaning for me` or `I do not feel emotionally
189 attached to this organization` (full list in Appendix A). Coding was reversed if an item was
190 phrased negatively and a mean score (range 1-5) across all items was calculated. A higher
191 value indicated greater affective commitment.

192

193 Having no turnover intentions (`How many times in the past 12 months have you thought
194 about changing your job?`; note that the coding was reversed for analysis) was rated on a five-
195 point Likert scale that ranged from 1 (daily) to 5 (never). Employees rated their level of job
196 satisfaction (`How satisfied are you today with your job?`) on an 11-point Likert scale ranging
197 from 0 (completely unhappy) to 10 (completely happy).

198

199 *Descriptive Sample Characteristics*

200

201 Individual and organizational characteristics used for the description of the analytical sample
202 were gender (male; female), age-group (20-29; 30-39; 40-49; 50-59; 60-65 years), white-
203 collar/blue-collar status (self-report), and full-time/part-time work.

204

205 ***Analyses***

206

207 The main analytical approach to test the associations between EWB, work characteristics, and
208 job attitudes involved two steps:

209

210 In a first step, fixed effects (FE) logistic regression models were used to estimate the
211 longitudinal associations of job demands and resources with EWB. FE models compare within
212 employees, not between employees. Therefore, changes in EWB within employees between
213 waves were analyzed. Even though all 4,038 subjects that participated in all three waves were
214 included, the analyses only analyze those whose responses reflect a change in one interval. In
215 these models, different binary dependent variables were used, based on the comparison of
216 two of the four categories of EWB. The analyses included the following comparisons, to
217 compare against the most desirable category engaged well-being:

- 218 1. disengaged strain, disengaged well-being, and engaged strain vs engaged well-being,
- 219 2. disengaged well-being vs engaged well-being,
- 220 3. engaged strain vs engaged well-being,
- 221 4. disengaged strain vs engaged well-being.

222

223 All job characteristics were included as metric independent variables. Odds ratios (OR) and
224 corresponding confidence intervals (CI) describe how increases in job resources and demands
225 by one scale unit were associated with a change from one or multiple lower categories into a
226 better category in subsequent waves.

227

228 In the second step, linear FE regression analyses were performed to analyze longitudinal
229 associations between EWB and job attitudes. For all linear regression models, our coefficients
230 represent within-individual average differences (presented as changes in %) in job attitude
231 scores between waves in which employees responses were categorized as reflecting
232 'disengaged strained' (reference) and waves in which employee responses reflected any other
233 category.

234

235 All regression models controlled for age in years at baseline. Time-constant control variables
236 such as gender were not included as FE-models account for all time-invariant indicators within
237 employees. We conducted our analyses using the statistical software package STATA, version
238 14 (29).

239

240

241 **Results**

242

243 *Analytical Sample*

244

245 Table 2 provides descriptive statistics of the analytical sample. Mental well-being was on
246 average rated as good (62.9, ± 20.0) and the average reported work engagement can be found
247 in the upper third of the total scale (3.7, ± 0.8). The sample was primarily male (73.5%),
248 between the age of 50 and 59 years (42.9%), and consisted predominantly of white-collar
249 workers (65.1%), and employees working in full-time jobs (87.3%). Means for job
250 characteristics are reported in the appendix (Table B1).

251

252 ---- Table 2 ----

253

254 The greater part of the overall analytical sample was categorized as engaged well-being
255 (47.7%). 28.3% belonged in the category disengaged well-being and 16.3% were engaged with
256 poor well-being (disengaged strained). With a proportion of 7.9% the category engaged
257 strained was the smallest category.

258

259 The results of the analysis are presented in Table 3. While increases in job resources were
260 generally associated with higher odds for a change into a better category of engaged well-
261 being ($OR \geq 1.22$), increasing psychological and social demands were associated with reduced
262 odds ($OR \leq 0.85$, physical demands not significant).

263 Amongst the job resources, only an improvement in teamwork significantly raised the odds
264 for a change from engaged strain to engaged well-being ($OR = 1.41$, $CI = 1.06 - 1.88$). With the
265 exception of work autonomy and diversity, on the other hand, an increase in all job resources
266 raised the odds to change from disengaged well-being to engaged well-being ($OR \leq 1.28$).
267 Improvements in fairness ($OR = 2.48$, $CI = 1.47 - 4.17$) and work autonomy and diversity ($OR =$
268 1.86 , $CI = 1.20 - 2.89$) were associated with higher odds for a change from disengaged strain
269 to engaged well-being.

270 An increase in psychological job demands was associated with significantly lower odds
271 regarding the change from engaged strain to engaged well-being ($OR = 0.72$, $CI = 0.53 - 0.98$).

272

273 ---- Table 3 ----

274

275 The association between EWB and job attitudes (second step) are shown in Table 4. A change
276 from the lowest category disengaged strain to any other category of EWB was associated with
277 increased commitment and job satisfaction and reduced turnover intentions. The lowest
278 increases can be found in changes from disengaged strain to disengaged well-being. The
279 associations were especially strong when employees changed from disengaged strain to
280 engaged well-being. Highest rate of changes was found for the reduction in turnover
281 intentions (up to 20.60%, CI = 16.85-24.34).

282

283 ---- Table 4 ----

284

285 **Discussion**

286

287 The aim of the present study was to test the longitudinal associations of job resources and
288 demands with EWB, as well as those between EWB and job attitudes. The results suggest that
289 improving work characteristics in the form of increased resources and reduced demands were
290 associated with increased employees' EWB and that, in turn, was associated with better job
291 attitudes (more job satisfaction and commitment, less turnover intentions). These
292 associations indicate that employers have the possibilities to increase employees' EWB
293 whereby both employees and their employers may profit from these improvements.

294

295 The findings presented above are consistent with the JD-R model (10) in general and add to it
296 the dimension of EWB: Improvements in job resources were associated with increased EWB,
297 while increases in job demands were associated with decreased EWB. These results can also
298 be interpreted as support for the pathways proposed in the JD-R model. In line with the
299 health-impairment process (10), especially higher psychological and social demands reduced
300 the odds to change from engaged strain to engaged well-being, indicating that the job
301 demands are mainly associated with the mental well-being dimension of EWB. On the other
302 hand, improvements in work engagement (i.e., changing from disengaged well-being to
303 engaged well-being and from disengaged strain to engaged well-being) showed strong
304 associations with increased job resources, supporting the motivational process proposed in
305 the JD-R model (10).

306

307 While job demands did not always show significant associations, we found that job resources
308 and improved EWB in general were strongly associated. Job resources are not only expected
309 to increase mental well-being and especially work engagement but to also decrease the
310 negative effects of job demands (10), which might explain missing associations of job
311 demands. Future studies should analyze the direct and indirect effects of job resources on
312 EWB. Overall, the results emphasize the importance of job resources in the promotion of
313 employees' EWB. Additionally, there were no associations between physical demands and
314 EWB. This might be explained by the fact that psychological and social demands as well as
315 EWB reflect mental processes or states and should therefore be more strongly associated with
316 one another. However, it could also be argued that due to the shifts in work in Western
317 societies to less physical work (30), physical job demands have become less relevant for most
318 occupations. More detailed analyses focusing on jobs that are more physically straining should
319 be conducted to get a better picture of these professions.

320

321 The positive associations between EWB and job attitudes, such as job satisfaction, turnover
322 intentions, and commitment, indicates that EWB is important not only on an employee but on
323 an employer level as well. As pointed out above, both mental health and work engagement
324 are associated with greater productivity, increased performance, reduced absence, and
325 decreased turnover intentions (6-9, 31, 32). In this study, EWB as a combined construct was
326 significantly associated with job attitudes, i.e., commitment, no turnover intentions, and job
327 satisfaction. Interestingly, especially increases in work engagement seemed to be associated
328 with greater increases in desirable job attitudes, and lowest increases were found for changing
329 from disengaged strain to disengaged well-being. This stresses the importance of the need to
330 focus not merely on mental well-being but also on work engagement when planning
331 workplace interventions. On the other hand, as outlined in the introduction, mental well-being
332 is important for higher productivity and fewer days of sick leave (1, 6). Thus, a construct that
333 combines both dimensions should be highly valuable for employers as well as employees.
334 Focusing on a construct such as EWB should lead to more lasting organizational success by
335 providing employees with necessary resources to reach organizational goals. Future studies
336 should test this assumption by analyzing the long-term effects of EWB on productivity and
337 other more objective indicators of organizational success.

338

339 The results extend the existent JD-R model (10) by combining the two dimensions of mental
340 well-being and work engagement. This construct of EWB with its defined cut-offs provides an
341 easily applicable tool. It could be used in organizations as a metric for indicating whether
342 improvement of work characteristics is needed to not only promote employees' EWB but to
343 also improve organizational success. Especially if many employees are observed in the lower
344 categories of EWB, improvements might be pursued. The measurement of EWB could then be
345 used to observe whether the implemented changes are successful over time, an important
346 responsibility that organizations face (33).

347

348 *Strength and Limitations*

349

350 The longitudinal design as well as the use of established and validated indicators of mental
351 well-being and work engagement are a strength of the present study. However, the presented
352 analyses do not allow a causal interpretation. Moreover, since two separate regression
353 analyses were calculated, it cannot be determined whether EWB might be a mediator
354 between job characteristics and job attitudes. It might be interesting to test this in future
355 studies. Further limitations are a potential selection bias as we have conducted a complete
356 case analysis. Additionally, the sample is primarily male, older, and working full-time, and
357 results should therefore be interpreted carefully as they might not be representative for
358 certain work populations. Future studies should test our results using study populations with
359 different sociodemographic characteristics. A bias due to common method variance cannot
360 be excluded, as all items were measured subjectively and based on self-reports. However, the
361 longitudinal design of the study should reduce common method variance, as situational
362 factors that might influence responses are not likely to occur at all three points of
363 measurement (34).

364

365 *Conclusion*

366

367 In the reported analyses, changes in job demands and resources were associated with changes
368 in EWB over time. This might be especially helpful to provide employers with a measurement
369 to monitor improvements in job characteristics. It also emphasizes the importance of job
370 characteristics in creating a healthy workplace environment. Additionally, we provided

371 evidence that an increase in EWB was associated with more positive job-related attitudes,
372 making this construct even more relevant for employers.

373

374 **Declarations**

375

376 **Ethics approval and consent to participate:**

377 Participants provided informed consent and the Ethics Committee of the Medical Faculty of
378 the University of Heidelberg approved the use of the LPP for secondary data analysis (2018-
379 514N-MA).

380

381 **Consent for publication:**

382 Not applicable.

383

384 **Availability of data and materials:**

385 The data that support the findings of this study are available from the Research Data Centre
386 (FDZ) of the German Federal Employment Agency (BA) at the Institute for Employment
387 Research (IAB) but restrictions apply to the availability of these data, which were used under
388 license for the current study, and so are not publicly available. Data access can be requested
389 from the Research Data Centre (FDZ) of the German Federal Employment Agency (BA) at the
390 Institute for Employment Research (IAB).

391

392 **Competing interests:**

393 JEF has received royalties for lectures regarding occupational health from various companies
394 and public agents. The authors declare that they have no conflict of interest.

395

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399

400 **Authors' contributions:**

401 LLB and CB wrote the manuscript under the guidance of RMH. CB performed data preparation
402 and analysis. CB, LLB, and RMH interpreted the results. JEF contributed to the conception and

403 design of this study. JEF led and supervised the study. All authors revised the final draft of the
404 manuscript critically for important intellectual content, and approved the version to be
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406

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408 This study uses the Linked Personnel Panel (LPP), waves 1 and 2. Data access was provided via
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414 **Literature**

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512

513 Tables and Figures

514

515 **Table 1:** Categories of EWB

	engaged well-being	disengaged well-being	engaged strain	disengaged strain
mental well-being	+	+	-	-
work engagement	+	-	+	-

516

517 **Table 2:** Descriptive statistics of the pooled analytical sample (n = 4,038; obs = 9,203)

	mean / %	S.D. / n
mental well-being (range 0-100)	62.9	20.0
work engagement (range 1-5)	3.7	0.8
commitment (range 1-5)	3.8	0.8
no turnover intentions (range 1-5)	4.5	0.8
job satisfaction (range 0-10)	7.6	1.6
male	73.5	6761
20-29 years	6.5	599
30-39 years	13.2	1212
40-49 years	30.6	2812
50-59 years	42.9	3952
60-65 years	6.8	628
white-collar	65.1	5993
full-time	87.3	8036

518

519 **Table 3:** Odds ratios (OR) and confidence intervals (CI) in brackets of changes in EWB when
 520 employees' report an increase of job demands or resources of one scale unit – results from
 521 logistic fixed effects regression analyses

	change from any lower category ¹ to engaged well- being (n = 1,227)	change from engaged strain to engaged well- being (n = 353)	change from disengaged well- being to engaged well-being (n = 723)	change from disengaged strain to engaged well- being (n = 230)
<i>Resources:</i>				
work autonomy and diversity	1.30 [1.10-1.52] **	1.31 [0.98-1.76]	1.12 [0.90-1.40]	1.86 [1.20-2.89] **
supervisory support and organizational goals	1.61 [1.32-1.99] ***	1.33 [0.91-1.93]	2.04 [1.53-2.71] ***	1.14 [0.69-1.87]
fairness	1.34 [1.10-1.64] **	0.92 [0.64-1.30]	1.46 [1.10-1.94] **	2.48 [1.47-4.17] **
development and job promotion	1.22 [1.06-1.41] **	1.07 [0.84-1.36]	1.28 [1.04-1.56] *	1.41 [0.95-2.08]
teamwork	1.49 [1.26-1.75] ***	1.41 [1.06-1.88] *	1.58 [1.26-1.97] ***	1.28 [0.82-2.01]
<i>Demands:</i>				
psychological demands	0.79 [0.66-0.94] **	0.72 [0.53-0.98] *	0.84 [0.65-1.09]	0.69 [0.46-1.04]
physical demands	0.96 [0.83-1.09]	0.97 [0.76-1.23]	1.02 [0.84-1.22]	0.74 [0.50-1.07]
social demands	0.85	0.92	0.89	0.69

[0.73-0.98] *

[0.72-1.18]

[0.71-1.10]

[0.47-1.02]

522 Note: ¹disengaged strain, engaged strain, and disengaged well-being; *** p < .001, ** p <

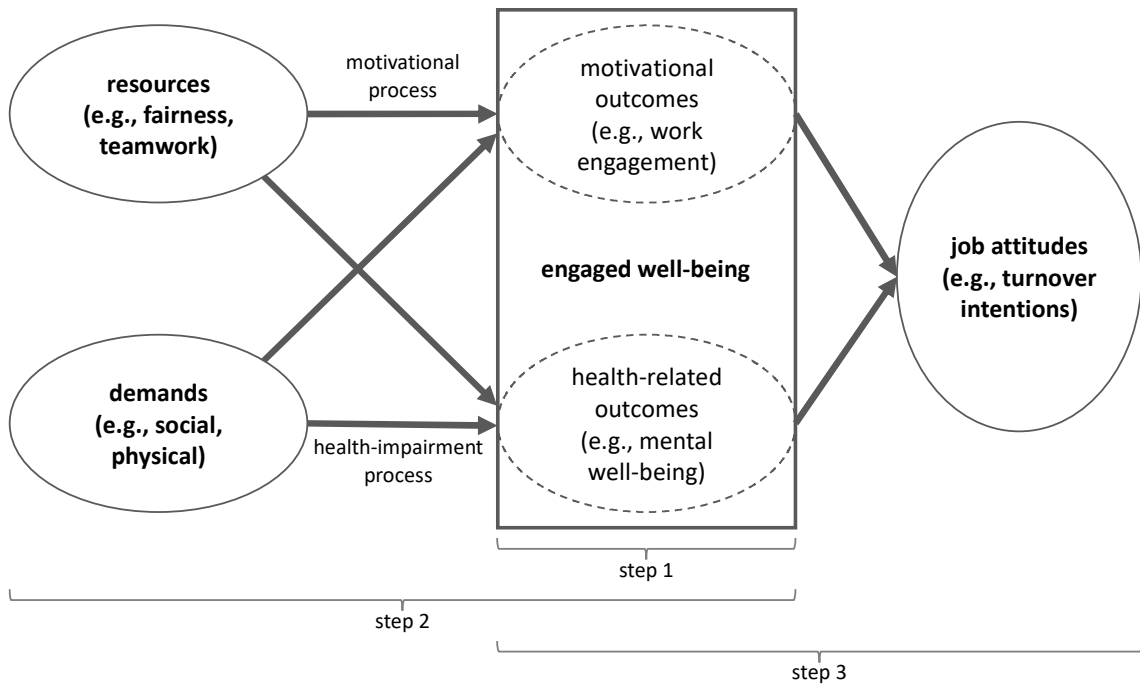
523 .01, * p < .05.

524 **Table 4:** Changes in job attitudes (in %, CI in brackets) when employees' EWB status changes
 525 from disengaged strain (reference category) to any higher category – results from linear
 526 fixed effects regression analyses (n = 4,038)

	no turnover		
	commitment	intentions	job satisfaction
engaged well-being	8.23 * [6.75-9.70]	20.60 * [16.85-24.34]	13.37 * [11.69-15.06]
disengaged well-being	3.12 * [1.83-4.42]	12.23 * [15.35 - 9.12]	7.22 * [5.73-8.71]
engaged strain	7.55 * [5.74-9.37]	15.47 * [20.28-10.66]	11.04 * [8.97-13.11]
disengaged strain	<i>ref.</i>	<i>ref.</i>	<i>ref.</i>

527 Note: * p < .001.

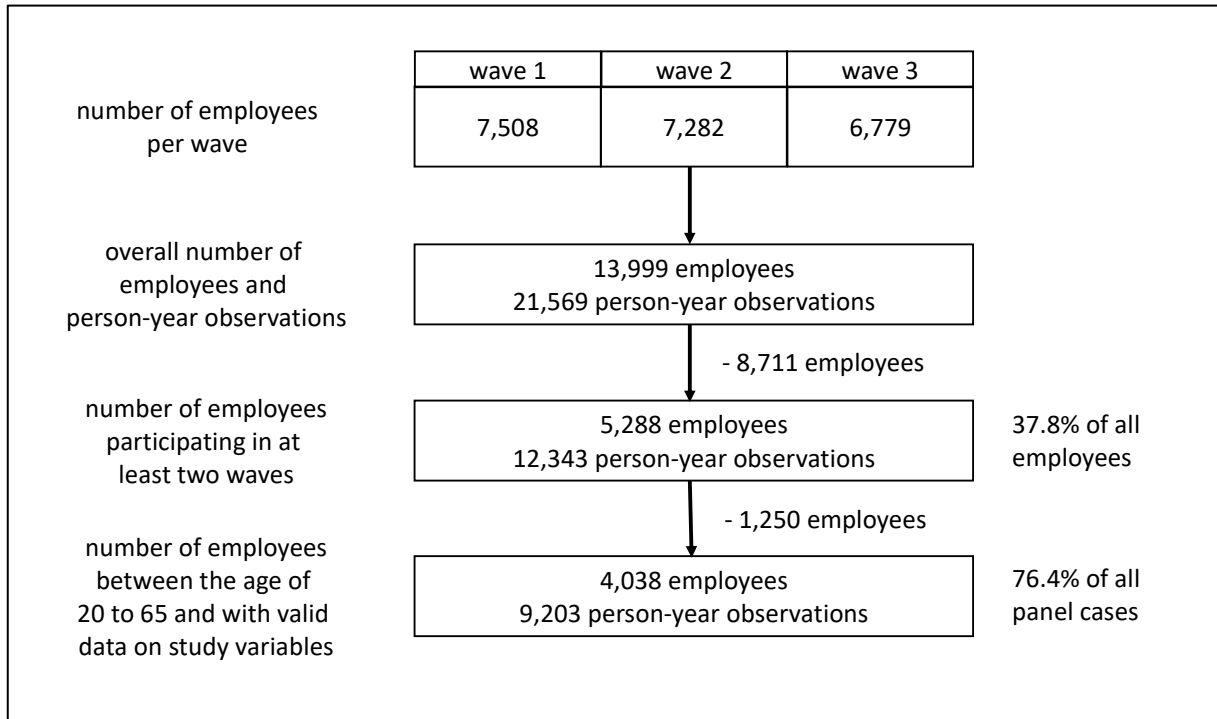
528 **Figure 1:** Theoretical assumptions about associations between EWB, work characteristics, and
529 job attitudes



530

531

532 **Figure 2:** Flow chart of analytical LPP-sample



533

Appendix B

Factor analyses for job resources and demands

Table B1: Description, exploratory factor analysis, and Cronbach’s alpha for job resources

Factor	Items	mean	S.D.	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	alpha
Work autonomy	<ul style="list-style-type: none"> ○ The job allows me to make a lot of decisions on my own. 	4.1	0.7	0.754					0.472
and diversity	<ul style="list-style-type: none"> ○ The job involves a great deal of task variety. ○ Supervisors show that they have confidence in those they manage. ○ Supervisors can be relied upon to give good guidance to people. 			0.820	0.613	0.435			
Supervisory support and organizational goals	<ul style="list-style-type: none"> ○ Supervisors show an understanding of the people who work for them. ○ The superiors clearly communicate requirements and objectives. ○ If the superiors of this establishment are dissatisfied with the personal performance of their employees, they talk openly with them about it. 	3.7	0.7		0.650	0.387	0.522	0.514	0.834
					0.730				
									0.653

- People have a good understanding of what the organization is trying to do.

0.667

- Everyone who works here is well aware of the long-term plans and direction of this company.

0.681

- I believe that I am being rewarded fairly at work.

0.725

- The rules and procedures to make decisions are fair.

0.329 **0.615**

Fairness

- The way my supervisor treats me is fair.

0.338 **0.609**

0.620

- No one working here is discriminated because of his/her sex, age, nationality, religious affiliation, handicap, sexual orientation or skin color.

0.266

- Our establishment is palpably interested in

- further development of my professional knowledge and competences.

0.309 **0.342** **0.504**

Development and job promotion

3.5 **0.9**

0.737

- In our establishment, employees expected to fit the new position best are predominantly promoted.

0.842

- In our establishment, employees characterized by outstanding job performance are **0.822** predominantly promoted.

- How often do you receive help and support

from colleagues if required?

4.3 0.7

0.842

0.682

- How often do you offer helping your

colleagues?

0.878

538 Shown are all factor loadings $\geq .3$; bold values indicate the factor chosen for an item; one item did not load on any factor with a value of $\geq .3$ and

539 we chose the factor with the highest loading (< 3), if the content of the item fit this factor.

540

Table B2: Description, exploratory factor analysis, and Cronbach's alpha for job demands

Factor	Items	Factor			alpha
		1	2	3	
	○ I often have time pressure over a long period or I have to deal with several important tasks at the same time.	0.539			
	○ The demands of my work interfere with my home and family life.	0.816			
Psychological demands	○ The amount of time my job takes up makes it difficult to fulfill family responsibilities.	0.820			0.749
	○ My job produces strain that makes it difficult to fulfill family duties.	0.818			
	○ How often do you receive business phone calls during your leisure time or how often do you answer business e-mails?	0.497			
	○ The job requires a lot of physical effort.		0.849		
Physical demands	○ At work I am exposed to unpleasant ambient conditions such as noise, extreme temperature, unpleasant lightning or odors.		0.826		0.707

<ul style="list-style-type: none"> ○ In our establishment, promotion is mostly not related to professional criteria or performances. ○ In the past two years with this establishment, I have been disadvantaged in personnel decisions, such as promotion, raise in salary, performance appraisal or further training. ○ How often do you feel wrongly criticized, harassed or denounced by your colleagues or superiors? 	<p>1.9 0.8</p> <p>0.768 0.448</p> <p>0.536</p>	<p>0.688</p>
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542 Shown are all factor loadings $\geq .3$; bold values indicate the factor chosen for an item.

543

