# Construct and Criterion-related validation of the Bifactor Engagement Scale

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The roots of employee <mark>(sometimes aka work, e.g., Schaufeli & Bakker, 2010a)</mark> engagement research likely started with theoretical expansions of forms of employee participation (see, for example, Ferris & Hellier, 1984) and job involvement (e.g., Elloy et al., 1991). This exploration extended into broader considerations of attitudes and emotions (Staw et al., 1994) and were informed by further exploration of the dimensionality of constructs such as organizational commitment (Meyer & Allen, 1991). The 1990's saw focused development and refinement. Staw et al. (1994) investigated the relationships between positive emotions and favorable work outcomes, and although they do not use the word, "engagement", their distinction between felt and expressed emotion likely held influence upon the burgeoning interest in the engagement construct.

#### Our Measure of Engagement

Our theoretical conceptualization of work engagement is primarily informed by Schaufeli & Bakker (2003) and Rosenberg (1960). Through the lens of our framework, engagement is a mental state wherein employees: a) feel energized (Vigor), b are enthusiastic about the content of their work and the things they do (Dedication), and c) are so immersed in their work activities that time seems compressed (Absorption). We further decompose each of these facets into three attitudinal components: d) feeling (e.g., affect), e) thought (e.g., cognition), and f) action (e.g., behavior).

### **Participants**

Of the 743 total Qualtrics panel respondents, roughly half were excluded based on conservative indices of carelessness across the larger survey. These screens included respondents with more than 50% missing responses, those who provided consistently non-differentiating responses across more than 12 consecutive items, and those who completed the survey in less than 300 seconds. These conservative screens resulted in a retained validation sample of 377. All analyses were derived from this n of 377.

#### Data analysis

We used R (Version 4.2.2; R Core Team, 2022) and the R-packages papaja (Version 0.1.1.9001; Aust & Barth, 2022), psych (Version 2.2.9; Revelle, 2022), and tinylabels (Version 0.2.3; Barth, 2022) for all our analyses. As a straightforward validation study, our analyses consisted predominantly of Pearsons product-moment correlations.

### Results

Table 1:		

Suggested final scale definitions.

Dedication Behavioral 34

Dedication Behavioral 35

Substantive	Attitudinal	Item.Number	Item.Stem
Absorption	Cognitive	1	I am able to concentrate on my work without getting distracted
Absorption	Cognitive	3	Time passes quickly while I'm working
Absorption	Affective	5	I enjoy thinking about work even when I'm not at work
Absorption	Affective	8	I love starting my workday
Absorption	Behavioral	10	I have to be reminded to take breaks while I'm at work
Absorption	Behavioral	11	I never miss a work deadline
Vigor	Cognitive	14	Thinking about work saps my energy
Vigor	Cognitive	16	I'm able to maintain good levels of energy throughout the workday
Vigor	Affective	17	I enjoy spending time completing my job tasks
Vigor	Affective	19	I feek motivated to go beyond what is asked of me at work
Vigor	Behavioral	21	When work is slow I find ways to be productive
Vigor	Behavioral	22	I express enthusiasm for my job while at work
Dedication	Cognitive	25	I plan to stay with this company as my career advances
Dedication	Cognitive	26	I believe this company cares about my career goals
Dedication	Affective	31	I feel proud of my accomplishments within this organization
Dedication	Affective	32	My job makes me feel like I'm part of something meaningful

Note. The recommended response scale is 'Strongly Disagree', 'Disagree', 'Somewhat Disagree', 'Somewhat Agree', 'Agree', and 'Strongly Agree'. TAKE THE ITEM # COLUMN OUT BEFORE FINAL POSTER

I embrace challenging situations at work

I speak positively about this organization to others

The items comprising the focal measure along with their scale associations and recommended administered response scale are located in Table 1. The current sample internal consistency estimates for our three substantive subscales were: 1) Absorption ( $\alpha$  = 0.75), 2) Dedication ( $\alpha$  = 0.89), and 3) Vigor ( $\alpha$  = 0.75), and estimates for our three attitudinal subscales were: 1) Affect/"Feel" ( $\alpha$  = 0.86), 2) Behavior/"Do" ( $\alpha$  = 0.77), and 3) Cognition/"Think" ( $\alpha$  = 0.77).

### **Construct validation**







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For convergent validity indices, we administered the 17-item Utrecht Work Engagement Scale (Schaufeli et al., 2002; Schaufeli & Bakker, 2010b) as well as Saks (2006)'s 12-item measure which aggregates to two scales: job and organizational engagement (see also Saks, 2019). An example item from the Saks (2006) (job) scale is, "Sometimes I am so into my job that I lose track of time". An example item from the Schaufeli et al. (2002) scale is, "At my work, I feel bursting with energy". The Schaufeli et al. (2002) measure follows the same structure as our focal measure, so we aggregated to subscales of Absorption ( $\alpha$  = 0.84), Dedication ( $\alpha$  = 0.87), and Vigor ( $\alpha$  = 0.85). Internal consistency estimates for the Saks scale were lpha = 0.69 (job engagement) and lpha = 0.84 (organizational engagement). Also note here that the English version of the UWES may actually be a translation (it is difficult to say for sure, as the test manual describes an original Dutch sample although the manual is written in English). Further suggesting that the English version may be a translation, some items have odd grammar (for example, "I am proud on [sic] the work that I do").

Two short scales from the Oregon Avocational Interest Scales (Goldberg, 2010) were retained for discriminant validitation - the 5-item "Pets" and 5-item "Household Activities" scales. These items asked how frequently respondents engaged in different activities. An example Household Activity item is, "Cleaned the house" (current sample lpha = 0.72) and an example Pets item is "Fed a pet animal" (current sample lpha = 0.88).

#### Criterion-related validation

We administered a short 4-item intent-to-quit scale developed by Kelloway et al. (1999). An example item is, "I don't plan to be in this organization much longer" (current sample  $\alpha$  = 0.92).

Table 2: Unit-weighted scale intercorrelations (all variables).

	1	2	3	4	5	6	7	8	9	10	11	12	13	M	SD
1. affect	-													4.15	1.02
2. behavior	.74***	-												4.39	0.83
3. cognition	.82***	.68***	-											4.04	0.85
4. dedication	.87***	.78***	.89***	_										4.37	1.04
5. absorption	.84***	.78***	.81***	.73***	_									3.93	0.87
6. vigor	.82***	.77***	.79***	.74***	.66***	_								4.24	0.80
7. saks.job	.61***	.60***	.60***	.60***	.59***	.59***	_							3.73	0.85
8. saks.work	.72***	.59***	.67***	.72***	.67***	.54***	.54***	_						3.36	0.81
9. UWES.dedication	.77***	.65***	.72***	.74***	.66***	.70***	.59***	.57***	_					4.96	1.36
10. UWES.absorption	.69***	.66***	.66***	.66***	.68***	.63***	.70***	.55***	.82***	_				4.64	1.24
11. UWES.vigor	.70***	.67***	.66***	.65***	.63***	.74***	.56***	.46***	.82***	.80***	-			4.89	1.18
12. intentquit	36***	24***	48***	49***	23 <sup>***</sup>	36***	23***	28***	32***	23***	26 <sup>***</sup>	<b>.</b>		2.85	1.22
13. pets	.05	.15**	.07	.06	.12*	.07	.16**	.07	.07	.13*	.12*	.03	_	3.71	1.01

14. household .10 .15\* .17\*\* .14\* .13\* .15\* .12\* .03 .20\*\*\* .21\*\*\* .23\*\*\* -.07.34\*\*\* 4.00 0.64

*Note.* \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

Table 3:

Scale intercorrelations (Overall engagement aggregates).

	1	2	3	4	5	M	SD
1. focal	_					4.19	0.82
2. Saks	.79***	_				3.55	0.73
3. UWES	.81***	.69***	-			4.83	1.18
4. intentquit	39***	29***	29***	_		2.85	1.22
5. pets	.09	.13*	.11	.03	_	3.71	1.01
6. household	.15**	.09	.23***	07	.34***	4.00	0.64

*Note.* \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

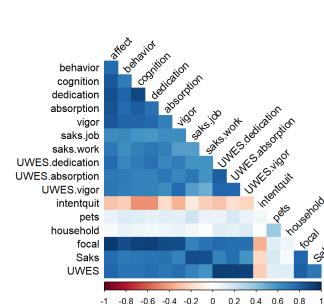


Table 2 presents associations among the focal measure subscales, the convergent construct validity subscales, the intent to quit criterion, and the two disciminant validity scales. Here we note higher-than-desired interscale correlations for our focal measure ( $\vec{r}$ 's range from .68 to .82 for the attitudinal scales and range from .73 to .89 for our substantive scales). The associations between the two scales are inflated due to the sharing of items (for example, the "affect" and "dedication" scales share 2 items in common). Convergent indices are generally higher for our subscales with the Saks "work" scale, which stresses the job referrent. This may be due to the majority of our items (see Table 1) also reflecting the job as opposed to the organization. The pattern of convergence with the UWES subscales largely emerged as expected: dedication (r = .74), absorption (r = .68), and vigor (r = .74) exhibited elevated inter-scale correlations, although we also note moderately high values throughout (ranging from a low of r = .63 to a high of r = .77). The focal scales of Cognition and Dedication did exhibit the highest magnitude associations with the intent to quit criterion of all administered variables, and the discriminant measures revealed generally small associations, although  $\vec{r}$ 's above .15 are potentially of concern.

The results of internal structural analyses via bifactor analysis overall scale aggregation may be supported, and because this is overall scale associations in Table 3. Here we see elevated converge (ranging from r = .69 to r = .81). The focal measure retains superio -.29; Fisher's z = 3.78, p < .05), however, this association is mut association (r = -.49) found in Table 2. Additionally, one of the dis exhibited a non-trivial association with the focal measure aggrega suggest a high level of convergent validity, a fair degree of discrim validity (focused on the intent to quit scale).

## Reference

1. We had also intended to use the Gallup "Q12" for construct validation not willing to share item- or person-level data.←