

# Later Life Workplace Index: Validation of an English Version

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## ABSTRACT

Research on measures for organizational practices targeted toward older employees has grown during the past decade. However, existing measures tend to capture the construct with unidimensional scales, use single-item operationalizations, or focus on specific domains. Thus, the Later Life Workplace Index (LLWI) was developed to serve as a multidimensional framework for measuring organizational practices for the aging workforce. The LLWI covers 9 domains, namely organizational climate, leadership, work design, health management, individual development, knowledge management, transition to retirement, continued employment after retirement, and health and retirement coverage. The index has recently been operationalized and validated in Germany. Given that the quantitative evidence for the framework is limited to Germany so far, we aimed to translate and validate an English version of the LLWI using a sample of older U.S. employees ( $N = 279$ ). Findings regarding the psychometric properties of the measure are presented, supporting the domain level factor structure through confirmatory factor analyses, but revealing some redundancy among the items for the overall 9 domain factor structure. Multigroup factor analyses comparing the U.S. sample to a German sample ( $N = 349$ ) further confirmed configural and (partial) metric measurement invariance of the English version of the LLWI. Results also supported convergent and discriminant validity as well as criterion and incremental validity regarding individual level attitudinal, health-related, intention, and behavioral outcomes. Based on these findings, implications for the use of the LLWI in research and practice and future research directions are discussed.

**KEYWORDS:** aging workforce, cross-cultural research, measurement invariance, organizational practices, validation

Due to the aging of workforces resulting from demographic change (United Nations, 2019), guidelines on how to successfully employ and retain older employees have gained importance (Boehm & Dwertmann, 2015; Kunze et al., 2011). Research has shown that the relevance of organizational practices changes over the lifespan due to changing needs and abilities in later life (Cadiz et al., 2019; Kooij et al., 2013). In line with this lifespan approach to aging at work (Rudolph, 2016), several organizational practices have been identified that are specifically related to older employees' health, motivation, performance, and retirement preferences, such as age discrimination climate, respectful leadership, and work design (Jonsson et al., 2021; Kunze

et al., 2011; Nilsson et al., 2011; Parker & Andrei, 2020; Wöhrmann et al., 2017).

Although these studies have demonstrated that organizational practices for the aging workforce constitute a multidimensional construct, existing measures for age-related organizational practices tend to use unidimensional scales (e.g., Taneva & Arnold, 2018), measure the availability of practices with single items (e.g., Kooij et al., 2014), or focus on specific aspects of the overall construct (e.g., Armstrong-Stassen & Lee, 2009). Recently, researchers have endeavored to advance these existing measures. Eppler-Hattab et al. (2020) developed a 24-item scale of workplace age-friendliness with a particular focus

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on organizational culture. Even though this new multidimensional measure does include development, wellness, and flexibility practices that are related to an age-friendly organizational culture, it is missing certain domains relevant for older employees that are often absent from existing measures, such as counseling for life in retirement and support regarding health and retirement coverage (M. Wang & Zhan, 2012). Moreover, the measure does not allow for a differentiated consideration of single domains (e.g., work design and health management or individual development and knowledge management). Similarly, specific organizational practices such as opportunities for physical exercise and healthy nutrition tend to be allocated into higher-level items, thereby restricting more nuanced and consequently accurate assessments. Thus, a multidimensional measure with comprehensive conceptual coverage of diverse relevant organizational practices could offer new opportunities for future research.

Hence, the Later Life Workplace Index (LLWI) was developed to serve as a multidimensional framework for organizational practices for an aging workforce (Wilckens et al., 2020; (see comment regarding the updated publication status on line 2.65) Wöhrmann et al., 2018). The index covers nine domains, namely organizational climate, leadership, work design, health management, individual development, knowledge management, transition to retirement, continued employment, as well as health and retirement coverage. The German operationalization of the framework contains 80 items and has been developed and validated in a multistudy project (Wilckens et al., 2021).

Despite the profound theoretical development of the LLWI framework, which is based on qualitative research conducted in Germany and the United States (Wilckens et al., 2020; Wöhrmann et al., 2018), as well as the confirmed psychometric properties based on the German validation studies (Wilckens et al., 2021), the applicability of the measurement model in other countries apart from Germany is yet to be determined. Since most developed countries are faced with aging workforces (Organisation for Economic Co-operation and Development [OECD], 2020), the application of the LLWI could be beneficial for both research and practice in many other countries. Therefore, we aim to shed light on the generalizability of the LLWI and provide further evidence for the multidimensional model. We developed an English language version of the LLWI and examined its psychometric properties and measurement invariance among a sample of older U.S. employees (as compared to a sample of older German employees). The English translation was aligned to the U.S. context since the largest English-speaking economy is facing similar challenges compared to Germany regarding its aging workforce (OECD, 2020).

#### OVERVIEW OF THE LLWI

The LLWI's development process had three stages. First, Wöhrmann et al. (2018) developed a qualitative framework based on 27 semi-structured expert interviews held in Germany. Subsequently, Wilckens et al. (2020) carried out a qualitative study to integrate the U.S. perspective into this framework utilizing findings from the Age Smart Employer Award. The award honors employers in New York City that enact organizational practices that foster age diversity. The collection of organizational practices used to evaluate the employers was compared to the organizational practices included in the qualitative LLWI framework. As a result, a new domain was added to the framework and existing domains were adapted. Finally, Wilckens et al. (2021) developed

a German scale measure for this revised framework. An initial pool of 102 items was developed based on the qualitative framework, expert interviews, and several small pre-tests. The items were then reduced to 80 items in a large-scale development study and cross-validated in a second study. In the following, we provide an overview of the LLWI framework. Detailed information regarding the development and domains can be found in Wilckens et al. (2020) as well as Wilckens et al. (2021).

The LLWI is comprised of nine domains (i.e., organizational climate, leadership, work design, health management, individual development, knowledge management, transition to retirement, continued employment, and health and retirement coverage). Each of these domains is further divided into two to four indicators (Figure 1). The *organizational climate* domain includes “set standards and actions of an employer shaped by the mission and values of the organization” that enhance the employment of older employees (Wilckens et al., 2020, p. 73). The domain's indicators are *equality of opportunity* regardless of age, a *positive image of age* and older employees within the organization, as well as an *open and target group-oriented communication* that includes the open exchange about challenges and possibilities of working in older age. The second domain, *leadership*, includes managers' responsibility to consider all employees' strengths and needs, especially older employees', to tap into their full potential. Managers' *appreciation* of all employees, regardless of age, constitutes the first indicator. Additionally, *responsiveness to individuality* is characterized by managers taking individual employees' capabilities, needs, and personalities into consideration, thereby being particularly sensitive to changes in later life. The domain *work design* is focused on the adaption of the workplace and work task according to the older employees' abilities and needs. Indicators include *flexible work time arrangements*, *flexible workplaces*, *work according to capabilities*, and *ergonomic working conditions*. *Health management* encompasses “all organizational activities that aim to maintain and promote employees' health and work ability” (Wilckens et al., 2021, p. 21). This includes the *availability of physical exercise and nutrition opportunities*, *workplace medical treatment*, and *health promotion* measures. The sixth domain, *individual development*, includes efforts to foster the professional and personal development of all employees, regardless of age. The first indicator, *continuous development planning*, focuses on identifying development opportunities for employees of all ages. The indicator *appropriate solutions for training and development* aims at adapting trainings to older employees' needs and capabilities. Finally, *enabling development steps and job changes* entails changes to the job task or position to respond to older employees' specific capabilities and developmental interests. The *knowledge management* domain focuses on practices regarding inter-generational exchange and conservation of knowledge. Indicators are *institutionalized knowledge transfer* (e.g., through mentoring programs) as well as *inter-generative collaboration* to share know-how and experiences between younger and older employees. One retirement-focused domain is *transition to retirement*, which includes measures for the individual planning and implementation of the transition into retirement. The four indicators are *timely transition planning*, *phased retirement and individualized transition solutions*, *counseling for retirement life preparation* offered by the organization, as well as *continuous inclusion and maintaining contact*

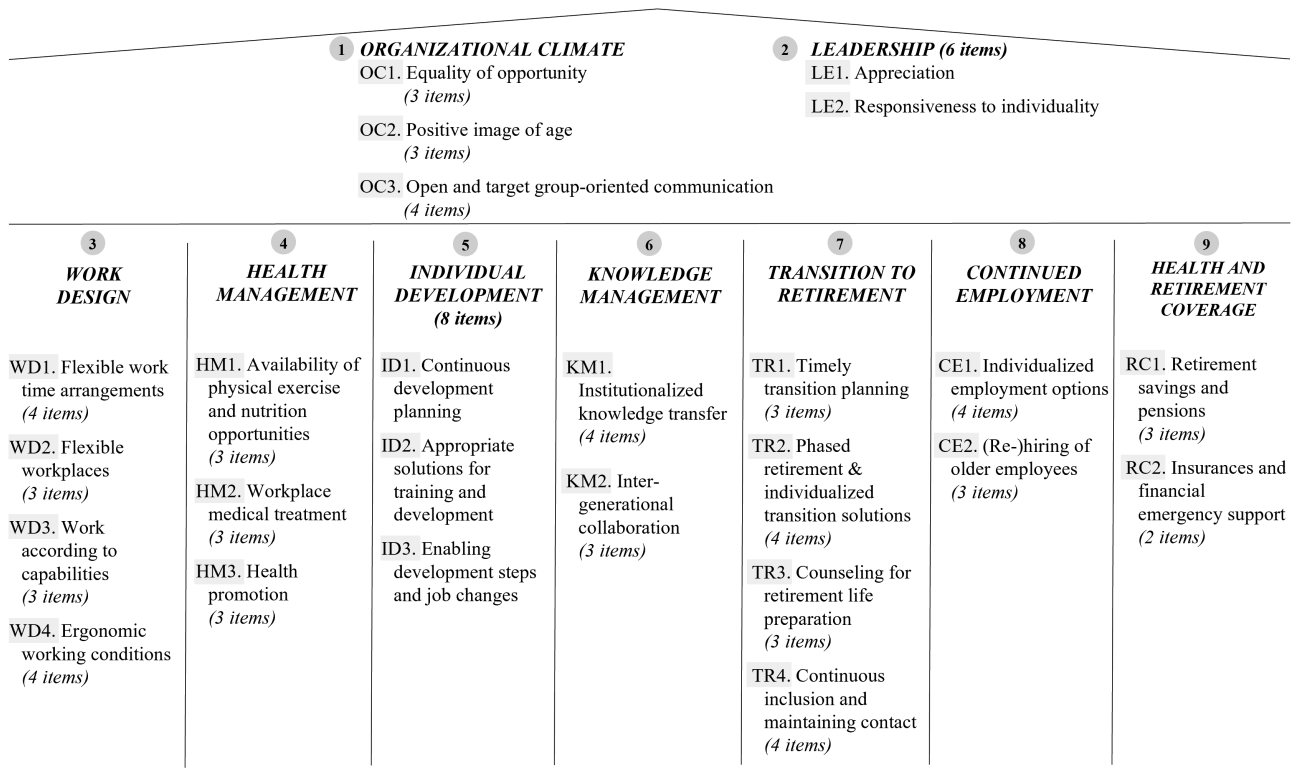


Figure 1. Domains and indicators of the Later Life Workplace Index. Note. Adapted from Wilckens et al. (2021). Published with kind permission of © Max R. Wilckens, Anne M. Wöhrmann, and Jürgen Deller 2021. All Rights Reserved.

with retired employees. Another retirement-focused domain is called *continued employment* and entails employment opportunities in the organization for employees that have reached retirement age. Thus, indicators are *individualized employment options* and the *(re-) hiring of older employees*. Finally, the last domain, *health and retirement coverage*, focuses on organizational measures regarding older employees' financial retirement planning and insurance coverage. The first indicator, *retirement savings and pensions*, includes opportunities and advice provided by the organization for financial retirement planning and retirement savings. The second indicator, *insurances and financial emergency support*, aims at advice on private supplemental insurance and the offer of such insurance. Recent studies using German employees provide quantitative evidence to support the proposed domains' nine-factor structure (Wilckens et al., 2021). Moreover, the hierarchical two-order factor structure that reflects the domains' indicators was supported for seven out of the nine domains. Only for leadership and individual development, the higher-order factor structure could not be confirmed quantitatively, which means that the indicators did not emerge as separate factors for these two domains. The studies further provide evidence for the reliability as well as discriminant, convergent, and criterion validity of the measure.

The LLWI encompasses a variety of human resource (HR) management practices, work environment factors, norms, and procedures relevant for aging workforces. So far, no English measure exists that has a comparable comprehensive coverage of organizational practices for older employees. A review of existing validated English measures

(Wilckens et al., 2021) revealed that they mainly consist of unidimensional scales (e.g., Taneva & Arnold, 2018), apply single items or dichotomous response formats to measure each specific organizational practice (e.g., Kooij et al., 2014), miss certain domains of organizational practices (e.g., Eppler-Hattab et al., 2020), or lack a thorough psychometric evaluation (e.g., Armstrong-Stassen & Lee, 2009).

Thus, this study advances research by analyzing the generalizability of a multidimensional framework of organizational practices for the aging workforce, thereby offering an English language version of the LLWI that can be widely applied in research and practice. The measure enables researchers to take a closer look at the interplay between the different organizational practices. Moreover, the LLWI can be used in a variety of different contexts since it was developed independently of organizational size and industry (Wilckens et al., 2021). Additionally, the scales can be administered to HR managers, managers, or older employees alike. Due to the practical orientation of the instrument, research findings stemming from studies applying the LLWI can be easily transferred to practice. Furthermore, the LLWI can be used in practice directly to illustrate organizations their strengths and weaknesses regarding the employment of aging workforces, thereby highlighting areas for improvement and giving indications for possible interventions (Wilckens et al., 2021). Consequently, a validated translation of this comprehensive measure has great potential to advance future research and practice in English-speaking countries. Hence, the purpose of this study was to examine the factor structure and measurement invariance of an English language version of the LLWI among a sample

of older U.S. employees as compared to a sample of older German employees. In addition, we analyzed the convergent, discriminant, criterion, and incremental validity of the English instrument to replicate and further develop the nomological network of the LLWI (see Table 1 for an overview of the validity measures and expected relationships with the LLWI domains).

For convergent validity assessment, we expected the LLWI domains to be strongly correlated ( $r \geq .5$ ) with existing measures of related constructs, thereby confirming the measure's convergent validity (Kline, 2005). In particular, in line with the study conducted by Wilckens et al. (2021), we expected the organizational climate domain to be strongly correlated to an age-diversity climate (Boehm et al., 2014) since both constructs highlight equal opportunities and openness to age diversity. Moreover, we aimed to expand the convergent validity evidence regarding the leadership domain. Based on the domain's indicators, we assumed a strong positive correlation with the construct of respectful leadership (van Quaquebeke & Eckloff, 2010). Finally, there is an existing measure for the construct of age-inclusive HR practices (Boehm et al., 2014), which we expected to be strongly positively correlated with the organizational climate, individual development, and continued employment domains since it focuses on equal development and recruitment opportunities as well as an age-friendly organizational culture.

Second, in line with Wilckens et al. (2021), we utilize affect as an unrelated construct to gauge discriminant validity. While correlations between affect and the organizational practices assessed by the LLWI might exist based on the positive framing of LLWI items, these correlations should be rather small ( $r \leq |.3|$ ) and therefore indicative of discriminant validity (Kline, 2005).

Third, we wanted to demonstrate the criterion validity of the LLWI through its relationship with older employees' attitudinal, health-related, as well as intention and behavioral outcomes since previous research has shown organizational practices captured by the LLWI to be antecedents of these outcomes (e.g., Kunze & Toader, 2019; Pak et al., 2019; Söderbacka et al., 2020). In doing so, we aimed to replicate and supplement the findings from Wilckens et al. (2021). Since there are no universal cut-off values to confirm criterion validity and older employees' outcomes depend on various other factors apart from the organizational practices covered by the LLWI, we developed our hypotheses based on theoretical propositions and current empirical research findings. Out of the outcomes under consideration, the attitudinal outcomes are most proximal to the organizational practices (Nishii et al., 2018). Accordingly, and based on prior studies (e.g., Kooij et al., 2013), we expected the LLWI to be moderately correlated ( $|.3| \leq r \leq |.5|$ ) with the attitudinal outcomes person–job fit, person–organization fit, job satisfaction, affective commitment, work engagement, and occupational future time perspective.

For health-related outcomes, we expected moderate correlations with the more attitudinal-based outcomes of work-related stress and well-being based on the premise that the LLWI domains cover practices aimed at reducing stressors for older employees (e.g., work according to capabilities) and prior research (e.g., Erkutlu & Chafra, 2016). For the more health-focused outcomes of older employees' work ability, perceived health, and sick days that do not directly include older employees' attitudinal outcomes (e.g., well-being encompasses job and

life satisfaction; see Danna & Griffin, 1999), we only predicted small correlations ( $|.1| \leq r \leq |.3|$ ).

Regarding the intention and behavioral outcomes, in line with prior research (e.g., Wöhrmann et al., 2013) we expected small correlations ( $|.1| \leq r \leq |.3|$ ) with older employees' turnover intention and postretirement work intention. Moreover, we assumed a small correlation with older employees' job performance (e.g., Kooij et al., 2013; Taneva & Arnold, 2018), especially for the non-retirement-focused LLWI domains. From a theoretical point of view, the comparably lower expectations are based on the understanding that older employees' attitudes act as prerequisites for their intentions and behavior (Nishii et al., 2018).

## METHOD

### Procedure

The translation of the LLWI items was carried out using a back-translation technique detailed by Brislin (1986). An English-German bilingual, who was informed about the purpose and content of the LLWI, translated the German items (Wilckens et al., 2021) into English language. The English items were then back-translated by another English-German bilingual who had no prior knowledge of the LLWI. Next, the research team compared both German language versions with the help of both translators and a researcher from the United States, who is an expert in the context of aging research, in an iterative procedure to reach a consensus. The comprehensibility of the English items was also ensured during this process.

Data from the United States were collected via an online study administered through LimeSurvey and distributed using Amazon Mechanical Turk (MTurk). Previous research has shown that MTurk samples are more diverse than other internet samples (e.g., Buhrmester et al., 2011). This is especially advantageous since we aimed to recruit participants from a wide variety of industries and occupations. Moreover, while some researchers have voiced concerns regarding the data quality of MTurk samples (cf. Aguinis et al., 2021), studies have shown the data obtained to be comparable to samples recruited via other channels (e.g., Buhrmester et al., 2011), especially when researchers implement suitable data screening procedures (Keith et al., 2017). To achieve this, we applied a rigorous data quality assurance process described in the following sections based on scientific recommendations (e.g., Curran, 2016; Meade & Craig, 2012).

We set several requirements for participants to partake in the survey. They were required to be U.S. residents aged 50 years and above working at least 20 hrs per week for one employer with at least 30 employees. Additionally, they had to have English as their first language. Participants were further restricted to those with an MTurk approval rate of at least 97% and a minimum of 1,000 approved HITs (Sheehan & Pittman, 2016). A "captcha" verification was used to detect and exclude bots. The survey was approved by an institutional review board at a university in the United States and the data collection took place between October 2019 and April 2020. To start the survey, participants had to agree to an informed consent after reading a thorough description of the purpose and procedure. Participants received a compensation of \$2.50 or \$3.50 after finishing the 30-min survey. This compensation meets MTurk payment standards in social science and psychology research (Sheehan & Pittman, 2016).

**Table 1. Overview of measures used for testing validity and the expected relationships with the LLWI subscales**

Validity measure	Definition/construct	Sample item	Expected relationship <sup>a</sup>	Findings
Convergent validity Age-diversity climate	“Organizational members’ shared perceptions of the fair and nondiscriminatory treatment of employees of all age groups with regard to all relevant organizational practices, policies, procedures, and rewards” (Boehm et al., 2014, p. 671)	“Our company makes it easy for people from diverse age groups to fit in and be accepted.”	+++ (organizational climate domain)	Fully supported
Respectful leadership	Manager’s “attitude towards other people, in whom he/she sees a reason that, in itself, justifies a degree of attention and a type of behavior that in return engenders in the target a feeling of being appreciated in importance and worth as a person” (van Quaquebeke & Eckloff, 2010, p. 344)	“My leader trusts my ability to independently and self-reliantly perform well.”	+++ (leadership domain)	Fully supported
Age-inclusive HR practices	“Organizational HR practices related to developing an age-inclusive workforce” (Boehm et al., 2014, p. 679)	“With how much intensity does your company offer age-neutral recruiting activities?”	+++ (organizational climate, individual development, and continued employment domains)	Fully supported
Discriminant validity I-PANAS-SF	Positive and negative affect (Thompson, 2007)	“Thinking about yourself and how you normally feel, to what extent do you generally feel alert?” “Thinking about yourself and how you normally feel, to what extent do you generally feel upset?”	+ (positive affect) - (negative affect)	Almost fully supported <sup>b</sup> Fully supported
Criterion validity Person–job fit	Employees’ cognitions about “their fit with the rewards that a particular job supplies in return for their service (needs-supplies fit)” (Cable & DeRue, 2002, p. 877)	“There is a good fit between what my job offers me and what I am looking for in a job.”	++	Fully supported
Person–organization fit	Employees’ “cognitions about their fit with an organization’s cultural values” (Cable & DeRue, 2002, p. 877)	“The things that I value in life are very similar to the things that my organization values.”	++	Fully supported
Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale Affective commitment	General job satisfaction (Cammann et al., 1983) Employees’ emotional attachment and identification with an organization (Meyer & Allen, 1997)	“All in all, I am satisfied with my job.” “I would be very happy to spend the rest of my career in this organization.”	++ ++	Fully supported Fully supported

Table 1. Continued

Validity measure	Definition/construct	Sample item	Expected relationship <sup>a</sup>	Findings
UWES-3	Work engagement is a state characterized by vigor, dedication, and absorption (Schaufeli et al., 2019)	"At my work, I feel bursting with energy."	++	Almost fully supported
Occupational future time perspective	"How much time individuals believe they have left in their [occupational] future and how they perceive that time" (Zacher & Frese, 2009, p. 487)	"Many opportunities await me in my occupational future."	++	Partially supported <sup>c</sup>
Stress in General scale	General work stress characterized by pressure and threat (Stanton et al., 2001)	"Do you find your job demanding?" (pressure) "Do you find your job irritating?" (threat)	--	Partially supported
WHO-5	Subjective psychological well-being (Topp et al., 2015)	"Over the past two weeks, I have felt cheerful and in good spirits."	++	Almost fully supported
Perceived work ability	Employee's "assessment of his or her ability to continue working in his or her job, given characteristics of the job along with his or her personal resources." (McGonagle et al., 2015, p. 1)	"How many points would you give your current ability to work?"	+	Fully supported
Perceived health	Health status and satisfaction (Adams & Beehr, 1998)	"Overall, I am very satisfied with my health."	+	Almost fully supported
Number of sick days	Number of sick days in the last 12 months (Tuomi et al., 1991)	"How many whole days have you been off work because of a health problem (disease, health care, or for examination) during the past year (12 months)?"	-	Not supported
Turnover intention	Intention to leave the organization (Kim & Stoner, 2008)	"In the next few months I intend to leave this organization."	-	Fully supported
Postretirement work intention	"Tendency to continue to work after retirement with the same employer" (Wöhrmann et al., 2013, p. 224)	"I would like to continue paid work in retirement."	+	Almost fully supported
Colleague-rated performance	In-role performance (Eisenberger et al., 2001)	"Think about the colleague aged 50 or older that you are working closest with. Please indicate how much the following statements apply to him/her. He/She meets the formal performance requirements of the job."	+	Partially supported

Note. +++ = strong positive correlation; ++ (-) = moderate positive (negative) correlation; + (-) = small positive (negative) correlation.

<sup>a</sup>Expected correlation with all LLWI domains unless otherwise specified in brackets.

<sup>b</sup>Only one expected relationship was not supported by our results.

<sup>c</sup>More than one expected relationship was not supported by our results.

## Data Screening and Participants

Out of 844 individuals who started the survey, 490 did not pass the screening questions. Another 17 participants dropped out later in the survey and were excluded from further data analyses. We rigorously screened the remaining 337 participants who finished the survey for careless respondents to increase data quality. First, two individuals were excluded since they did not pass at least two out of three instructed response items. This threshold to detect respondents who are not paying attention was chosen based on Curran's (2016) recommendations. A closer look at the response time for each survey page yielded no outliers regarding too short response times, that is, no participant had a response time that was lower than 1.5 interquartile ranges from the first quartile. Calculating the longstring index (Meade & Craig, 2012) on a string of 117 unidimensional items to detect invariant respondents, 15 participants were identified as outliers and excluded from further analyses. Computing the even-odd consistency (Dunn et al., 2018) for the 80 LLWI items to detect respondents who answered inconsistently, 41 participants with a value lower than .30 were excluded (Johnson, 2005). Among this reduced sample of 279 participants, the average response time was 29.09 min ( $SD = 11.04$ ) compared to 28.82 min ( $SD = 10.83$ ) in the original survey-completion sample.

The final sample was 61.6% female with a mean age of 57.0 years ( $SD = 4.9$ ). More than half of the participants had an associate's degree or above (63.5%) and had been working for their current organization for more than 6 years (64.5%). Participants with a supervisory position amounted up to 42.3%. The majority (68.4%) worked in an occupation where they spend more than half their time at an office workplace. Employers' organizational sizes differed between 30 to 499 employees (40.4%), 500 to 4,999 employees (24.0%), and more than 5,000 employees (35.5%). The economic sectors represent the U.S. distribution (U.S. Bureau of Labor Statistics, 2020) well, with 48.2% service organizations, 16.9% industrial organizations, 16.5% educational institutions, 11.9% retail organizations, 5.4% public administration and defense, 0.7% agriculture, and 0.4% craft businesses.

For the purpose of testing measurement invariance, some analyses included a sample of older employees from Germany that had previously been utilized to validate the German language version of the LLWI (Wilckens et al., 2021). This German sample included 349 employees, with 43.0% of them being female and with a mean age of 55.9 years ( $SD = 4.1$ ). The majority of the participants (85.9%) had been working for their employer for more than 6 years and 39.3% held a supervisory position. A detailed description of the sample and the data collection procedure can be obtained from Wilckens et al. (2021).

## Measures

The questionnaire included the LLWI items and additional measures to serve as validations scales. To replicate the prior findings from the German validation, we used the same scales utilized in the validation of the German language version of the LLWI (Wilckens et al., 2021) and included additional measures to extend the evidence regarding convergent and criterion validity (see Table 1 for an overview). All measures were available in English language.

## LLWI

We used the English translation (see the Appendix for the items) of the LLWI (Wilckens et al., 2021) consisting of 80 items differentiated

into nine subscales reflecting the nine domains of the LLWI, namely organizational climate (10 items), leadership (6 items), work design (14 items), health management (9 items), individual development (8 items), knowledge management (7 items), transition to retirement (14 items), continued employment (7 items), and health and retirement coverage (5 items). Except for the domains of leadership and individual development, the domain level scales can be further divided into indicator level subscales (see Figure 1 for the number of items per indicator). All items assess organizational practices at the organizational level (example beginnings of the items are "In our organization..." or "Employees of our organization..."). Responses were measured on a rating scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

## Measures for Testing Convergent Validity

We assessed age-diversity climate with a four-item measure developed by Boehm et al. (2014). Furthermore, we used a 12-item scale from van Quaquebeke and Eckloff (2010) to measure respectful leadership. Finally, we assessed age-inclusive HR practices with another scale from Boehm et al. (2014). The reliabilities of these measures were very good ( $\alpha = [.90; .95]$ ; Table 2).

## Measures for Testing Discriminant Validity

We assessed positive and negative affect at the beginning of the survey using the short version of the Positive and Negative Affect Schedule (I-PANAS-SF; Thompson, 2007). Reliability was .78 and .81 for positive and negative affect, respectively.

## Measures for Testing Criterion Validity

Regarding the attitudinal measures, we assessed person–job fit and person–organization fit with three items each from Cable and DeRue (2002). We also assessed job satisfaction with three items from the Michigan Organizational Assessment Questionnaire (Cammann et al., 1983), affective commitment with a six-item measure developed by Meyer and Allen (1997), and work engagement with a three-item version of the Utrecht Work Engagement Scale (UWES-3; Schaufeli et al., 2019). Lastly, we assessed occupational future time perspective with a six-item measure from Zacher and Frese (2009). The reliabilities of all six measures were (very) good ( $\alpha = [.84; .97]$ ; Table 2).

For criteria related to older employees' health, we assessed work-related stress using the Stress in General scale from Stanton et al. (2001). We also measured well-being using the five-item scale provided by the World Health Organization (WHO-5; Topp et al., 2015), perceived work ability with a four-item scale from McGonagle et al. (2015), and self-rated perceived health with four items from Adams and Beehr (1998). We further asked for the number of sick days with one item from the Work Ability Index (WAI; Tuomi et al., 1991). Reliabilities were at least acceptable for all measures ( $\alpha = [.78; .91]$ ; Table 2).

Finally, for the intentional and behavioral criteria, we assessed turnover intention with three items from Kim and Stoner (2008) and the same-employer–post-retirement work intention with three items from Wöhrmann et al. (2013). Furthermore, using the four-item measure provided by Eisenberger et al. (2001), we also obtained job performance ratings. Since self-ratings of performance measures are prone to leniency (Heidemeier & Moser, 2009), we adapted the measure to let participants rate the performance of a colleague aged 50 or above that they are working closely with. Such peer-ratings have shown to be more

Table 2. Means, standard deviations, and correlations

Variable	$\alpha$	M	SD	1	2	3	4	5	6	7	8	9
1. Organizational climate	.91	4.95	1.12									
2. Leadership	.91	4.96	1.26	.68***								
3. Work design	.92	3.72	1.37	.40***	.54***							
4. Health management	.93	3.46	1.51	.37***	.46***	.54***						
5. Individual development	.89	4.94	1.22	.67***	.67***	.51***	.46**					
6. Knowledge management	.88	4.93	1.27	.56***	.59***	.46***	.50***	.66**				
7. Transition to retirement	.94	3.18	1.47	.37***	.49***	.62***	.63***	.49***	.48***			
8. Continued employment	.79	5.11	1.06	.62***	.48***	.48***	.37***	.60***	.51***	.47***		
9. Health and retirement coverage	.89	4.63	1.54	.33***	.38***	.34***	.55***	.44***	.38***	.58***	.29***	
10. Age-diversity climate	.90	5.34	1.31	.74***	.70***	.48***	.41***	.72***	.65***	.44***	.70***	
11. Respectful leadership	.95	4.05	0.73	.53***	.62***	.40***	.34***	.61***	.54***	.37***	.47***	.29***
12. Age-inclusive HR practices	.90	2.97	0.95	.59***	.45***	.42***	.44***	.60***	.53***	.45***	.65***	.42***
13. Positive affect	.78	4.02	0.55	.30***	.31***	.22***	.22***	.27***	.26***	.30***	.15*	.19**
14. Negative affect	.81	1.84	0.54	-.23***	-.25***	-.16**	-.15*	-.29***	-.19**	-.14*	-.14*	-.14*
15. Person–job fit	.94	3.63	1.03	.50***	.58***	.53***	.42***	.55***	.53***	.41***	.40***	.31***
16. Person–organization fit	.96	3.51	1.01	.41***	.59***	.48***	.43***	.52***	.53***	.47***	.39***	.30***
17. Job satisfaction	.97	5.60	1.35	.58***	.65***	.48***	.43***	.62***	.56***	.46***	.49***	.34***
18. Affective commitment	.93	4.73	1.60	.53***	.64***	.50***	.46***	.56***	.61***	.46***	.42***	.32***
19. Work engagement	.84	4.87	1.12	.40***	.51***	.35***	.33***	.47***	.51***	.39***	.31***	.29***
20. Occupational future time perspective	.89	3.69	1.34	.22***	.29***	.26***	.34***	.26***	.17**	.32***	.15*	.17**
21. Work stress (pressure)	.90	1.22	0.74	-.26***	-.36***	-.42***	-.27***	-.26***	-.13*	-.33***	-.29***	-.18**
22. Work stress (threat)	.90	0.67	0.67	-.38***	-.53***	-.48***	-.32***	-.41***	-.32***	-.37***	-.34***	-.24***
23. Well-being	.91	3.36	1.00	.38***	.51***	.41***	.37***	.44***	.43***	.43***	.32***	.25***
24. Perceived work ability	.78	8.94	1.09	.28***	.30***	.17**	.17**	.21***	.21***	.17**	.18**	.27***
25. Perceived health	.89	5.22	1.37	.22***	.22***	.15*	.20**	.19**	.13*	.23***	.09	.29***
26. Number of sick days		3.96	12.98	-.10	-.05	-.04	.02	-.05	-.09	.03	.08	.00
27. Turnover intentions	.77	3.22	1.59	-.45***	-.46***	-.39***	-.27***	-.41***	-.46***	-.36***	-.34***	-.23***
28. Postretirement work intention	.83	4.65	1.49	.30***	.37***	.30***	.26***	.31***	.41***	.19**	.28***	.11
29. Colleague-rated performance	.97	6.20	0.85	.25***	.24***	.06	.01	.20**	.20**	.07	.17**	.08

Note. N = 279.  $\alpha$  = Cronbach's alpha. For reasons of clarity, only the correlations between the LLWI scales and the validation scales are displayed. A full correlation table can be obtained from the authors upon request.  
\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



reliable than self-ratings (Conway & Huffcutt, 1997). Reliabilities were at least acceptable for all three measures ( $\alpha = [.77; .97]$ ; Table 2).

## Data Analysis

Analyses were conducted in R version 3.6.1 using the “lavaan” (Rosseel, 2012) and “psych” (Revelle, 2020) package as well as in Mplus version 8.3. First, we calculated descriptive statistics for all LLWI items. Second, we conducted domain level confirmatory factor analyses (CFA) to determine the model fit of the proposed factor structure within each domain. Both the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett’s test of sphericity indicated the suitability of the data for CFA. The CFAs were calculated using a maximum likelihood estimation. Since the chi-square test is sensitive to sample size (L. Wang et al., 1996), two additional indices were used to assess the models’ goodness of fit: the comparative fit index (CFI) and standardized root mean square residual (SRMR). CFI values higher than .90 can be considered an acceptable fit (McDonald & Ho, 2002), whereas values higher than .95 are indicative of a good fit (Hu & Bentler, 1999). SRMR values lower than .08 indicate a good fit (Hu & Bentler, 1999). Two competing models were evaluated: the model specified by the authors of the LLWI (Wilckens et al., 2021) and (if not already specified) a unidimensional model with all items loading on a single factor. The LLWI subscales would be considered to have factorial validity if they meet the criteria stated above and have a better fit than the alternative models. Third, we analyzed the reliability of each domain and indicator level scale using Cronbach’s alpha. Fourth, we performed an overall hierarchical CFA with the LLWI domains as second-order and the indicators as first-order factors to assess the overall model fit. Fifth, we computed multigroup CFAs on the domain level combining the U.S. and German samples to analyze measurement invariance. In particular, we examined configural invariance and metric invariance. Configural invariance shows if the basic factor structure is supported in both the German and the U.S. samples (Putnick & Bornstein, 2016). It was assessed by evaluating the model fit of a multigroup CFA (baseline model) according to the indices mentioned above. Metric invariance indicates whether participants in both samples interpreted the LLWI domains in a similar manner, thus requiring factor loadings to be equal across the two samples (Putnick & Bornstein, 2016; van de Schoot et al., 2012). It was assessed by evaluating the change of the model fit when the factor loadings are constrained to be equal across groups (restrictive model). We followed Chen’s (2007) recommendations by using cut-off values of .01 for the change in CFI, .015 for the change in root mean square error of approximation (RMSEA), and .03 for the change in SRMR. Additionally, we analyzed the correlations between the LLWI scales and validation scales to present evidence for convergent, discriminant, and criterion validities. Finally, we examined the incremental validity of the LLWI domains. For this purpose, we conducted hierarchical multiple regression analyses where the outcomes were regressed on the existing conceptually similar scales we used to assess the LLWI’s convergent validity first before we added the nine LLWI scales in a second step. The LLWI measure would be considered to have incremental validity if it explains significant additional variance in the outcomes (Haynes & Lench, 2003).

## RESULTS

### Preliminary Analyses and CFA

The descriptive statistics for all LLWI items are presented in Table 3. In total, only 3.9% of the responses to the LLWI items were missing.

The results of the domain level and overall CFAs as well as the internal consistency coefficients are displayed in Table 4. On the domain level, the CFI and SRMR values indicate a good fit of the factor structure for the LLWI domains *organizational climate*, *leadership*, *health management*, *knowledge management*, *transition to retirement*, as well as *health and retirement coverage* (CFI = [.96; .99], SRMR = [.01; .06]). For the domains *work design*, *individual development*, and *continued employment*, the fit was acceptable (CFI = [.90; .92]), SRMR = [.05; .06]). Further, all models had a significantly better fit compared to their alternative one-factor solution ( $\Delta\chi^2 = [35.09; 1136.54]$ ,  $\Delta df = [1; 6]$ ,  $p < .001$ ). Internal consistencies for the domain level scales ranged between .79 and .94, showing the scales to be reliable. On the indicator level, Cronbach’s alpha ranged between .72 and .95. The only alpha values that were lower than .80 were found in the *continued employment* domain.

The hierarchical CFA regarding the overall factor structure did not yield an acceptable fit ( $\chi^2 = 6094.33$ ,  $df = 3024$ , CFI = .83, SRMR = .09). However, research has pointed out that some model fit indices, particularly the CFI, can demonstrate a worse model fit with an increasing number of variables used (Kenny & McCoach, 2003), indicating that a less restrictive interpretation could be useful in these cases. Considering the high number of parameters estimated in the hierarchical model, the poor model fit is understandable (Shi et al., 2019). Indeed, using the indicators’ first-order scale means for each domain’s second-order factor increased the model fit for the overall model slightly ( $\chi^2 = 1446.21$ ,  $df = 491$ , CFI = .85, SRMR = .07). Looking at the modification indices for the hierarchical model, five items that accounted for most data-model discrepancies were scrutinized. First, one item from the *individual development* domain (ID-5, “In our organization, training methods are adapted to take into account the needs of older employees”) demonstrated a relation to the *work design*, *health management*, *transition to retirement*, and *continued employment* indicators. This is not completely unexpected because the item and the indicators have the common theme of considering older employees’ needs in the design and implementation of organizational practices. Two items from the *work design* indicator *flexible work time arrangements* (WD1-1 and WD1-4, “Employees of our organization can adjust the beginning and the end of their daily working hours to their individual needs” and “Employees of our organization have enough flexibility in their working time organization to appropriately address unforeseen events in their private lives”) were related to the domain’s third and fourth indicator as well as to single indicators from the other domains. Again, this finding is theoretically reasonable since flexible work time arrangements play a role for many other organizational practices (e.g., open and target-group specific communication, responsiveness to individuality, or transition to retirement practices). Next, one item from the *continued employment* domain (CE1-4, “In our organization, working conditions ... for employees in retirement age are flexibly adapted to their wishes”) was related to the *work design* indicators as well as the *transition to retirement* indicator *phased retirement and individualized transition solutions*. Due to the wording of the item, the relation with the *flexible work time arrangements*, *flexible workplaces*, *work according to capabilities*, and *phased retirement and individualized transition solutions* indicators is understandable. Finally, one item from the *health management* domain (HM3-2, “In our organization, managers and top management are committed to promoting a sustainable, healthy way of life and work for their employees”) was related to the second *health management* indicator as

**Table 3. LLWI item statistics**

Code	<i>N</i>	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
Organizational climate (OC)					
OC1-1	279	5.15	1.55	-0.83	-0.34
OC1-2	278	5.40	1.41	-1.02	0.36
OC1-3	278	5.08	1.55	-0.77	-0.31
OC2-1	277	5.25	1.42	-1.01	0.47
OC2-2	272	4.90	1.56	-0.58	-0.62
OC2-3	279	6.04	0.97	-1.46	3.73
OC3-1	267	4.70	1.59	-0.46	-0.72
OC3-2	268	3.59	1.76	0.23	-1.10
OC3-3	274	4.31	1.69	-0.32	-0.96
OC3-4	269	4.28	1.62	-0.26	-0.90
Leadership (LE)					
LE-1	279	5.56	1.27	-1.42	1.99
LE-2	276	4.82	1.62	-0.64	-0.47
LE-3	278	4.96	1.54	-0.82	0.12
LE-4	277	4.22	1.72	-0.18	-0.93
LE-5	278	5.02	1.41	-0.88	0.58
LE-6	279	5.14	1.49	-0.99	0.68
Work design (WD)					
WD1-1	279	3.95	2.07	-0.07	-1.49
WD1-2	269	3.39	1.96	0.37	-1.25
WD1-3	278	3.71	2.06	0.14	-1.44
WD1-4	277	4.56	1.88	-0.52	-0.89
WD2-1	271	3.21	2.20	0.42	-1.40
WD2-2	276	3.69	1.96	0.11	-1.38
WD2-3	277	3.27	1.97	0.42	-1.20
WD3-1	261	3.75	1.78	0.11	-1.17
WD3-2	268	3.19	1.83	0.52	-0.95
WD3-3	258	3.29	1.74	0.30	-1.10
WD4-1	271	3.92	1.84	-0.10	-1.21
WD4-2	267	4.07	1.89	-0.13	-1.18
WD4-3	277	3.77	2.05	0.05	-1.43
WD4-4	275	4.61	1.72	-0.62	-0.60
Health management (HM)					
HM1-1	273	3.06	1.91	0.69	-0.81
HM1-2	277	3.98	1.97	-0.08	-1.27
HM1-3	274	3.20	1.99	0.52	-1.10
HM2-1	274	3.61	1.94	0.21	-1.26
HM2-2	251	3.16	1.90	0.55	-0.96
HM2-3	252	2.87	1.81	0.70	-0.71
HM3-1	274	3.86	1.89	-0.02	-1.22
HM3-2	272	3.78	1.87	0.02	-1.20
HM3-3	259	3.41	1.81	0.34	-1.00
Individual development (ID)					
ID-1	272	5.36	1.43	-1.20	0.68
ID-2	277	5.06	1.67	-0.85	-0.21
ID-3	279	5.41	1.42	-1.28	1.15
ID-4	277	4.96	1.68	-0.86	-0.27
ID-5	264	3.76	1.83	0.12	-1.12
ID-6	276	5.21	1.54	-1.14	0.74
ID-7	273	5.00	1.67	-0.93	-0.04
ID-8	271	4.69	1.71	-0.60	-0.62

Table 3. Continued

Code	N	M	SD	Skewness	Kurtosis
Knowledge management (KM)					
KM1-1	274	4.47	1.84	-0.37	-1.13
KM1-2	268	4.15	1.87	-0.15	-1.26
KM1-3	259	4.21	1.91	-0.22	-1.27
KM1-4	278	4.98	1.69	-0.77	-0.41
KM2-1	278	5.31	1.45	-1.01	0.49
KM2-2	278	5.41	1.44	-1.10	0.82
KM2-3	279	5.41	1.40	-1.11	0.81
Transition to retirement (TR)					
TR1-1	265	3.06	1.70	0.49	-0.97
TR1-2	261	3.06	1.75	0.52	-0.91
TR1-3	262	3.27	1.80	0.38	-1.02
TR2-1	249	3.41	2.00	0.30	-1.37
TR2-2	236	2.15	1.62	1.64	1.71
TR2-3	266	3.44	2.10	0.30	-1.39
TR2-4	257	3.33	1.94	0.34	-1.19
TR3-1	249	3.43	2.02	0.27	-1.42
TR3-2	252	2.79	1.73	0.75	-0.62
TR3-3	256	3.67	2.11	0.12	-1.50
TR4-1	250	3.13	1.97	0.51	-1.11
TR4-2	248	3.22	2.02	0.45	-1.22
TR4-3	248	2.87	1.93	0.78	-0.75
TR4-4	239	2.81	1.90	0.84	-0.60
Continued employment (CE)					
CE1-1	270	6.10	1.03	-2.16	6.80
CE1-2	249	4.09	1.75	-0.06	-1.09
CE1-3	249	4.96	1.74	-0.71	-0.58
CE1-4	259	4.08	1.88	-0.06	-1.27
CE2-1	276	5.09	1.59	-0.87	-0.05
CE2-2	257	5.16	1.56	-0.99	0.33
CE2-3	274	5.77	1.25	-1.47	2.24
Health and retirement coverage (RC)					
RC1-1	272	5.03	1.87	-0.89	-0.47
RC1-2	278	5.31	1.63	-1.05	0.20
RC1-3	273	4.21	1.87	-0.20	-1.16
RC2-1	274	4.40	1.84	-0.33	-1.11
RC2-2	262	4.37	2.01	-0.36	-1.27

well as the domains *leadership* and *individual development* and single indicators from the *organizational climate*, *knowledge management*, and *continued employment* domains. This overlap can be explained theoretically as well. Managers' commitment and dedication to their employees could be related to a positively perceived organizational climate. Likewise, this commitment might foster inter-generational collaboration regarding health topics and enable employment options for older employees in retirement age. In sum, the findings indicate that there is some redundancy in the items when all 80 items are used together. Hence, we removed these five items for the overall model which resulted in an improved fit for both the hierarchical ( $\chi^2 = 5140.67$ ,  $df = 2644$ , CFI = .85, SRMR = .08) and the second-order model with first-order scale means ( $\chi^2 = 1280.25$ ,  $df = 459$ , CFI = .86, SRMR = .07). However, since the number of parameters was still high, the CFI was still rather low.

To shed further light on the interrelations between the indicators and domains, the domain level and indicator level correlations are displayed in Table 5. Although correlations between the domains were high, they did not exceed .68. Thus, while some relations between the domains can be theoretically explained (e.g., individual development practices can be highly correlated with organizational climate; Boehm & Dwertmann, 2015), they still measure distinct aspects of the overall construct. Similar observations could be made for single indicators from the *organizational climate*, *work design*, *health management*, and *transition to retirement* domains that were also moderately to strongly correlated to other domains or their indicators. These correlations did not exceed .64 either. Moreover, in almost all cases, the highest correlations could be found for the indicators and their respective overall domain. Since some overlap between the domains can be theoretically justified, these results do not contradict the proposed factor structure.

**Table 4. Confirmatory factor analysis and reliability results**

Model	Number of subscales	Number of items	$\alpha$ (all items)	$\alpha$ (first-order scales)	Factor structure proposed by Wilckens et al. (2021)				One-factor solution			
					$\chi^2$	df	CFI	SRMR	$\chi^2$	df	CFI	SRMR
1. Organizational climate	3	10	.91	.84–.92	104.20	32	.96	.05	564.79	35	.72	.10
2. Leadership	1	6	.91		17.74	9	.99	.02				
3. Work design	4	14	.92	.83–.88	258.34	71	.92	.06	883.77	77	.68	.11
4. Health management	3	9	.93	.82–.93	82.39	24	.97	.03	247.08	27	.87	.06
5. Individual development	1	8	.89		122.30	20	.90	.05				
6. Knowledge management	2	7	.88	.82–.93	68.34	13	.96	.05	181.32	14	.86	.09
7. Transition to retirement	4	14	.94	.89–.95	215.19	71	.96	.06	1351.73	77	.62	.12
8. Continued employment	2	7	.79	.72–.73	52.38	13	.92	.06	104.25	14	.82	.07
9. Health and retirement coverage	2	5	.89	.82–.86	10.64	4	.99	.01	45.73	5	.95	.04
Hierarchical model					6094.33	3024	.83	.09				
Second-order model					1446.21	491	.85	.07				
with first-order scale means												
Hierarchical model (75 items)					5140.67	2644	.85	.08				
Second-order model					1280.25	459	.86	.07				
with first-order scale means (75 items)												

Note.  $N = 279$ .  $\alpha$  = Cronbach's alpha; CFI = comparative fit index; SRMR = standardized root mean square residual.

Furthermore, these findings align with the correlations reported by Wilckens et al. (2021).

### Measurement Invariance

The results of the multigroup CFAs are displayed in Table 6. Due to the good fit of the domain level models, the measurement invariance analyses were conducted on the domain level. The baseline model demonstrated an at least acceptable model fit for all nine LLWI domains, although the RMSEA was rather high for the *individual development* domain (RMSEA = .11). However, Monte Carlo simulations have shown that the RMSEA can be higher for models with small degrees of freedom and small sample size (Kenny et al., 2015). Considering this, configural variance for all domains was supported. Constraining the factor loadings to be equal across groups (restrictive model) showed that full metric invariance was supported for the domains *organizational climate*, *work design*, *health management*, *individual development*, *transition to retirement*, as well as *health and retirement coverage*. Comparing the restrictive model to the baseline model for these domains resulted in a change in CFI lower than .01, in RMSEA lower than .015, and in SRMR lower than .03. For the domains *leadership*, *knowledge management*, and *continued employment*, the restrictive model resulted in a slightly worse model fit (for *leadership*:  $\Delta$ CFI = .004,  $\Delta$ RMSEA = .000,  $\Delta$ SRMR = .031; for *knowledge management*:  $\Delta$ CFI = .012,  $\Delta$ RMSEA = .007,  $\Delta$ SRMR = .033; for *continued employment*:  $\Delta$ CFI = .027,  $\Delta$ RMSEA = .016,  $\Delta$ SRMR = .032). Thus, the factor loadings were not invariant across the U.S. and German samples for these three domains. Looking at the modification indices for released equality constraints, we found some factor loadings that should be freed (i.e., LE-6, KM2-3, CE1-3, CE1-4; see Appendix for the respective item wording). For these four items, the estimated factor

loadings differed between the U.S. and the German sample. Especially the item KM2-3 was more sensitive in the U.S. sample ( $\lambda = .88$  compared to  $\lambda = .76$ ). On the contrary, the items LE-6, CE1-3, and CE1-4 were more sensitive in the German sample ( $\lambda = .87$ ,  $\lambda = .82$ , and  $\lambda = .61$  compared to  $\lambda = .89$ ,  $\lambda = .88$ , and  $\lambda = .83$ ). Freeing these factor loadings from their constraint, the model fit of the restrictive model was no longer worse compared to the baseline model (for *leadership*:  $\Delta$ CFI = .004,  $\Delta$ RMSEA = .001,  $\Delta$ SRMR = .029; for *knowledge management*:  $\Delta$ CFI = .006,  $\Delta$ RMSEA = .001,  $\Delta$ SRMR = .022; for *continued employment*:  $\Delta$ CFI = .010,  $\Delta$ RMSEA = .005,  $\Delta$ SRMR = .012). Consequently, partial metric invariance for these domains was supported.

### Convergent Validity

The correlations between the LLWI domains and validation scales are displayed in Table 2. For the assessment of convergent validity, we utilized three validation scales. Regarding age-diversity climate, correlations ranged from .29 (*health and retirement coverage*) to .74 (*organizational climate*) with a mean correlation of .57. These values largely matched the results obtained by Wilckens et al. (2021) in the validation of the German language version of the LLWI, with correlations ranging between .33 and .73 and an average correlation of .55. As expected, the correlation was strongest for the *organizational climate* domain. For respectful leadership, the weakest correlation was also found for *health and retirement coverage* (.30). The mean correlation was .46 and, as assumed, the strongest correlation was found for the *leadership* domain (.62). Age-inclusive HR practices were moderately (.42 for *work design* and *health and retirement coverage*) to strongly (.65 for *continued employment*) correlated with the LLWI domains with a mean correlation of .51. While these correlations are slightly lower than those reported



**Table 6. Multigroup confirmatory factor analysis for test of measurement invariance**

Model	Model comparison	$\chi^2 (\Delta\chi^2)$	$df (\Delta df)$	CFI ( $\Delta CFI$ )	RMSEA ( $\Delta RMSEA$ )	SRMR ( $\Delta SRMR$ )	Invariance
1. Organizational climate							
M1: Configural invariance		185.80	64	.97	.08	.04	Yes
M2: Metric invariance	M1	(30.99)	(7)	(.006)	(.003)	(.022)	Yes
2. Leadership							
M1: Configural invariance		67.71	18	.98	.10	.02	Yes
M2: Metric invariance	M1	(18.30)	(5)	(.004)	(.000)	(.031)	No
M2a: Partial metric invariance	M1	(16.07)	(4)	(.004)	(.001)	(.029)	Partial
3. Work design							
M1: Configural invariance		414.78	142	.94	.09	.06	Yes
M2: Metric invariance	M1	(20.63)	(10)	(.003)	(.001)	(.003)	Yes
4. Health management							
M1: Configural invariance		168.52	48	.96	.10	.03	Yes
M2: Metric invariance	M1	(10.82)	(6)	(.001)	(.004)	(.011)	Yes
5. Individual development							
M1: Configural invariance		155.66	40	.95	.11	.04	Yes
M2: Metric invariance	M1	(23.06)	(7)	(.007)	(.002)	(.026)	Yes
6. Knowledge management							
M1: Configural invariance		96.20	26	.97	.10	.04	Yes
M2: Metric invariance	M1	(31.82)	(5)	(.012)	(.007)	(.033)	No
M2a: Partial metric invariance	M1	(16.85)	(4)	(.006)	(.001)	(.022)	Partial
7. Transition to retirement							
M1: Configural invariance		388.78	142	.96	.09	.05	Yes
M2: Metric invariance	M1	(36.21)	(10)	(.004)	(.001)	(.009)	Yes
8. Continued employment							
M1: Configural invariance		77.45	26	.96	.09	.05	Yes
M2: Metric invariance	M1	(37.33)	(5)	(.027)	(.016)	(.032)	No
M2a: Partial metric invariance	M1	(15.08)	(3)	(.010)	(.005)	(.012)	Partial
9. Health and retirement coverage							
M1: Configural invariance		14.55	8	1.00 (.996)	.06	.01	Yes
M2: Metric invariance	M1	(3.28)	(3)	(.000)	(.008)	(.010)	Yes

Note.  $N = 628$ ; United States  $n = 279$ ; Germany  $n = 349$ . CFI = comparative fit index; RMSEA = root mean squared error of approximation; SRMR = standardized root mean square residual; M1 = baseline model; M2 = restrictive model with equal factor loadings across groups.

by Wilckens et al. (2021; mean correlation: .58; range: [.43; .73]), the relative distribution of the correlation strength was comparable. As expected, strong correlations were found for *organizational climate* (.59), *individual development* (.60), and *continued employment* (.65). In sum, the results met our criteria and indicated good convergent validity for the English language version of the LLWI.

### Discriminant Validity

Regarding discriminant validity, similar to the results reported by Wilckens et al. (2021), only small correlations were found between the LLWI domains and positive affect (mean correlation: .25) as well as negative affect (mean correlation: -.19) indicating discriminant validity regarding affectivity. Extending these analyses, we determined partial correlations between the LLWI scales and validation scales controlling for positive and negative affect to detect common method bias (Podsakoff et al., 2003). Results revealed only small differences in

the reported correlation coefficients ( $\Delta r = [.00; .14]$  with an average of .05), indicating that the correlations were consistent and common method bias only had a small effect (Podsakoff et al., 2003).

### Criterion Validity

Regarding criterion validity for the attitudinal outcomes, as expected the LLWI domains were moderately correlated with person–job and person–organization fit (mean correlation: .47 and .46; range: [.31; .58] and [.30; .59]) and comparable to the results reported by Wilckens et al. (2021; mean correlation: .47 and .52; range: [.38; .61] and [.43; .65]). Moreover, we found moderate to strong correlations for job satisfaction, affective commitment, and work engagement (mean correlation: .51, .50, and .40; range: [.34; .65], [.32; .64], and [.29; .51]). While the correlations for work engagement were weaker in the U.S. sample, they were still comparable to the results reported in the validation of the German language version (mean correlation:

**Table 7. Results of hierarchical regression analysis for person–job fit and person–organization fit**

Variable	Person–job fit		Person–organization fit	
	Model 1	Model 2	Model 1	Model 2
Step 1 (convergent scales)				
Age-diversity climate	0.26***	0.09 (0.07)	0.21***	0.02
Respectful leadership	0.50***	0.36***	0.46***	0.25**
Age-inclusive HR practices	0.03	−0.01	0.06	0.04
Step 2 (LLWI scales)				
Organizational climate		0.07		−0.09
Leadership		0.09		0.21**
Work design		0.20***		0.06
Health management		0.04		0.05
Individual development		0.03		0.06
Knowledge management		0.07		0.13*
Transition to retirement		−0.02		0.10
Continued employment		−0.09		−0.05
Health and retirement coverage		0.01		−0.04
$R^2$	.38	.46	.32	.42
$\Delta R^2$		.08***		.10***
$F$	54.14***	19.11***	40.42***	16.51***

Note.  $N = [255; 256]$ . Unstandardized regression coefficients are reported.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

.40; range: [.32; .47]). Contrary to our expectations, the correlation with occupational future time perspective was only small for some of the LLWI domains (mean correlation: .24; range: [.15; .34]). Furthermore, the correlations were smaller compared to the German validation studies (mean correlation: .31; range: [.19; .38]). For the health-related outcomes, as expected, we found negative correlations between the work stress measures and the LLWI domains. However, especially for the pressure subscale, many of the correlations were only small (mean correlation: −.28 and −.38; range: [−.42; −.13] and [−.53; −.24]). Still, the results were comparable to the correlations reported in Wilckens et al. (2021). One explanation could be that the organizational practices could create a perceived burden for older employees (Wilckens et al., 2021). For older employees' well-being, our results largely support the expected moderate correlation (mean correlation: .39; range: [.25; .51]). Positive correlations were also found for work ability (mean correlation: .22; range: [.17; .30]) and perceived health (mean correlation: .19; range: [.09; .29]). However, contrary to our expectations, the correlation between perceived health and *continued employment* was nonsignificant. Comparing the results to the ones reported in Wilckens et al. (2021), we found that except for *health and retirement coverage* all domains demonstrated lower correlations with perceived health. Similar observations could be made for the number of sick days. Here, we found no significant correlations in our data. However, the amount and variance of sickness absence days reported by the U.S. participants were notably smaller compared to the German participants (for the United States:  $M = 3.96$ ,  $SD = 12.98$ ; for Germany:  $M = 15.28$ ,  $SD = 38.41$ ). This might explain the different findings. For turnover intentions and postretirement work intentions we also found the expected negative and positive correlations, respectively (mean correlation: −.37 and .28; range: [−.46; −.23] and [.11; .41]). Compared to the German validation studies the correlations for turnover and postretirement work intentions were higher for most of

the LLWI domains. However, the correlation between *health and retirement coverage* and postretirement work intentions was nonsignificant. Lastly, the assumed correlation between the LLWI domains and peer-rated job performance could be confirmed for *organizational climate*, *leadership*, *individual development*, *knowledge management*, and *continued employment*, but not for the other four domains (mean correlation: .14; range: [.01; .25]). In sum, although some differences compared to the results of the German validation could be identified, most of our assumed correlations were confirmed, giving support to the criterion validity of the English language version of the LLWI regarding various older employees' attitudinal, health-related, as well as intention and behavioral outcomes.

### Incremental Validity

In a final step, we examined the incremental validity of the LLWI domains above age-diversity climate, respectful leadership, and age-inclusive HR practices. Results show that the LLWI domains explained significant additional variance in person–job fit and person–organization fit beyond the three scales used to assess convergent validity, indicating incremental validity (Table 7). The LLWI domains explained 8% unique variance in person–job fit and 10% in person–organization fit, respectively ( $p < .001$ ). Similar findings emerged for the attitudinal outcomes job satisfaction, affective commitment, and work engagement (Table 8). Here, the amount of significant additional variance explained by the LLWI domains ranged between 6% and 10% ( $p < .001$ ). Regarding the health-related outcomes well-being and perceived health, the LLWI domains explained 5% significant additional variance in well-being and 6% in perceived health ( $p < .001$  and  $p < .01$ ; Table 9). Furthermore, the LLWI domains explained significant additional variance for turnover intention ( $\Delta R^2 = .04$ ,  $p < .01$ ), postretirement work intention ( $\Delta R^2 = .04$ ,  $p < .01$ ), and occupational future time perspective ( $\Delta R^2 = .09$ ,  $p < .001$ ; Table 10). Accordingly, we found sufficient

**Table 8. Results of hierarchical regression analysis for job satisfaction, affective commitment, and work engagement**

Variable	Job satisfaction		Affective commitment		Work engagement	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Step 1 (convergent scales)						
Age-diversity climate	0.39***	0.12	0.45***	0.13	0.25***	0.09
Respectful leadership	0.70***	0.47***	0.96***	0.68***	0.64***	0.44***
Age-inclusive HR practices	0.05	-0.01	-0.09	-0.15	-0.16	-0.22*
Step 2 (LLWI scales)						
Organizational climate		0.08		0.15		0.02
Leadership		0.19*		0.20*		0.09
Work design		0.11		0.16*		0.02
Health management		0.04		0.08		-0.01
Individual development		0.13		-0.06		0.03
Knowledge management		0.05		0.29***		0.23***
Transition to retirement		0.05		0.08		0.11
Continued employment		-0.04		-0.17		-0.11
Health and retirement coverage		0.01		-0.01		0.04
R <sup>2</sup>	.47	.53	.46	.56	.31	.38
ΔR <sup>2</sup>		.06***		.10***		.07***
F	76.53***	24.68***	72.61***	27.75***	38.45***	13.80***

Note.  $N = 256$ . Unstandardized regression coefficients are reported.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

evidence for incremental validity of the LLWI domains above existing scales to measure age-related organizational practices.<sup>1</sup>

### DISCUSSION

The present study aimed to develop and validate an English language version of the LLWI, a comprehensive model of organizational practices relevant to the context of aging at work (Wilckens et al., 2021). The index differentiates practices from nine domains, namely organizational climate, leadership, work design, health management, individual development, knowledge management, transition to retirement, continued employment, as well as health and retirement coverage (Wilckens et al., 2020). While the LLWI was recently operationalized in a German 80-item measure (Wilckens et al., 2021), the authors point out the limitation that quantitative evidence for the proposed factor structure is limited to Germany so far. To examine the generalizability of the new measure beyond Germany, we validated the psychometric properties and analyzed the measurement invariance of an English language version of the LLWI across the United States.

With regards to the factor structure of each separate domain, the model fit of the factor structure proposed by the German language LLWI measure was (very) good or acceptable for all LLWI domains and showed superiority to alternative one-factor solutions for the domains, thereby supporting the factorial validity of the measure on the domain level. The overall model fit of the nine-factor domain structure indicated that there was some redundancy among the items. Hence, we propose to remove five

items from the measure if all items are used simultaneously to generate an overall measure. Considering the domain level model fit, though, research conducted on the single domains should use all available items belonging to the scale to ensure the scale's integrity and gain the maximum information possible regarding the domain. Besides, configural and (partial) metric invariance was supported for all domains, providing further evidence for the applicability of the German measurement model for the U.S. Internal consistency was acceptable to very good for all nine LLWI domains as well, demonstrating the reliability of the scales. Domain intercorrelations showed that despite some overlap between the nine domains, they still measure distinct factors of the multidimensional construct of organizational practices for the aging workforce. Finally, most of the findings regarding convergent, discriminant, and criterion validity of the German language version of the LLWI were replicated in our study and we found additional evidence for convergent and criterion validity of the measure. The LLWI domains were moderately to strongly correlated to other reliable scales measuring different areas of organizational practices that are relevant for older employees. While there was only a small correlation with positive and negative affect, the LLWI domains were moderately correlated with different outcomes related to older employees' work attitudes, health, and behavioral intentions. Furthermore, we demonstrated the incremental validity of the LLWI scales above convergent scales regarding these outcomes.

### IMPLICATIONS FOR SCIENCE AND PRACTICE

The LLWI includes HR practices, work environment factors, norms, and procedures to combine diverse relevant organizational practices for the successful employment of older employees in one multidimensional measure. Thus, with this study we provide a comprehensive measure in English language to advance research

<sup>1</sup> To make sure that our data screening procedure was effective, we performed all analyses with the unscreened sample as well. We could detect changes in the results for the unscreened sample (e.g., to the model fit or scale reliability), indicating that our data screening was, indeed, effective.



**Table 9. Results of hierarchical regression analysis for well-being and perceived health**

Variable	Well-being		Perceived health	
	Model 1	Model 2	Model 1	Model 2
Step 1 (convergent scales)				
Age-diversity climate	0.29***	0.23**	0.08	0.10
Respectful leadership	0.48***	0.38***	0.43**	0.40*
Age-inclusive HR practices	-0.19*	-0.26**	-0.12	-0.27*
Step 2 (LLWI scales)				
Organizational climate		-0.02		0.26*
Leadership		0.05		-0.10
Work design		0.04		0.02
Health management		0.07		0.03
Individual development		0.03		0.02
Knowledge management		0.00		-0.15
Transition to retirement		0.13*		0.12
Continued employment		-0.05		-0.20
Health and retirement coverage		-0.01		0.20**
R <sup>2</sup>	.31	.36	.05	.11
ΔR <sup>2</sup>		.05***		.06**
F	39.44***	13.17***	5.28**	3.70***

Note. N = 256. Unstandardized regression coefficients are reported.  
 \* p < .05. \*\* p < .01. \*\*\* p < .001.

**Table 10. Results of hierarchical regression analysis for turnover intention, postretirement work intention, and occupational future time perspective**

Variable	Turnover intention		Postretirement work intention		Occupational future time perspective	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Step 1 (convergent scales)						
Age-diversity climate	-0.29**	-0.07	0.35***	0.13	0.22*	0.08
Respectful leadership	-0.66***	-0.51**	0.33*	0.15	0.10	-0.06
Age-inclusive HR practices	-0.08	-0.08	-0.14	-0.15	-0.05	-0.14
Step 2 (LLWI scales)						
Organizational climate		-0.26*		-0.02		0.08
Leadership		-0.08		0.15		0.11
Work design		-0.19*		0.14		-0.04
Health management		0.14		0.07		0.19**
Individual development		0.12		-0.11		0.16
Knowledge management		-0.21*		0.36***		-0.14
Transition to retirement		-0.12		-0.14		0.23**
Continued employment		0.18		0.05		-0.12
Health and retirement coverage		-0.01		-0.02		-0.08
R <sup>2</sup>	.26	.30	.13	.17	.04	.13
ΔR <sup>2</sup>		.04**		.04**		.09***
F	31.12***	10.16***	13.47***	5.45***	4.72**	4.28***

Note. N = [254; 256]. Unstandardized regression coefficients are reported.  
 \* p < .05. \*\* p < .01. \*\*\* p < .001.

in the field of work, aging, and retirement. The LLWI can be used to investigate the interrelations between the different areas of organizational practices, compare their relevance for individual and organizational level outcomes, and conduct research on specific domains using the scales separately. Moreover, the measure can

be administered to HR managers, managers, or older employees. Thus, the LLWI facilitates research on a large variety of possible research questions and research designs, raising new potential for the rapidly evolving research field of age and work (Sullivan & Al Ariss, 2019).

Our study further provided evidence for the generalizability of the LLWI framework across nations and cultures. Despite the divergent pension and healthcare systems in Germany and the United States, the factor structure and measurement invariance were still supported to a large extent. Together with the evidence from the qualitative studies conducted across Germany and the United States during the development of the LLWI framework (Wilckens et al., 2020), this underlines the relevance of the organizational practices covered in the LLWI across different backgrounds despite the influence of economic and cultural factors on these organizational practices (Staudinger et al., 2016). However, four items emerged that had diverging factor loadings across the two samples (i.e., LE-6, KM2-3, CE1-3, and CE1-4), indicating that these particular items were not understood and rated in the same manner in both countries. The items belonging to the continued employment domain might differ in meaning due to country-specific retirement policies (e.g., different regulations regarding possibilities to work in retirement age). Moreover, while there is a mandatory retirement age in Germany, the English wording had to be adapted to “conventional retirement age” during the translation process to reflect the U.S. context adequately. However, the items belonging to the domains leadership and knowledge management should not be directly impacted by such policies since they are focused on the managers’ interest in their employees’ well-being and intergenerational knowledge transfer. Thus, other influences like cultural differences might play a role (Marcus et al., 2020). Based on these findings, cross-cultural comparisons between the United States and Germany regarding organizational practices for the aging workforce measured by the LLWI should still be conducted and interpreted carefully. Our findings further emphasize the necessity to validate new language versions of existing validated measures before applying them to research. National regulatory or cultural influences can potentially impact many variables related to age and work (Fisher et al., 2016; Madero-Cabib et al., 2020). Therefore, it is not sufficient to use a translation of a measure without separately examining its psychometric properties and measurement invariance.

For practice, this study enables organizations in English-speaking countries or international organizations with English as their business language to assess strengths and weaknesses regarding their organizational practices for aging workforces, identify areas for improvement, and facilitate organizational change to enhance the successful employment of older employees. In doing so, organizations could choose to either use the LLWI as a whole to gain a comprehensive overview of their organizational practices or they could choose to focus on specific domains. Since the instrument was developed independent of industrial context and organizational size, it can be applied in a wide range of organizations. Moreover, organizations could use the LLWI to benchmark with peer organizations externally or among their own departments or establishments internally. An internal comparison would allow for a differentiated assessment and could reveal specific departments or workgroups that need improvement. Additionally, practitioners might use repeated assessments of their organization to track changes over time, thereby evaluating the effectiveness of organizational measures implemented to support the older employees.

## LIMITATIONS AND FUTURE RESEARCH

### DIRECTIONS

Despite the implications of our study, some limitations have to be mentioned. First, the analyses conducted were based on a single sample of 279 older U.S. employees. Moreover, some researchers have voiced concerns regarding the quality of data obtained from MTurk (cf. Cheung et al., 2017). However, we followed a strict data screening procedure based on scientific recommendations (e.g., Curran, 2016) utilizing survey response times, instructed response items, longstring index, and even-odd consistency to detect careless and inconsistent respondents. This resulted in 58 excluded participants (17.2%). Comparing the study results obtained from the screened sample to the unscreened sample, several differences could be detected, indicating that the data screening procedure was efficient. While this rigorous data screening decreased our sample size, it was still comparable to the sample size used to conduct CFAs in the German validation study ( $N = 349$ ), which was our target sample size. This target sample size seemed to be sufficient to detect the factor loadings estimated in the German validation study (observed statistical power was higher than 99%; Bliese & Wang, 2020). Our slightly smaller sample size still had sufficient power to detect the factor loadings from that German study (observed statistical power would be higher than 99%; Bliese & Wang, 2020). Nevertheless, a cross-validation study to replicate our results in another setting (e.g., using an organizational sample) would still be beneficial. Furthermore, while this data collection resulted in a very diverse sample regarding organizational size and industry that could not be obtained from an organizational sample alone, future studies could benefit from collecting organizational samples to analyze within-organization consistency (Wilckens et al., 2021). Organizational level data on the LLWI items obtained from multiple respondents per organization (i.e., older employees, managers, and HR managers) and on organizational outcomes could aid to further establish the reliability and validity of the LLWI.

Moreover, the study was carried out cross-sectionally. Hence, we cannot infer causality regarding the observed relationships between the LLWI domains and the scales used to assess criterion validity. However, a review of occupational health-oriented intervention studies, for example, has shown that such organizational practices can affect older employees’ work ability (Oakman et al., 2018), suggesting that similar results might be found for the other domains. Thus, future studies should apply an experimental or longitudinal design to enable such causal interpretations. Moreover, despite our findings regarding the small effect of affectivity, the use of self-report data still bears the risk of common method bias. Future studies should therefore use other-rated data (e.g., supervisor performance ratings) or objective data (e.g., objective health measures). This could also yield new insights regarding the assumed relationships with some of the validations scales that could not be confirmed (e.g., sick days).

Our study indicates that the generalizability of the LLWI framework can persist despite diverging economic and societal contexts. These findings suggest that the measurement model could be applicable to other Western countries as well. Therefore, future studies should develop and validate additional cross-national translations to advance the applicability of the LLWI beyond Germany and the United States. This could further advance cross-cultural research. Future research could, for example, take a closer look at

the possible influence of cultural or regulatory contexts on the relevance of organizational practices for individual and organizational level outcomes and investigate the causes and consequences of such an effect. Since the LLWI measure is rather lengthy, future research should also aim to develop and validate a short version of the LLWI. A shorter version could be applied more efficiently to research and practice, especially when all nine subscales are used simultaneously (e.g., as a compact screening instrument). To achieve this, the factor structure on domain-level could be collapsed across the indicators. This would simplify the overall factor structure, thereby facilitating the item reduction without compromising the nine-domain factor structure.

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**Appendix****LLWI Scales (Copyrighted by the Authors)****Table A1. LLWI Scales (Copyrighted by the Authors. Approach the Authors for Permission to Use)**

Code	English item
<b>OC Organizational climate</b>	
<i>OC1 Equality of opportunity</i>	
OC1-1	In our organization, regardless of age, all employees have the same opportunities.
OC1-2	In our organization, regardless of age, all employees have the same opportunities for further training.
OC1-3	In our organization, regardless of age, all employees have the same opportunities to develop their career.
<i>OC2 Positive image of age</i>	
OC2-1	In our organization, there is a positive attitude towards older employees.
OC2-2	In our organization, older employees are perceived as being able to adapt well to changes.
OC2-3	In our organization, older employees are perceived as competent.
<i>OC3 Open and target group-oriented communication</i>	
OC3-1	In our organization, the possibilities of working for older employees are openly communicated.
OC3-2	In our organization, "aging" is talked about openly.
OC3-3	In our organization, employees can openly talk about age-related challenges and issues (e.g., performance limitations, speed in using digital tools, changes in short-term memory).
OC3-4	In our organization, there is a great deal of understanding for the challenges of aging.
<b>LE Leadership</b>	
<i>Appreciation</i>	
<i>Responsiveness to individuality</i>	
LE-1	Managers of our organization show appreciation both for current work results as well as for the overall performance of their employees.
LE-2	Managers of our organization give their employees freedom in designing their work.
LE-3	Managers of our organization invest time in their employees.
LE-4	Managers of our organization address the personal needs and living conditions of their employees.
LE-5	Managers of our organization sincerely support their employees in their professional and personal development.
LE-6	Managers of our organization are interested in the well-being of their employees.
<b>WD Work design</b>	
<i>WD1 Flexible work time arrangements</i>	
WD1-1	Employees of our organization can adjust the beginning and the end of their daily working hours to their individual needs.
WD1-2	Employees of our organization can reduce or increase the number of hours specified in their work contract according to their individual needs.
WD1-3	Employees of our organization can adapt the timing and the length of their breaks to their individual needs.
WD1-4	Employees of our organization have enough flexibility in their working time organization to appropriately address unforeseen events in their private lives.
<i>WD2 Flexible workplaces</i>	
WD2-1	Employees of our organization have the opportunity to work from home.
WD2-2	Employees of our organization have the opportunity to flexibly adapt where they work in the organization to their current needs (e.g., quiet workplaces, standing workstations, project workrooms).
WD2-3	Employees of our organization can choose their place of work to ensure a good balance between their work and private life (work-life balance).
<i>WD3 Work according to capabilities</i>	
WD3-1	In our organization, managers change the tasks of their employees in the foreseeable future (e.g., within half a year) if the tasks no longer correspond to the employee's ability to perform and to withstand stress.
WD3-2	In our organization, job rotation (regular change of responsibilities) is provided in case of monotonous routines or high physical strain at the workplace.
WD3-3	In our organization, when tasks are cognitively over- or undemanding (e.g., asking employees to remember many things, to concentrate, to make difficult decisions) the assignment is changed in the foreseeable future (e.g., within half a year).
<i>WD4 Ergonomic working conditions</i>	
WD4-1	In our organization, workplaces are designed according to ergonomic recommendations.
WD4-2	In our organization, proposals by employees for ergonomic improvements are taken up and implemented as far as possible.

Code	English item
WD4-3	In our organization, employees can adapt the lighting conditions at their workplace to their individual needs.
WD4-4	In our organization, employees use the most appropriate tools to reduce the physical strain of their work.
<b>HM Health management</b>	
<i>HM1 Availability of physical exercise and nutrition opportunities</i>	
HM1-1	Employees of our organization receive incentives and opportunities to eat healthy food (e.g., by lower prices or a greater variety compared to the less healthy alternatives).
HM1-2	Employees of our organization are encouraged to move as much as possible in the workplace (e.g., use the stairs, talk a walk during lunch break, sports during lunch break, use the bicycle to work).
HM1-3	Employees of our organization receive incentives and opportunities to do sports outside work (e.g., company sports groups, cooperation with gyms).
<i>HM2 Workplace medical treatment</i>	
HM2-1	In our organization, employees regularly receive medical check-ups (e.g., vaccinations, stress tests, eye examinations, blood pressure).
HM2-2	In our organization, there are special programs to reintegrate employees into work after a long illness (e.g., medical therapies, mental or physical health therapies).
HM2-3	In our organization, employees receive therapeutic help in the workplace or in the immediate vicinity if required (e.g., physiotherapy in case of great physical stress and strain).
<i>HM3 Health promotion</i>	
HM3-1	In our organization, employees are made aware of health-promoting behavior (e.g., through training, counseling, displays).
HM3-2	In our organization, managers and top management are committed to promoting a sustainable, healthy way of life and work for their employees.
HM3-3	In our organization, health aspects play an important role in organizational decisions (e.g., investment decisions or operational changes).
<b>ID Individual development</b>	
<i>Continuous development planning</i>	
<i>Appropriate solutions for training and development</i>	
<i>Enabling development steps and job changes</i>	
ID-1	In our organization, development prospects and qualification requirements are identified for employees, regardless of age.
ID-2	In our organization, managers have regular conversations with their employees, regardless of age, about their personal and professional objectives (e.g., annual meetings to discuss their developmental goals).
ID-3	In our organization, employees, regardless of age, know about their potential for development.
ID-4	In our organization, older employees are offered training to learn new competencies and develop their expertise.
ID-5	In our organization, training methods are adapted to take into account the needs of older employees (e.g., more practical learning techniques instead of lecture formats).
ID-6	In our organization, employees, regardless of age, are involved in projects according to their competencies and developmental interests.
ID-7	In our organization, opportunities for career development into management or expert positions are possible for older employees.
ID-8	In our organization, employees move to a different job or position if it better suits their specific skills and abilities.
<b>KM Knowledge management</b>	
<i>KM1 Institutionalized knowledge transfer</i>	
KM1-1	In our organization, there are mentoring programs in which experienced employees support others with their knowledge.
KM1-2	In our organization, there are processes/procedures to systematically pass on the knowledge and experience of older employees to their younger colleagues before they leave the organization.
KM1-3	In our organization, there are IT systems that are also used by older employees for the documentation and dissemination of knowledge.
KM1-4	In our organization, there are regular opportunities for every employee to exchange experiences and knowledge (e.g., in regular meetings).
<i>KM2 Inter-generational collaboration</i>	
KM2-1	In our organization, older and younger employees are encouraged to share their knowledge and experience.
KM2-2	In our organization, managers support the exchange of knowledge between younger and older employees.
KM2-3	In our organization, employees pass on their knowledge to colleagues of other generations (younger or older).

Code	English item
<b>TR Transition to retirement</b>	
<i>TR1 Timely transition planning</i>	
TR1-1	In our organization, managers discuss early with their employees (e.g., from the age of 55) as to how to make the transition to retirement.
TR1-2	In our organization, managers take time to plan the transition to retirement for individual employees.
TR1-3	In our organization, succession planning for the employee who is retiring is begun long before the expected retirement date.
<i>TR2 Phased retirement and individualized transition solutions</i>	
TR2-1	In our organization, employees have the option to reduce their weekly working hours during the last years before retirement (phased retirement).
TR2-2	In our organization, employees have the option to work full time (with 50% pay), followed by a period of non-working (also with 50% pay) over a period of 2-3 years each before retirement.
TR2-3	In our organization, employees can adjust their working hours before retirement (e.g., flextime or, if shift work, no night shifts).
TR2-4	In our organization, the transition to retirement is flexibly shaped according to employee needs.
<i>TR3 Counselling for retirement life preparation</i>	
TR3-1	Our organization offers counseling to employees who are about to retire so they can reflect upon their expectations and plans for retirement.
TR3-2	Our organization encourages employees who are about to retire to develop alternative activities for a meaningful daily routine after retirement (e.g., family, volunteering, traveling).
TR3-3	Our organization provides employees with information about retirement (e.g., articles, brochures, books, internet/intranet sites).
<i>TR4 Continuous inclusion and maintaining contact</i>	
TR4-1	Our organization maintains active contact with retired employees (e.g., by an alumni network).
TR4-2	Our organization informs retired employees about current developments in the organization (e.g., newsletter, alumni newsletter).
TR4-3	Our organization allows retired employees to catch up with each other regularly (e.g., at meetings of an alumni network).
TR4-4	Our organization is still in active contact with most of its former employees, even 5 years after their retirement.
<b>CE Continued employment</b>	
<i>CE1 Individualized employment options</i>	
CE1-1	In our organization, employees may work beyond the conventional retirement age if they wish so.
CE1-2	In our organization, employment opportunities for people in retirement age are clearly defined and structured (e.g., by integration into strategic workforce planning).
CE1-3	In our organization, managers are well-informed about the possibilities of working beyond the conventional retirement age.
CE1-4	In our organization, working conditions (time and type of activity) for employees in retirement age are flexibly adapted to their wishes.
<i>CE2 (Re-)hiring of older employees</i>	
CE2-1	In our organization, older applicants are hired as well.
CE2-2	In our organization, age-neutral language is used in recruitment (e.g., job advertisements).
CE2-3	In our organization, people of all ages apply for job vacancies.
<b>RC Health &amp; retirement coverage</b>	
<i>RC1 Retirement savings and pensions</i>	
RC1-1	Our organization thoroughly informs employees about the components of a retirement plan (e.g., federal or state retirement systems, retirement plans offered by employer, private savings and investments, continued employment during retirement).
RC1-2	Our organization offers employees comprehensive opportunities to save money for their retirement.
RC1-3	Our organization offers employees good personal advice on financial security in later life.
<i>RC2 Insurances and financial emergency support</i>	
RC2-1	Our organization keeps employees well-informed about meaningful private supplemental insurance covering age-related risks (e.g., supplements to health or long-term care insurance, occupational accident insurance).
RC2-2	Our organization offers employees private supplemental insurance as part of the total remuneration package (e.g., additions to health or long-term care insurance, occupational disability).