Engagement Survey Technical Report

Eagle I.O

Most recently updated 2022-08-16

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Home

This is a report that documents the technical details regarding the development of the Eagle I.O Engagement survey.

This report was written with `bookdown` [Xie, 2022a] within `rMarkdown` [Allaire et al., 2019] using `R` version 4.2.1 [R Core Team, 2022].

Chapter 1

Introduction

1.1 Engagement as a Psychological Construct

The roots of employee [aka work; e.g., Schaufeli and Bakker [2010]] engagement research likely started with theoretical expansions of forms of employee participation [see, for example, Ferris and 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 and

Allen, 1991]. The 1990's saw focused development and refinement (for example, a dissertation; Leone [1995] or actual semantic reference; Kahn). 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.

Kahn described engaged employees as being physically involved, cognitively vigilant, and emotionally connected. Although occasionally referred to as residing on the opposing pole to *burnout* [Maslach and Leiter, 2008], these two constructs are currently most commonly conceptualized as being distinct [Timms et al., 2012, Kim et al., 2009, Goering et al., 2017, Schaufeli et al., 2008], although certainly not universally [Cole et al., 2012, Taris et al., 2017]. Goering et al. [2017] explore nomological networks, concluding that these two constructs have a moderate (negative) association, but also distinct nomological networks. Schaufeli et al. [2008] investigated both internal and external association indicators, concluding that engagement and burnout (as well as *workaholism*) should be considered three distinct constructs.

Burnout can be defined as a psychological syndrome characterized by exhaustion (low energy), cynicism (low involvement), and inefficacy (low efficacy), which is experienced in response to chronic job stressors [e.g., Leiter and Maslach, Maslach and Leiter, 1997]. Alternatively, engagement refers to an individual worker's involvement and satisfaction as well as enthusiasm for work [Harter et al., b]. Schaufeli and Bakker [a] further specify a "positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (p. 74). Via their conceptualization, vigor is described as high levels of energy and mental resilience while working. Dedication refers to being strongly involved in one's work and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Absorption is characterized by being fully concentrated and happily engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work [Schaufeli et al.]. This absorption element has been noted as being influenced in conceptual specification by [Csikszentmihalyi, 1990]'s concept of "flow".

Regarding measurement, Gallup is widely acknowledged as an early pioneer in the measurement of the construct [see, for example, Coffman and Harter, 1999]. The Utrecht Work Engagement Scale (UWES) is another self-report questionnaire developed by Schaufeli and Bakker [a] that directly assesses the vigor, dedication, and absorption elements.

> we need to do some market research on the Q12: 1. what's the feedback report look like? (google images show one overall "satsifaction" score and/or one overall "engagement" score), 2. how much does it cost, 3. what are the 200 pulse items Gallup refers to? (6/7/21)

Our conceptualization of work engagement is a mental state wherein employees…

- ...feel energized (**Vigor**)
- ...are enthusiastic about the content of their work and the things they do (**Dedication**)
- ...are so immersed in their work activities that time seems compressed (**Absorption**)

The process of coming to this definitional model of employee engagement is further elaborated upon in Appendix A.

Chapter 2

Instrument creation

2.1 Intended Structure

Within the broader process of conceptual construct specification, we decided to attempt an intentional *a priori* bi-factor structure, whereby each of the substantive dimensions (Dedication, Vigor, and Absorption)[1] could further be de-

[1] We also discovered at this point that some contagious agent has infiltrated the minds of people working on this project, such that the word, "absorption" confounds our spelling abilities, and roughly 50% of the time ends up being spelled (misspelled?), "absorbtion"…

constructed into the attitudinal elements of Cognition, Affect, and Behavior [see, for example, Eagly and Chaiken, Rosenberg, 1960]. This is not standard practice within Psychological measurement and introduces complexity into scale definitions. Appendix A loosely documents the line of thought behind this decision.

Through item-writing and revision, it began to dawn on us that the substantive elements may already reflect the Cognition (Vigor), Affect (Absorption), and Behavioral (Dedication) dimensions. As of August, 2020, however, we could not locate a source article that made this potential confound explicit, so we persisted through crafting items that reflected cognitive, affective, and behavioral indicators of each substantive dimension. [2]

The most germaine acknowledgement of this potential construct overlap seems to be made by Schaufeli et al. (pp. 74-75):

> Rather than a momentary and specific state, engagement refers to a more persistent and pervasive affective cognitive state that is not focused on any particular object, event, individual, or behavior. **Vigor** is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. **Dedication** is characterized by a sense of significance, enthusiasm, inspiration, pride, and challenge. Instead of involvement we prefer to use the term dedication. Although, involvement – like dedication (see above) – is usually defined in terms of psychological identification with one's work or one's job [Kanungo, 1982, Lawler and Hall, 1970] , whereby the latter goes one step beyond, both quantitatively as well as qualitatively. In a qualitative sense, dedication refers to a particularly strong involvement that goes one step further than the usual level of identification. In a qualitative sense, dedication has a wider scope by not only referring to a particular cognitive or belief state but including the affective dimension as well. The final dimension of engagement, **absorption**, is characterized by being fully concentrated and deeply engrossed in one's work, whereby time passes quickly and one has difficulties with detaching oneself from work.

The survey is intentionally complex in terms of item and scale associations. There are three substantive engagement dimensions as well as three attitudinal dimensions, and item cross-loadings are intended to fully exhaust the 3 x 3 conditions (e.g., each item loads on one substantive and one attitudinal dimension):

[2] We did, however, find some criticisms of the tripartite model of attitudes as originally specified by Rosenberg [1960], although there has also been a recent attempt to reintroduce and improve upon the original model [Kaiser and Wilson, 2019] as well as repurposing of the framework as a *process* [e.g., thoughts and feelings leading to behavior; Pachankis [2007]].

Substantive	Attitudinal
Dedication	Affective
Absorption	Behavioral
Vigor	Cognitive

The feedback report uses the terms, "feel", "do", and "think" instead of the Psychological literature-based affect, behavior, and cognition.

2.2 Item generation

After content validation but prior to settling on 4 candidate items per 3x3 condition, there was a dearth of items within some of the Affective, Cognitive, or Behavioral item groupings. We generated additional candidates at this point and have these items located here (Montclair State University e-mail needed to access). It was from this larger list of (reduced) candidate items that the 36 pilot candidates were identified (and in some cases modified, edited, or otherwise further crafted)

2.3 Content Validation

7 Eagle I.O consultants were twice instructed to place each of 34 items into one of three categories: Absorption, Dedication, or Vigor, and Cognitive, Affective, or Behavioral. Instructions asked each rater to:

> INSTRUCTIONS: Place an "X" in the column that you feel is the best fit for each item (only one "X" per row please)

The substantive scale definitions provided for ratings were:

- *Absorption*: Being fully immersed in one's work, where time passes quickly and one has difficulty detaching from work tasks
- *Vigor*: Experiencing persistent levels of energy, effort, and enthusiasm while working
- *Dedication*: Experiencing pride and challenge in ones work, as well as strong feelings of support from and loyalty toward the organization

The attitudinal scale definitions were:

- *Cognitive*: Pertaining to thoughts or general mental processes (for example what someone thinks)

- *Affective*: Pertaining to feelings or emotions (for example, how someone feels)
- *Behavioral*: Pertaining to acts or actions (for example, what someone does)

The goal was to identify item(s) that were equally and heavily implicated with one substantive and one attitudinal scale.

Chapter 3

Procedure

3.1 Pilot

The pilot administrations consisted of 36 items that were presented in one of four administration groupings (see Appendix B): 1) within substantive dimension (attitudinally grouped [but randomized within blocks of 4]), 2) within at-

titudinal dimension (substantively grouped [but randomized within blocks of 4]), 3) within substantive dimension (randomly distributed by attitude), and 4) within attitudinal dimension (randomly presented by substance).[1]

The six response options administered in the pilot were:

- Strongly Disagree
- Disagree
- Slightly Disagree
- Slightly Agree
- Agree
- Strongly Agree

The four "experimental" conditions therefore prioritized and reflected the 3x3 groupings *or* one of the organization schemes (cognitive, affective, and behavioral *or* dedication, absorption, and vigor).

We chose to control the order of item administration because of our *a priori* specification of a bi-factor structure, with the expectation that item ordering would serve as a response cue, yielding stronger factor structural support based on the organization scheme.

3.1.1 Sampling strategy (pilot)

The pilot sampling strategy consisted of snowball (aka referral) sampling as well as questionnaire posting within social media platforms (LinkedIn and facebook). The pilot goal was to reduce the final instrument from 36 candidate items (4 per "cell") to 18 retained items (2 per "cell"). We hoped to obtain about 250 total responses viable for analysis.

The launch was informed by research looking at different "days of the week" and their effectiveness regarding response rate. This was both commercial as well as academic [e.g., Anseel et al.].

Eagle I.O members sent a template email asking working adults to take the survey and forward it to family and friends who also qualify as participants. Eagle I.O members were also tasked with reaching out to other students, alumni, friends, and family through the following:

- Facebook post on MSU I/O group page
- LinkedIn profiles of all Eagle I.O members

[1] Decision was made on 10/13 to have the order of presentation *randomized* within each of the broader organization blocks (for example, Condition 3: all Affective, Cognitive, and Behavioral Absorption items were randomly administered, then all ABC Dedication items, etc [although DAC was also randomized by block such that not every respondent had the same DAC ordering])

- Email first and second year students directly
- Email MSU alumni directly
- Email I/O professors
- Mentors reached out to mentees individually
- Survey was posted on the Eagle I.O webpage

3.1.1.1 Pilot analyses

A Confirmatory Bi-Factor Analysis will be performed to determine the best candidate items for the final assessment.

3.2 Demographic Information

These are to be included in future administrations in an attempt to develop marketable norms:

- Employees who work overtime vs. those who do not
- Employees who get paid for overtime vs. those who don't receive compensation for extra hours worked[2]

[2] I was thinking about this because at my job I have been working 12+ hours some days yet I do not get overtime pay. Not sure if this would work for what we are doing and I know my work experiences are not universal (nor should they be) haha!

Chapter 4

(PART*) Analyses

Chapter 5

Scale Definitions

5.1 Pilot analyses

282 people responded. We may want to further screen these 282 responses for short response durations. According to communications with Qualtrics in early December, this is the number of seconds to complete the entire survey.

Currently, the "number of people who clicked on the assessment link (330)" versus valid n (282) may take care of our very low duration respondents. The shortest response duration in the 330 datafile is 101 whereas the lowest in the 282 datafile is 43. All analyses were performed via `R` version R version 4.2.1 (2022-06-23 ucrt) [R Core Team, 2022]. Demographic consituency of the pilot sample is located in Appendix C.

5.1.1 Classical test theory

In addition to the below interactive plot [via `plotly` version 4.10.0; Sievert et al. [2021]], a full inter-item correlation matrix is located in Appendix D.

```
## Some items ( I find it difficult to mentally disconnect from work. ) were negatively
## probably should be reversed.
## To do this, run the function again with the 'check.keys=TRUE' option
```

5.1.1.1 Internal consistency estimates

Condition 1 administered items within the substantive dimensions (with successive randomized blocks of Cognitive, Affective, and Behavioral items). Condition 2 administered items within the attitudinal dimensions (with successive randomized blocks of Absorption, Vigor, and Dedication items). Condition 3 stressed the substantive dimensions (with items fully randomized regardless of attitudinal association). Condition 4 stressed the attitudinal dimensions (with items fully randomized within attitudinal dimension regardless of substantive scale association, see Chapter 3.1 and Appendix B). All internal consistency estimates were generated via `psych` version 2.2.5 [Revelle, 2022]. Alphas for the candidate 12-item scales were:

Dimension	Undifferentiated	Condition 1	Condition 2	Condition 3	Condition 4
Affective	0.87	0.88	0.84	0.88	0.87
Behavioral	0.79	0.73	0.84	0.76	0.87
Cognitive	0.81	0.79	0.85	0.8	0.87
Absorption	0.74	0.72	0.77	0.72	0.87
Vigor	0.85	0.8	0.88	0.84	0.87
Dedication	0.9	0.9	0.91	0.91	0.87

"Cell" level alphas (4 items each scale, responses collapsed across administrative conditions) were:

Cell	Alpha
Affective - Absorption	0.66
Affective - Vigor	0.71
Affective - Dedication	0.75
Behavioral - Absorption	0.56
Behavioral - Vigor	0.7
Behavioral - Dedication	0.64
Cognitive - Absorption	0.59
Cognitive - Vigor	0.62
Cognitive - Dedication	0.83

Corrected item-total correlations are presented in Appendix E

5.1.2 Confirmatory factor analyses

We used `lavaan` version 0.6.12 [Rosseel et al., 2022] and `semPlot` version 1.1.5 [Epskamp, 2022]

Bifactor analysis are most commonly applied in the exploration of common method variance [see, for example, Reise, Rodriguez et al.]. Most commonly attributed to Holzinger and Swineford [1937], Giordano et al. provide an overview regarding past and potential applications of *exploratory* bifactor analysis and cite Reise as an influential impetus for the resurgence of bifactor models in general. Giordano and Waller [2020] has a recent review of seven different bifactor model applications.

Deese guys also do bifactor stuff: Mansolf and Reise [2017]

Model	χ^2	*df*	RMSEA	SRMR	CFI	TLI	AIC
3-factor substantive	2159.21	591	0.11	0.1	0.64	0.62	25481.97
3-factor attitudinal	2318.92	591	0.11	0.1	0.6	0.58	25641.68

Note. The bifactor model did not actually converge, so no fit indices are available for the bifactor analysis of the 36-item pilot instrument.

5.2 Scale Reduction

Final scale definitions were primarily informed by two sets of indices: 1) corrected item-total correlations, and 2) CFA modification indices. We approached these two procedures as competing item-reduction techniques rather than complementary indices - we did this with the forethought of presenting the competing finalized models within a research context (for example, SIOP). The initially computed corrected item-total correlations can be found in Appendix E. The CFA modification indices extracted from the initial 36-item scale definitions are located in Appendix G.

5.2.1 Corrected item-total informed scale definitions

5.2.2 Modification index-informed scale definitions

Scale reduction was performed from 36 to 22 items using modification indices from the two independent models. For example, if modification indices implicated residual covariances between substantive model indicators, and these indicators were furthermore potentially explained by the items both being, for example, "Affective", then those items were retained. Similarly, if modification indices from the attitudinal model CFA implicated residual item covariances, and these items were associated via the substantive model, those two items were given preference for retention. This process became less instructive after the reduction of 14 items. The goal of the assessment was a finalized 18 (6 per dimension and 2 per dimensional "intersection"), so we prioritized empirial factor loadings (from both substantive and attitudinal models) for the final 4 item reductions. This resulted in two possible final scale definitions: one giving "priority" to the attitudinal model, and one giving "priority" to information extracted from the substantive model.

Dedication
Vigor
Absorption
0.85
0.85
0.94
0.72
0.54
0.78
0.68
0.76
0.73
0.75
0.57
0.70
0.72
0.59
0.45
0.19
0.33
0.73
0.57
0.67
0.47
Item_35 0.48
Item_34 0.71
Item_32 0.39
Item_31 0.54
Item_28 0.43
Item_26 0.46
Item_22 0.44
Item_21 0.68
Item_19 0.51
Item_17 0.49
Item_16 0.65
Item_15 0.79
Item_11 0.96
Item_10 0.89
Item_8 0.47
Item_5 0.68
Item_3 0.55
Item_1 0.78

Behavioral
Affective
Cognitive
Dedication
Vigor
Absorption
0.40
0.54
0.69
0.89
0.80
1.06
0.77
0.60
0.63
0.75
0.70
0.61
0.59
0.74
0.57
0.83
0.68
0.52
0.42
0.18
0.41
0.53
0.44
0.55
0.36
0.78

Dedication
Vigor
Absorption
0.88
0.88
0.98
Item_35
Item_34
Item_32
Item_31
Item_28
Item_26
Item_22
Item_21
Item_19
Item_17
Item_16
Item_14
Item_11
Item_10
Item_8
Item_7
Item_3
Item_2
3.77
5.62
3.58
4.97
3.19
2.53
4.28
3.84
3.81
4.36
3.37
2.58
3.78
2.37
2.66
4.50
3.86
2.45

Behavioral
Affective
Cognitive
0.96
0.88
0.90
Item_36
Item_34
Item_22
Item_21
Item_11
Item_10
Item_32
Item_31
Item_19
Item_17
Item_8
Item_5
Item_28
Item_26
Item_16
Item_15
Item_3
Item_1
3.71
5.62
4.28
3.83
3.78
2.37
3.58
4.98
3.82
4.37
2.67
2.12
3.20
2.54
3.38
2.44
3.87
2.69

18-Item Model	χ^2	*df*	RMSEA	SRMR	CFI	TLI	AIC
substantive (att priority)	430.47	132	0.09	0.07	0.84	0.81	13467.84
attitudinal (att priority)	396.01	132	0.09	0.06	0.85	0.83	13433.39
substantive (sub priority)	460.61	132	0.09	0.07	0.83	0.8	14216.13
attitudinal (sub priority)	447.7	132	0.09	0.07	0.82	0.8	14424.26
bifactor (sub priority)	336.58	126	0.08	0.06	0.89	0.86	15026.75

5.3 Final proposed structure

The two approaches were applied in the interest of a research question. From a more practical sense, the final scale definitions were informed by these two

approaches as well as a consideration of item content (was the indicator an important inclusion for proper content domain sampling?).

5.3.1 Omega

Omega reliability (ω) estimates independent latent construct reliability absent the effect of other constructs. Rodriguez et al. identify "Omega Hierarchical" (ω_H) as particularly applicable for bifactor models. Specifically, ω_H "...estimates the proportion of variance in total scores that can be attributed to a single general factor, thereby, treating variability in scores due to group factors as measurement error" (p. 150).

5.4 Multigroup analyses

- using experimental condition as "multiple groups" (measurement invariance)

5.5 Summary

Recommendation for final instrument based on consideration of all of the above pieces of evidence

Chapter 6

Analyses (Construct & Criterion Validation)

6.1 Post-pilot administration modifications

Because the bifactor analyses resulted in some equivocation regarding final scale definitions, we entered into construct validation with some flexibility regarding final scale definitions. Twenty items were retained for construct validation, with the intent of further reducing the instrument to our desired 18 items upon psychometric evaluation of records obtained from this second round of data collection. Furthermore, four pilot items were lightly revised for grammatical considerations:

Pilot administration:

- Item 1 (Pilot): `I'm able to concentrate on my work without distractions`
- Item 19 (Pilot): `I feel motivated to go beyond what is asked of me`
- Item 25 (Pilot): `I plan my future with this company`

Construct validation administration:

- Item 1 (Revised): `I am able to concentrate on my work without getting distracted`
- Item 19 (Revised): `I feel motivated to go beyond what is asked of me at work`
- Item 25 (Revised): `I plan to stay with this company as my career advances`

Slight modification was also made to the response scale - the middle-most pilot administration options of "Slightly Disagree" and "Slightly Agree" had their semantic modifiers changed to "Somewhat". The response scale offered in the construct validation was therefore:

- Strongly Disagree
- Disagree
- Somewhat Disagree
- Somewhat Agree
- Agree
- Strongly Agree

6.2 Procedure

Qualtrics panels were solicited, with the only eligibility requirement being working adults (either part- or full-time). The engagement items were presented in one of two orderings, prioritizing either the attitudinal or substantive structure:

6.2.1

Attitudinal Prioritization	Substantive Prioritization
Affective - Absorption	0.66
Affective - Vigor	0.71

Attitudinal Prioritization	Substantive Prioritization
Affective - Dedication	0.75
Behavioral - Absorption	0.56
Behavioral - Vigor	0.7
Behavioral - Dedication	0.64
Cognitive - Absorption	0.59
Cognitive - Vigor	0.62
Cognitive - Dedication	0.83

6.2.2

6.2.3 Construct validation

For convergent validity indices, we administered the 17-item Utrecht Work Engagement Scale [UWES; Schaufeli et al.; Schaufeli and Bakker [b]] as well as the Saks [2006] 12-item scale which aggregates to two scales: job and organizational engagement [see also Saks, 2019]. [1]

The English version of the UWES may actually be a translation (difficult to say for sure, however, as the test manual describes an original Dutch sample although the manual is written in English), and some items have odd grammar (for example, "I am proud on the work that I do").

Two short scales from the Oregon Avocational Interest Scales [ORAIS; Goldberg [2010]] were retained for discriminant validitation - the 5-item "Pets" and 5-item "Game-Playing" scales were administered.

6.2.4 Criterion-related validation

We administered a short 4-item intent-to-quit scale developed by Kelloway et al. [1999].

[1] We had intended to use the Gallup "Q12" for construct validation [Thackray, Harter et al., a], but Gallup was not willing to share item- or person-level data.

Chapter 7

Future plans

Most effort is currently dedicated to the technical report. We also need feedback reports and a user manual. The feedback report(s) are the most secondarily important.

The development of the feedback report will occur in stages:

1. static .pdf
2. "static" .html (standard template but potentially interactive elements)
3. "static" `xaringan` [Xie, 2022b]
4. dynamic `xaringan`

- user-generated presenter notes

- user-selected visuals (taken from .html report)

5. Dynamic dashboard

The intent is to lean on the `xaringan` presentation as the central marketable piece. Initial templates should be able to do client colors and fonts via chunk specification, but evolved templates should be client-driven, such that figures can be selected and annotated from the .html, generating a user-selected and annotated `xaringan` presentation that can be hosted by Eagle but accessed via password protection by the client.

Eventually Eagle could optimize interpretation via contributions of cognitive psychologists, graphic designers, etc.

7.1 Things to do

- Finalize items (SIOP papers should take care of this)
- ~~Get survey into Qualtrics for pilot testing~~
- Work on feedback report
- Generate User Manual

7.2 Research projects

Figure 7.1: SIOP 2022

Three projects are being targetted for SIOP 2022:

1. Engagement instrument development

- document the *a priori* bi-factor pursuit
- pilot study with 36 items culled to 18 final
- "ignore" pilot conditions (e.g., not the focus of write-up)
- four levels of feedback:
  - overall (engagement)
  - marginal (substantive)
  - marginal (attitudinal)
  - cell (substantive x attitudinal)
- Morgan taking the lead (6/3/21)

2. Different paths toward scale definitions

- modification indices vs. corrected item-total correlations
- final arbiter = ???
- Casey taking the lead (6/3/21)

3. Measurement invariance across the 4 pilot administration conditions

- focus on 4 pilot conditions
- look into item ordering literature (probably from 1970's)
- relative strength of association (item-trait) based on item ordering
- if we do this only with final scale definitions won't the conditions be watered-down?
- currently leaderless

4. Engagement instrument validation (data collection summer 2021)

- Need to first finalize scale definitions

7.3 Completed projects as of August 16, 2022

Garcia Prieto Palacios Roji, R., Stachowski, A. A., & Kulas, J. T. (2022). O*Net Demands and Resources: Associations with Stress, Burnout, and Engagement (Poster). Society for Industrial and Organizational Psychology Annual Conference, Seattle, WA, United States.

Osorio-Duffoo, C., Garcia Prieto Palacios Roji, R., Russell, M.C., & Kulas, J.T. (2022). Engagement Versus Attitude: Measurement Invariance Across Item

Orderings (Poster). Society for Industrial-Organizational Psychology Annual Conference, Seattle, WA, United States.

Russell, M.C., Garcia Prieto Palacios Roji, R., Osorio-Duffoo, C., Kulas, J.T. (2022). Development of an Intended Bifactor Engagement Measure (Poster). Society for Industrial-Organizational Psychology Annual Conference, Seattle, WA, United States.

Chapter 8

Author bios

[Renata Garcia Prieto Palacios Roji](mailto:garciaprier1@mail.montclair.edu) is pursuing her PhD in Industrial an

[John Kulas](mailto:kulasj@montclair.edu) received his PhD in Industrial and Organizational Psychology from No

Chapter 9

References

Appendix A

Timeline of events

A.1 Spring 2019

This is believed to be Eagle I.O's initial definition of engagement:

> A state of personal immersion in work characterized by enthusiasm, dedication, and personal investment, expressed cognitively, affectively, and behaviorally in the proactive pursuit of advancing organizational goals.

This definition was created by Eagle I.O Spring 2019, and modified by Kulas and Renata the following Fall semester of 2019 to include the *four* dimensions of Fulfillment, Absorbtion, Dedication, and Vigor.

A.2 Spring 2020

We considered removing fulfillment.

Fulfillment: finding meaning in one's work, while having a sense of autonomy, growth, usefulness, achievement, and feeling appreciated by org. [Satisfaction(?)]

It was decided to operationalize fullfillment as an *outcome* of engagement rather than a definitional element

A.2.1 February 4, 2020

We lost the document where we had saved the citations for the creation of our engagement dimensions. we found it today (02/04/2020).

Three out of the four dimensions (Dedication, Vigor, and Absorbtion) came from Schaufeli et al., and we are trying to find where Fulfillment came from. We are also trying to improve the definition of each domain by looking at the current items and conducting a Modified Q sort (not correct name) to create piles of items that have commonalities within each domain.

A.2.2 February 24, 2020

Definitional amendment notes and considerations:

Absorption: being fully concentrated and happily immersed in ones work [time passes quickly and has difficulty detaching from ones work; Schaufeli et al.]

Dedication/Commitment: being strongly involved in one's work and experiencing a sense of enthusiasm, inspiration, pride, and challenge. [Schaufeli et al.] Identifying as an organizational member/ambassador

This includes conceptual elements of identification with the organization, a sense of "oneness", seeking continuous learning and improvement. We got rid of "challenge" altogether and moved the "inspiration" and "pride" elements to other categories.

Dedication: seeking continous imporvement and demonstrating initiative

Vigor: investing consistent effort, persistence, energy, and mental resilience while working [Schaufeli et al.] maybe add enthusiasm here as well

Vigor: Experiencing persistent levels of energy and enthusiasm while working

A.2.3 Structural considerations

It was considered to potentially change from a focus on affective, cognitive, and behavioral to whether their engagement stems from content/satisfaction with the organization or the people they work with. This idea was however abandoned Spring 2020.

After completing individual Q-sorts (Kulas and Renata) we decided to revisit the originally specified substantive definitions and build them up a little to make the difference between them more noticeable (and we also retained the affect, behavior, cognition focus).

A.3 Summer 2020

Definitions as of 5/19/2020:

Absorption: Being fully immersed in one's work, where time passes quickly and one has difficulty detaching from work tasks

Vigor: Experiencing persistent levels of energy, effort, and enthusiasm while working

Dedication: Experiencing pride and challenge in ones work, as well as strong feelings of support from and loyalty toward the organization

The development team "content validation" as well as the broader content validation to inform the pilot administration (see Chapter 2.3) retained these definitions we ordered all the items according to the ones we individually selected for each category and created an item bank with the remaining items. Together we placed the items in the bank into the agreed upon categories.

Appendix B

Pilot conditions

Our four orderings of items were randomized within dimension (Affective, Behavioral, Cognitive or Dedication, Absorption, Vigor), "block" (Qualtrics designation for groupings of items), and item. The elements that were randomized are identified in the following tables by randomized element (A, B, C, or D):

Table B.1: Pilot administration ordering Condition 1

Condition1	Substantiv
I<92>m able to concentrate on my work without distractions<a0>	Absorption
I have a hard time detaching mentally from my work<a0>	Absorption
Time passes quickly while I<92>m working	Absorption
I find it difficult to mentally disconnect from work<a0>	Absorption
I enjoy thinking about work even when I<92>m not at work	Absorption
Most days, I feel happiest when the workday is soon to be complete (r)	Absorption
I am happiest when I am immersed in a project	Absorption
I love starting my workday.	Absorption
I devote more time than is expected of me.	Absorption
I have to be reminded to take breaks while I<92>m at work	Absorption
I never miss a work deadline.<a0>	Absorption
I never allow distractions to interfere with my work<a0>	Absorption
I devote my full attention to my work tasks throughout the day<a0>	Vigor
Thinking about work saps my energy (r)	Vigor
I would rather direct my focus toward a work task than a personal task	Vigor
I<92>m able to maintain good levels of energy throughout the workday	Vigor
I enjoy spending time completing my job tasks.	Vigor
Most days I feel enthusiastic about starting my work day.	Vigor
I feel motivated to go beyond what is asked of me	Vigor
This job drains my energy (r)	Vigor
When work is slow I find ways to be productive.	Vigor
I express enthusiasm for my job while at work<a0>	Vigor
I try my best to perform well at work	Vigor
If I notice my energy level is low, I take corrective steps to re-energize.	Vigor
I plan my future with this company.	Dedication
I believe this company cares about my career goals	Dedication
I often think about finding another job (r)	Dedication
This organization challenges me to work at my full potential<a0>	Dedication
I am proud to be a member of this organization.	Dedication
I feel supported by my supervisor when I fail at a task	Dedication
I feel proud of my accomplishments within this organization<a0>	Dedication
My job makes me feel like I<92>m part of something meaningful<a0>	Dedication
I make valued contributions to the organization	Dedication
I embrace challenging situations at work.	Dedication
I speak positively about this organization to others.	Dedication
This organization provides the resources necessary for me to successfully perform my job	Dedication

Table B.2: Pilot administration ordering Condition 2

Condition2	Substantive	Attitudi
I<92>m able to concentrate on my work without distractions<a0>	Absorption	Cognitiv
I have a hard time detaching mentally from my work<a0>	Absorption	Cognitiv
Time passes quickly while I<92>m working	Absorption	Cognitiv
I find it difficult to mentally disconnect from work<a0>	Absorption	Cognitiv
I devote my full attention to my work tasks throughout the day<a0>	Vigor	Cognitiv
Thinking about work saps my energy (r)	Vigor	Cognitiv
I would rather direct my focus toward a work task than a personal task	Vigor	Cognitiv
I<92>m able to maintain good levels of energy throughout the workday	Vigor	Cognitiv
I plan my future with this company.	Dedication	Cognitiv
I believe this company cares about my career goals	Dedication	Cognitiv
I often think about finding another job (r)	Dedication	Cognitiv
This organization challenges me to work at my full potential<a0>	Dedication	Cognitiv
I enjoy thinking about work even when I<92>m not at work	Absorption	Affective
Most days, I feel happiest when the workday is soon to be complete (r)	Absorption	Affective
I am happiest when I am immersed in a project	Absorption	Affective
I love starting my workday.	Absorption	Affective
I enjoy spending time completing my job tasks.	Vigor	Affective
Most days I feel enthusiastic about starting my work day.	Vigor	Affective
I feel motivated to go beyond what is asked of me	Vigor	Affective
This job drains my energy (r)	Vigor	Affective
I am proud to be a member of this organization.	Dedication	Affective
I feel supported by my supervisor when I fail at a task	Dedication	Affective
I feel proud of my accomplishments within this organization<a0>	Dedication	Affective
My job makes me feel like I<92>m part of something meaningful<a0>	Dedication	Affective
I devote more time than is expected of me.	Absorption	Behavior
I have to be reminded to take breaks while I<92>m at work	Absorption	Behavior
I never miss a work deadline.<a0>	Absorption	Behavior
I never allow distractions to interfere with my work<a0>	Absorption	Behavior
When work is slow I find ways to be productive.	Vigor	Behavior
I express enthusiasm for my job while at work<a0>	Vigor	Behavior
I try my best to perform well at work	Vigor	Behavior
If I notice my energy level is low, I take corrective steps to re-energize.	Vigor	Behavior
I make valued contributions to the organization	Dedication	Behavior
I embrace challenging situations at work.	Dedication	Behavior
I speak positively about this organization to others.	Dedication	Behavior
This organization provides the resources necessary for me to successfully perform my job	Dedication	Behavior

Table B.3: Pilot administration ordering Condition 3

Condition3	Substantiv
I<92>m able to concentrate on my work without distractions<a0>	Absorption
I enjoy thinking about work even when I<92>m not at work	Absorption
I devote more time than is expected of me.	Absorption
I have a hard time detaching mentally from my work<a0>	Absorption
Most days, I feel happiest when the workday is soon to be complete (r)	Absorption
I have to be reminded to take breaks while I<92>m at work	Absorption
Time passes quickly while I<92>m working	Absorption
I am happiest when I am immersed in a project	Absorption
I never miss a work deadline.<a0>	Absorption
I find it difficult to mentally disconnect from work<a0>	Absorption
I love starting my workday.	Absorption
I never allow distractions to interfere with my work<a0>	Absorption
I devote my full attention to my work tasks throughout the day<a0>	Vigor
I enjoy spending time completing my job tasks.	Vigor
When work is slow I find ways to be productive.	Vigor
Thinking about work saps my energy (r)	Vigor
Most days I feel enthusiastic about starting my work day.	Vigor
I express enthusiasm for my job while at work<a0>	Vigor
I would rather direct my focus toward a work task than a personal task	Vigor
I feel motivated to go beyond what is asked of me	Vigor
I try my best to perform well at work	Vigor
I<92>m able to maintain good levels of energy throughout the workday	Vigor
This job drains my energy (r)	Vigor
If I notice my energy level is low, I take corrective steps to re-energize.	Vigor
I plan my future with this company.	Dedication
I am proud to be a member of this organization.	Dedication
I make valued contributions to the organization	Dedication
I believe this company cares about my career goals	Dedication
I feel supported by my supervisor when I fail at a task	Dedication
I embrace challenging situations at work.	Dedication
I often think about finding another job (r)	Dedication
I feel proud of my accomplishments within this organization<a0>	Dedication
I speak positively about this organization to others.	Dedication
This organization challenges me to work at my full potential<a0>	Dedication
My job makes me feel like I<92>m part of something meaningful<a0>	Dedication
This organization provides the resources necessary for me to successfully perform my job	Dedication

Table B.4: Pilot administration ordering Condition 4

Condition4	Substantive	Attitudi
I<92>m able to concentrate on my work without distractions<a0>	Absorption	Cognitiv
I devote my full attention to my work tasks throughout the day<a0>	Vigor	Cognitiv
I plan my future with this company.	Dedication	Cognitiv
I have a hard time detaching mentally from my work<a0>	Absorption	Cognitiv
Thinking about work saps my energy (r)	Vigor	Cognitiv
I believe this company cares about my career goals	Dedication	Cognitiv
Time passes quickly while I<92>m working	Absorption	Cognitiv
I would rather direct my focus toward a work task than a personal task	Vigor	Cognitiv
I often think about finding another job (r)	Dedication	Cognitiv
I find it difficult to mentally disconnect from work<a0>	Absorption	Cognitiv
I<92>m able to maintain good levels of energy throughout the workday	Vigor	Cognitiv
This organization challenges me to work at my full potential<a0>	Dedication	Cognitiv
I enjoy thinking about work even when I<92>m not at work	Absorption	Affective
I enjoy spending time completing my job tasks.	Vigor	Affective
I am proud to be a member of this organization.	Dedication	Affective
Most days, I feel happiest when the workday is soon to be complete (r)	Absorption	Affective
Most days I feel enthusiastic about starting my work day.	Vigor	Affective
I feel supported by my supervisor when I fail at a task	Dedication	Affective
I am happiest when I am immersed in a project	Absorption	Affective
I feel motivated to go beyond what is asked of me	Vigor	Affective
I feel proud of my accomplishments within this organization<a0>	Dedication	Affective
I love starting my workday.	Absorption	Affective
This job drains my energy (r)	Vigor	Affective
My job makes me feel like I<92>m part of something meaningful<a0>	Dedication	Affective
I devote more time than is expected of me.	Absorption	Behavior
When work is slow I find ways to be productive.	Vigor	Behavior
I make valued contributions to the organization	Dedication	Behavior
I have to be reminded to take breaks while I<92>m at work	Absorption	Behavior
I express enthusiasm for my job while at work<a0>	Vigor	Behavior
I embrace challenging situations at work.	Dedication	Behavior
I never miss a work deadline.<a0>	Absorption	Behavior
I try my best to perform well at work	Vigor	Behavior
I speak positively about this organization to others.	Dedication	Behavior
I never allow distractions to interfere with my work<a0>	Absorption	Behavior
If I notice my energy level is low, I take corrective steps to re-energize.	Vigor	Behavior
This organization provides the resources necessary for me to successfully perform my job	Dedication	Behavior

Appendix C

Pilot demographics

C.1 Response date

As reported by Qualtrics' `Recorded Date` estimates:

Figure C.1: Qualtrics recorded date of pilot survey response

C.2 Response latencies

As reported by Qualtrics' `Duration (in seconds)` variable:

Figure C.2: Qualtrics recorded response latencies (truncated for over 7000 seconds)

C.3 Geographic constituency

As reported by Qualtrics' `Location Latitude` and `Location Longitude` estimates, rounded to one decimal place in consideration of pilot respondents' privacy:

Geographic location of pilot sample respondents

Appendix D

Correlations

D.1 Inter-Item correlations

I enjoy thinking about work even when I'm not at work.

Most days, I feel happiest when the workday is soon to be complete.

I am happiest when I am immersed in a project.

I love starting my workday.

I enjoy spending time completing my job tasks.

Most days I feel enthusiastic about starting my work day.

I feel motivated to go beyond what is asked of me.

This job drains my energy.

I am proud to be a member of this organization.

I feel supported by my supervisor when I fail at a task.

I feel proud of my accomplishments within this organization.

My job makes me feel like I'm part of something meaningful.

I devote more time than is expected of me.

I have to be reminded to take breaks while I'm at work.

I never miss a work deadline.

I never allow distractions to interfere with my work.

When work is slow I find ways to be productive.

I express enthusiasm for my job while at work.

I try my best to perform well at work.

If I notice my energy level is low, I take corrective steps to re-energize.

I make valued contributions to the organization.

I embrace challenging situations at work.

I speak positively about this organization to others.

This organization provides the resources necessary for me to successfully perform my job.

I devote my full attention to my work tasks throughout the day.

Thinking about work saps my energy.

I would rather direct my focus toward a work task than a personal task.

I'm able to maintain good levels of energy throughout the workday.

I plan my future with this company.

I believe this company cares about my career goals.

I often think about finding another job.

This organization challenges me to work at my full potential.

I'm able to concentrate on my work without distractions.

I have a hard time detaching mentally from my work.

Time passes quickly while I'm working.

I find it difficult to mentally disconnect from work.

I enjoy thinking about work even when I'm not at work.

1.00

0.42

0.27

0.49

0.40

0.51

0.33

0.25

0.36

0.21

0.30

0.43

0.18

0.17

-0.03

0.10

0.24

0.38

0.25

0.10

0.28

0.28

0.35

0.00

0.15

0.40

0.24

0.29

0.38

0.33

0.37

0.36

0.16

0.26

0.34

0.25

Most days, I feel happiest when the workday is soon to be complete.

0.42

1.00

0.19

0.36

0.35

0.47

0.23

0.36

0.25

0.07

0.20

0.28

0.10

-0.05

-0.13

-0.02

0.15

0.24

0.18

0.08

0.15

0.13

0.17

-0.01

0.10

0.50

0.18

0.21

0.37

0.27

0.39

0.20

0.06

0.03

0.30

0.00

I am happiest when I am immersed in a project.

0.27

0.19

1.00

0.21

0.35

0.27

0.43

0.09

0.14

0.16

0.18

0.20

0.21

0.17

0.05

0.13

0.20

0.25

0.18

0.12

0.20

0.28

0.10

-0.02

0.22

0.12

0.30

0.10

0.19

0.13

0.13

0.06

0.13

0.12

0.22

0.12

I love starting my workday.

0.49

0.36

0.21

1.00

0.59

0.82

0.35

0.43

0.50

0.20

0.46

0.50

0.19

0.14

0.11

0.25

0.34

0.46

0.31

0.23

0.33

0.28

0.46

0.26

0.35

0.51

0.33

0.49

0.46

0.50

0.52

0.53

0.29

0.12

0.49

0.06

I enjoy spending time completing my job tasks.

0.40

0.35

0.35

0.59

1.00

0.59

0.52

0.28

0.47

0.19

0.47

0.58

0.21

0.24

0.06

0.23

0.36

0.52

0.35

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0.42

0.24

0.36

0.40

0.39

0.35

0.40

0.46

0.41

0.39

0.30

0.09

0.44

0.04

Most days I feel enthusiastic about starting my work day.

0.51

0.47

0.27

0.82

0.59

1.00

0.43

0.43

0.53

0.24

0.48

0.54

0.20

0.19

0.11

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0.55

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0.31

0.49

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0.37

0.54

0.38

0.51

0.47

0.50

0.55

0.50

0.25

0.17

0.47

0.12

I feel motivated to go beyond what is asked of me.

0.33

0.23

0.43

0.35

0.52

0.43

1.00

0.17

0.41

0.32

0.52

0.53

0.40

0.40

0.10

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0.43

0.26

0.41

0.54

0.37

0.14

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0.36

0.39

0.40

0.36

0.40

0.20

0.31

0.42

0.27

This job drains my energy.

0.25

0.36

0.09

0.43

0.28

0.43

0.17

1.00

0.36

0.27

0.21

0.34

-0.05

-0.05

-0.02

0.04

0.11

0.28

0.06

0.02

0.12

0.15

0.35

0.31

0.09

0.61

0.09

0.30

0.35

0.42

0.51

0.31

0.10

-0.14

0.22

-0.19

I am proud to be a member of this organization.

0.36

0.25

0.14

0.50

0.47

0.53

0.41

0.36

1.00

0.29

0.52

0.63

0.17

0.19

0.14

0.28

0.37

0.54

0.39

0.21

0.27

0.36

0.75

0.40

0.26

0.36

0.24

0.34

0.57

0.68

0.59

0.59

0.26

0.15

0.44

0.11

I feel supported by my supervisor when I fail at a task.

0.21

0.07

0.16

0.20

0.19

0.24

0.32

0.27

0.29

1.00

0.27

0.35

0.04

0.02

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0.03

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0.22

0.19

0.02

0.25

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0.34

0.02

0.17

0.03

0.18

0.20

0.44

0.27

0.36

0.02

0.00

0.20

-0.01

I feel proud of my accomplishments within this organization.

0.30

0.20

0.18

0.46

0.47

0.48

0.52

0.21

0.52

0.27

1.00

0.56

0.26

0.16

0.09

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0.43

0.38

0.46

0.22

0.21

0.35

0.16

My job makes me feel like I'm part of something meaningful.

0.43

0.28

0.20

0.50

0.58

0.54

0.53

0.34

0.63

0.35

0.56

1.00

0.21

0.22

0.02

0.27

0.35

0.56

0.38

0.16

0.46

0.43

0.53

0.27

0.34

0.40

0.26

0.40

0.53

0.58

0.56

0.55

0.33

0.15

0.47

0.10

I devote more time than is expected of me.

0.18

0.10

0.21

0.19

0.21

0.20

0.40

-0.05

0.17

0.04

0.26

0.21

1.00

0.38

-0.01

0.24

0.33

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0.32

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0.20

0.13

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0.03

0.13

0.20

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0.25

0.17

0.31

0.32

0.29

I have to be reminded to take breaks while I'm at work.

0.17

-0.05

0.17

0.14

0.24

0.19

0.40

-0.05

0.19

0.02

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0.22

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0.37

-0.03

0.19

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0.15

0.28

I never miss a work deadline.

-0.03

-0.13

0.05

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-0.02

0.14

-0.04

0.09

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0.32

-0.03

0.10

0.26

0.01

0.01

0.00

0.06

0.33

-0.01

0.08

-0.06

I never allow distractions to interfere with my work.

0.10

-0.02

0.13

0.25

0.23

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0.23

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0.28

0.03

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0.35

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0.09

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0.54

0.04

0.31

0.01

When work is slow I find ways to be productive.

0.24

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0.20

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0.34

0.46

0.11

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0.28

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0.18

0.29

1.00

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0.45

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0.24

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0.13

I express enthusiasm for my job while at work.

0.38

0.24

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0.52

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0.57

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0.52

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0.29

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0.35

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0.41

0.43

0.28

0.19

0.42

0.14

I try my best to perform well at work.

0.25

0.18

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0.35

0.43

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0.45

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1.00

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0.23

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0.32

0.26

0.36

0.24

0.24

0.32

0.19

If I notice my energy level is low, I take corrective steps to re-energize.

0.10

0.08

0.12

0.23

0.20

0.23

0.26

0.02

0.21

0.02

0.18

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0.15

0.14

0.08

0.19

0.31

0.31

0.30

1.00

0.25

0.22

0.24

0.11

0.32

0.18

0.08

0.37

0.17

0.21

0.14

0.31

0.27

-0.06

0.24

-0.07

I make valued contributions to the organization.

0.28

0.15

0.20

0.33

0.32

0.36

0.41

0.12

0.27

0.25

0.55

0.46

0.22

0.16

0.11

0.26

0.23

0.40

0.26

0.25

1.00

0.46

0.20

0.12

0.31

0.20

0.18

0.27

0.26

0.25

0.29

0.29

0.24

0.09

0.26

0.00

I embrace challenging situations at work.

0.28

0.13

0.28

0.28

0.39

0.31

0.54

0.15

0.36

0.33

0.54

0.43

0.20

0.14

0.11

0.21

0.29

0.46

0.37

0.22

0.46

1.00

0.34

0.22

0.27

0.16

0.14

0.28

0.24

0.33

0.22

0.36

0.19

0.19

0.30

0.14

I speak positively about this organization to others.

0.35

0.17

0.10

0.46
0.42
0.49
0.37
0.35
0.75
0.28
0.49
0.53
0.13
0.14
0.17
0.30
0.31
0.54
0.38
0.24
0.20
0.34
1.00
0.43
0.30
0.32
0.20
0.35
0.54
0.62
0.56
0.55
0.28
0.13

0.40

0.08

This organization provides the resources necessary for me to successfully perform my job.

0.00

-0.01

-0.02

0.26

0.24

0.20

0.14

0.31

0.40

0.34

0.29

0.27

-0.01

-0.02

0.10

0.11

0.09

0.15

0.16

0.11

0.12

0.22

0.43

1.00

0.06

0.26

-0.03

0.20

0.25

0.45

0.36

0.37

0.18

-0.13

0.11

-0.16

I devote my full attention to my work tasks throughout the day.

0.15

0.10

0.22

0.35

0.36

0.37

0.39

0.09

0.26

0.02

0.24

0.34

0.34

0.37

0.32

0.54

0.46

0.40

0.41

0.32

0.31

0.27

0.30

0.06

1.00

0.17

0.30

0.53

0.25

0.15

0.24

0.32

0.57

0.13

0.48

0.06

Thinking about work saps my energy.

0.40

0.50

0.12

0.51

0.40

0.54

0.21

0.61

0.36

0.17

0.21

0.40

0.03

-0.03

-0.03

0.09

0.23

0.32

0.19

0.18

0.20

0.16

0.32

0.26

0.17

1.00

0.17

0.45

0.28

0.41

0.51

0.30

0.21

-0.12

0.32

-0.18

I would rather direct my focus toward a work task than a personal task.

0.24

0.18

0.30

0.33

0.39

0.38

0.32

0.09

0.24

0.03

0.20

0.26

0.13

0.19

0.10

0.21

0.24

0.35

0.23

0.08

0.18

0.14

0.20

-0.03

0.30

0.17

1.00

0.29

0.12

0.16

0.18

0.14

0.26

0.18

0.26

0.13

I'm able to maintain good levels of energy throughout the workday.

0.29

0.21

0.10

0.49

0.35

0.51

0.36

0.30

0.34

0.18

0.31

0.40

0.20

0.14

0.26

0.39

0.40

0.41

0.36

0.37

0.27

0.28

0.35

0.20

0.53

0.45

0.29

1.00

0.24

0.33

0.32

0.43

0.50

0.12

0.50

0.08

I plan my future with this company.

0.38

0.37

0.19

0.46

0.40

0.47

0.39

0.35

0.57

0.20

0.38

0.53

0.24

0.17

0.01

0.12

0.34

0.38

0.29

0.17

0.26

0.24

0.54

0.25

0.25

0.28

0.12

0.24

1.00

0.60

0.63

0.51

0.18

0.16

0.38

0.10

I believe this company cares about my career goals.

0.33

0.27

0.13

0.50

0.46

0.50

0.40

0.42

0.68

0.44

0.43

0.58

0.13

0.11

0.01

0.14

0.25

0.44

0.32

0.21

0.25

0.33

0.62

0.45

0.15

0.41

0.16

0.33

0.60

1.00

0.57

0.69

0.19

0.19

0.33

0.12

I often think about finding another job.

0.37

0.39

0.13

0.52

0.41

0.55

0.36

0.51

0.59

0.27

0.38

0.56

0.22

0.13

0.00

0.20

0.34

0.41

0.26

0.14

0.29

0.22

0.56

0.36

0.24

0.51

0.18

0.32

0.63

0.57

1.00

0.48

0.26

0.03

0.38

-0.02

This organization challenges me to work at my full potential.

0.36

0.20

0.06

0.53

0.39

0.50

0.40

0.31

0.59

0.36

0.46

0.55

0.25

0.23

0.06

0.22

0.41

0.43

0.36

0.31

0.29

0.36

0.55

0.37

0.32

0.30

0.14

0.43

0.51

0.69

0.48

1.00

0.29

0.27

0.45

0.20

I'm able to concentrate on my work without distractions.

0.16

0.06

0.13

0.29

0.30

0.25

0.20

0.10

0.26

0.02

0.22

0.33

0.17

0.11

0.33

0.54

0.31

0.28

0.24

0.27

0.24

0.19

0.28

0.18

0.57

0.21

0.26

0.50

0.18

0.19

0.26

0.29

1.00

0.01

0.44

-0.04

I have a hard time detaching mentally from my work.

0.26

0.03

0.12

0.12

0.09

0.17

0.31

-0.14

0.15

0.00

0.21

0.15

0.31

0.27

-0.01

0.04

0.17

0.19

0.24

-0.06

0.09

0.19

0.13

-0.13

0.13

-0.12

0.18

0.12

0.16

0.19

0.03

0.27

0.01

1.00

0.15

0.90

Time passes quickly while I'm working.

0.34

0.30

0.22

0.49

0.44

0.47

0.42

0.22

0.44

0.20

0.35

0.47

0.32

0.15

0.08

0.31

0.40

0.42

0.32

0.24

0.26

0.30

0.40

0.11

0.48

0.32

0.26

0.50

0.38

0.33

0.38

0.45

0.44

0.15

1.00

0.09

I find it difficult to mentally disconnect from work.

0.25

0.00

0.12

0.06

0.04

0.12

0.27

-0.19

0.11

-0.01

0.16

0.10

0.29

0.28

-0.06

0.01

0.13

0.14

0.19

-0.07

0.00

0.14

0.08

-0.16

0.06

-0.18

0.13

0.08

0.10

0.12

-0.02

0.20

-0.04

0.90

0.09

1.00

D.2 Scale-level correlations

Because of the large inter-construct covariance estimates, we constructed standard unit-weighted scale aggregates (interactive plot of unit-weighted aggregates located below)

D.2.1 Substantive scales

D.2.2 Attitudinal scales

Correlation matrix of 3 unit-weighted substantive and 3 unit-weighted attitudinal scales:

Absorption
Vigor
Dedication
Cognitive
Affective
Behavioral
0.65
0.78
0.78
0.89
0.80
0.72
0.80
0.79
0.77
0.81
0.87
0.86
0.75
0.66
0.79

Appendix E

Corrected item-total correlations

E.1 "Marginal" level

E.1.1 Attitudinal

E.1.2 Construct Substantive

E.2 "Cell" level

Table E.1: Affective Items

	n	r.drop	mean	sd
I enjoy thinking about work even when I'm not at work.	270	0.56	3.1	1.5
Most days, I feel happiest when the workday is soon to be complete.	269	0.40	2.6	1.2
I am happiest when I am immersed in a project.	267	0.35	4.6	1.0
I love starting my workday.	270	0.70	3.6	1.3
I enjoy spending time completing my job tasks.	270	0.65	4.5	1.0
Most days I feel enthusiastic about starting my work day.	269	0.77	3.8	1.4
I feel motivated to go beyond what is asked of me.	269	0.58	4.6	1.2
This job drains my energy.	269	0.43	3.2	1.4
I am proud to be a member of this organization.	268	0.64	4.7	1.2
I feel supported by my supervisor when I fail at a task.	263	0.35	4.5	1.4
I feel proud of my accomplishments within this organization.	268	0.60	5.0	1.0
My job makes me feel like I'm part of something meaningful.	267	0.70	4.6	1.3

Table E.2: Behavioral Items

	n	r.dr
I devote more time than is expected of me.	271	0.
I have to be reminded to take breaks while I'm at work.	269	0.
I never miss a work deadline.	269	0.
I never allow distractions to interfere with my work.	271	0.
When work is slow I find ways to be productive.	270	0.
I express enthusiasm for my job while at work.	271	0.
I try my best to perform well at work.	272	0.
If I notice my energy level is low, I take corrective steps to re-energize.	271	0.
I make valued contributions to the organization.	267	0.
I embrace challenging situations at work.	269	0.
I speak positively about this organization to others.	269	0.
This organization provides the resources necessary for me to successfully perform my job.	270	0.

Table E.3: Cognitive Items

	n	r.drop	mean	sd
I devote my full attention to my work tasks throughout the day.	271	0.46	4.1	1.3
Thinking about work saps my energy.	270	0.35	3.6	1.4
I would rather direct my focus toward a work task than a personal task.	269	0.35	3.4	1.4
I'm able to maintain good levels of energy throughout the workday.	271	0.56	4.1	1.2
I plan my future with this company.	265	0.55	3.9	1.6
I believe this company cares about my career goals.	268	0.58	3.9	1.5
I often think about finding another job.	267	0.56	3.5	1.6
This organization challenges me to work at my full potential.	268	0.67	4.3	1.3
I'm able to concentrate on my work without distractions.	270	0.39	3.7	1.4
I have a hard time detaching mentally from my work.	272	0.31	3.7	1.5
Time passes quickly while I'm working.	272	0.60	4.6	1.2
I find it difficult to mentally disconnect from work.	273	0.22	3.7	1.6

Table E.4: Absorption Items

	n	r.drop	mean	sd
I enjoy thinking about work even when I'm not at work.	270	0.46	3.1	1.5
Most days, I feel happiest when the workday is soon to be complete.	269	0.16	2.6	1.2
I am happiest when I am immersed in a project.	267	0.32	4.6	1.0
I love starting my workday.	270	0.50	3.6	1.3
I devote more time than is expected of me.	271	0.46	4.5	1.3
I have to be reminded to take breaks while I'm at work.	269	0.37	3.7	1.6
I never miss a work deadline.	269	0.16	4.5	1.2
I never allow distractions to interfere with my work.	271	0.39	3.2	1.4
I'm able to concentrate on my work without distractions.	270	0.36	3.7	1.4
I have a hard time detaching mentally from my work.	272	0.42	3.7	1.5
Time passes quickly while I'm working.	272	0.51	4.6	1.2
I find it difficult to mentally disconnect from work.	273	0.37	3.7	1.6

Table E.5: Vigor Items

	n	r.drop	mean	sd
I devote my full attention to my work tasks throughout the day.	271	0.50	4.1	1.28
Thinking about work saps my energy.	270	0.49	3.6	1.38
I would rather direct my focus toward a work task than a personal task.	269	0.39	3.4	1.37
I'm able to maintain good levels of energy throughout the workday.	271	0.63	4.1	1.22
I enjoy spending time completing my job tasks.	270	0.62	4.5	1.03
Most days I feel enthusiastic about starting my work day.	269	0.70	3.8	1.40
I feel motivated to go beyond what is asked of me.	269	0.59	4.6	1.20
This job drains my energy.	269	0.34	3.2	1.37
When work is slow I find ways to be productive.	270	0.53	4.5	1.18
I express enthusiasm for my job while at work.	271	0.68	4.8	1.11
I try my best to perform well at work.	272	0.50	5.4	0.76
If I notice my energy level is low, I take corrective steps to re-energize.	271	0.36	4.2	1.14

Table E.6: Dedication Items

	n	r.dr
I plan my future with this company.	265	0.
I believe this company cares about my career goals.	268	0.
I often think about finding another job.	267	0.
This organization challenges me to work at my full potential.	268	0.
I am proud to be a member of this organization.	268	0.
I feel supported by my supervisor when I fail at a task.	263	0.
I feel proud of my accomplishments within this organization.	268	0.
My job makes me feel like I'm part of something meaningful.	267	0.
I make valued contributions to the organization.	267	0.
I embrace challenging situations at work.	269	0.
I speak positively about this organization to others.	269	0.
This organization provides the resources necessary for me to successfully perform my job.	270	0.

Table E.7: Affective - Absorption Items

	n	r.drop	mean	sd
I enjoy thinking about work even when I'm not at work.	270	0.57	3.1	1.5
Most days, I feel happiest when the workday is soon to be complete.	269	0.37	2.6	1.2
I am happiest when I am immersed in a project.	267	0.31	4.6	1.0
I love starting my workday.	270	0.51	3.6	1.3

Table E.8: Affective - Vigor Items

	n	r.drop	mean	sd
I enjoy spending time completing my job tasks.	270	0.58	4.5	1.0
Most days I feel enthusiastic about starting my work day.	269	0.63	3.8	1.4
I feel motivated to go beyond what is asked of me.	269	0.47	4.6	1.2
This job drains my energy.	269	0.34	3.2	1.4

Table E.9: Affective - Dedication Items

	n	r.drop	mean	sd
I am proud to be a member of this organization.	268	0.61	4.7	1.2
I feel supported by my supervisor when I fail at a task.	263	0.38	4.5	1.4
I feel proud of my accomplishments within this organization.	268	0.59	5.0	1.0
My job makes me feel like I'm part of something meaningful.	267	0.66	4.6	1.3

Table E.10: Cognitive - Absorption Items

	n	r.drop	mean	sd
I'm able to concentrate on my work without distractions.	270	0.14	3.7	1.4
I have a hard time detaching mentally from my work.	272	0.58	3.7	1.5
Time passes quickly while I'm working.	272	0.29	4.6	1.2
I find it difficult to mentally disconnect from work.	273	0.52	3.7	1.6

Table E.11: Cognitive - Vigor Items

	n	r.drop	mean	sd
I devote my full attention to my work tasks throughout the day.	271	0.40	4.1	1.3
Thinking about work saps my energy.	270	0.32	3.6	1.4
I would rather direct my focus toward a work task than a personal task.	269	0.32	3.4	1.4
I'm able to maintain good levels of energy throughout the workday.	271	0.60	4.1	1.2

Table E.12: Cognitive - Dedication Items

	n	r.drop	mean	sd
I plan my future with this company.	265	0.67	3.9	1.6
I believe this company cares about my career goals.	268	0.70	3.9	1.5
I often think about finding another job.	267	0.65	3.5	1.6
This organization challenges me to work at my full potential.	268	0.65	4.3	1.3

Table E.13: Behavioral - Absorption Items

	n	r.drop	mean	sd
I devote more time than is expected of me.	271	0.36	4.5	1.3
I have to be reminded to take breaks while I'm at work.	269	0.37	3.7	1.6
I never miss a work deadline.	269	0.22	4.5	1.2
I never allow distractions to interfere with my work.	271	0.42	3.2	1.4

Table E.14: Behavioral - Vigor Items

	n	r.drop	mean	sd
When work is slow I find ways to be productive.	270	0.51	4.5	1.18
I express enthusiasm for my job while at work.	271	0.54	4.8	1.11
I try my best to perform well at work.	272	0.54	5.4	0.76
If I notice my energy level is low, I take corrective steps to re-energize.	271	0.40	4.2	1.14

Table E.15: Behavioral - Dedication Items

	n	r.dr
I make valued contributions to the organization.	267	0.
I embrace challenging situations at work.	269	0.
I speak positively about this organization to others.	269	0.
This organization provides the resources necessary for me to successfully perform my job.	270	0.

Appendix F

Qualitative item characteristics

Item reading level information was performed via the packages `quanteda` version 3.2.1 [Benoit et al., 2022] and `quanteda.textstats` version 0.95 [Benoit et al., 2021] in R version 4.2.1 (2022-06-23 ucrt) [R Core Team, 2022]. Two indices were investigated: "Flesch-Kincaid" is the same grade level index that's currently used by Microsoft Word [Kincaid et al.] whereas "Dale.Chall" reflects N_{wd} ["difficulty" of words; Chall and Dale]. These indices are primarily influenced by two qualitative characteristics: N_{wf}, which is the number of words matching the Dale-Chall List of 3000 "familiar words", and N_{wd}, which is the number of "difficult" words not matching the Dale-Chall list of "familiar" words.

The average Flesch-Kincaied (e.g., reading grade) for our 36 candidate pilot items was 6.08 (sd = 3.03). The average Dale-Chall index was 33.93 (sd = 11.23).

F.1 Frequency distributions by dimension

Infrequent word incidence across attitudinal dimensions
density
0.04
0.03
0.02
0.01
0.00
10
20
30
40
Dale Chall Index
Attitudinal Dimension
Affective
Behavioral
Cognitive

Item reading level estimates across substantive/attitudinal dimension comb
density
0.75
0.50
0.25
0.00
5
10
Flesch−Kincaid Index
Att/Engage Interaction
Absorption Affective
Absorption Behavioral
Absorption Cognitive
Dedication Affective
Dedication Behavioral
Dedication Cognitive
Vigor Affective
Vigor Behavioral
Vigor Cognitive

F.2 Tables of qualitative indices

Table F.1: Organized by Flesch-Kincaid aka Reading Level

	document	Substantive	Att
36	This organization provides the resources necessary for me to successfully perform my job	Dedication	Bel
35	I speak positively about this organization to others.	Dedication	Bel
33	I make valued contributions to the organization	Dedication	Bel
34	I embrace challenging situations at work.	Dedication	Bel
31	I feel proud of my accomplishments within this organization	Dedication	Aff
28	This organization challenges me to work at my full potential	Dedication	Cog
24	If I notice my energy level is low, I take corrective steps to re-energize.	Vigor	Bel
16	I m able to maintain good levels of energy throughout the workday	Vigor	Cog
4	I find it difficult to mentally disconnect from work	Absorption	Cog
12	I never allow distractions to interfere with my work	Absorption	Bel
18	Most days I feel enthusiastic about starting my work day.	Vigor	Aff
1	I m able to concentrate on my work without distractions	Absorption	Cog
15	I would rather direct my focus toward a work task than a personal task	Vigor	Cog
27	I often think about finding another job (r)	Dedication	Cog
26	I believe this company cares about my career goals	Dedication	Cog
22	I express enthusiasm for my job while at work	Vigor	Bel
29	I am proud to be a member of this organization.	Dedication	Aff
30	I feel supported by my supervisor when I fail at a task	Dedication	Aff
14	Thinking about work saps my energy (r)	Vigor	Cog
17	I enjoy spending time completing my job tasks.	Vigor	Aff
6	Most days, I feel happiest when the workday is soon to be complete (r)	Absorption	Aff
5	I enjoy thinking about work even when I m not at work	Absorption	Aff
13	I devote my full attention to my work tasks throughout the day	Vigor	Cog
7	I am happiest when I am immersed in a project	Absorption	Aff
2	I have a hard time detaching mentally from my work	Absorption	Cog
19	I feel motivated to go beyond what is asked of me	Vigor	Aff
32	My job makes me feel like I m part of something meaningful	Dedication	Aff
25	I plan my future with this company.	Dedication	Cog
3	Time passes quickly while I m working	Absorption	Cog
9	I devote more time than is expected of me.	Absorption	Bel
10	I have to be reminded to take breaks while I m at work	Absorption	Bel
8	I love starting my workday.	Absorption	Aff
20	This job drains my energy (r)	Vigor	Aff
21	When work is slow I find ways to be productive.	Vigor	Bel
23	I try my best to perform well at work	Vigor	Bel
11	I never miss a work deadline.	Absorption	Bel

Table F.2: Organized by Dale Chall aka includes Difficult Words

	document	Subst
16	I m able to maintain good levels of energy throughout the workday	Vigor
36	This organization provides the resources necessary for me to successfully perform my job	Dedic
34	I embrace challenging situations at work.	Dedic
1	I m able to concentrate on my work without distractions	Abso
4	I find it difficult to mentally disconnect from work	Abso
31	I feel proud of my accomplishments within this organization	Dedic
28	This organization challenges me to work at my full potential	Dedic
32	My job makes me feel like I m part of something meaningful	Dedic
20	This job drains my energy (r)	Vigor
24	If I notice my energy level is low, I take corrective steps to re-energize.	Vigor
12	I never allow distractions to interfere with my work	Abso
22	I express enthusiasm for my job while at work	Vigor
2	I have a hard time detaching mentally from my work	Abso
14	Thinking about work saps my energy (r)	Vigor
33	I make valued contributions to the organization	Dedic
13	I devote my full attention to my work tasks throughout the day	Vigor
6	Most days, I feel happiest when the workday is soon to be complete (r)	Abso
11	I never miss a work deadline.	Abso
3	Time passes quickly while I m working	Abso
35	I speak positively about this organization to others.	Dedic
7	I am happiest when I am immersed in a project	Abso
19	I feel motivated to go beyond what is asked of me	Vigor
30	I feel supported by my supervisor when I fail at a task	Dedic
5	I enjoy thinking about work even when I m not at work	Abso
10	I have to be reminded to take breaks while I m at work	Abso
15	I would rather direct my focus toward a work task than a personal task	Vigor
8	I love starting my workday.	Abso
25	I plan my future with this company.	Dedic
17	I enjoy spending time completing my job tasks.	Vigor
27	I often think about finding another job (r)	Dedic
9	I devote more time than is expected of me.	Abso
23	I try my best to perform well at work	Vigor
26	I believe this company cares about my career goals	Dedic
18	Most days I feel enthusiastic about starting my work day.	Vigor
21	When work is slow I find ways to be productive.	Vigor
29	I am proud to be a member of this organization.	Dedic

Appendix G

CFA Modification Indices

Initial CFA modification indices (top 700 reported; 36-item specification):

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