Development of an Intended Bifactor Engagement Measure

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Introduction

In recent years, employee engagement has earned its stripes as a useful predictor of employee outcomes (Alarcon & Edwards, 2011; Hanaysha, 2016; Rich et al., 2010). Despite engagement's burgeoning popularity and emergence into the cultural mainstream, considerable disagreement exists among psychologists on the definition and factor structure of the construct.

The "substantive" model of engagement describes it in terms of three dimensions: Vigor, or high levels of energy at work; Dedication, or feelings of involvement, pride, and meaning in one's work; and Absorption, or concentration and flow while working (Schaufeli et al., 2002). On the other hand, the now-resurgent tripartite model of attitudes divides attitudes into conitive, affective, and behavioral components (Rosenberg, 1960).

Breaking from the traditional scale development approach, in which each item only indicates one construct, we sought to develop an engagement measure in which each item simultaneously captures a dimension from *both* the substantive and attitudinal models. In so doing, we aim to construct a scale with very broad content domain coverage relative to its length.

Methods

50 items were generated to semantically reflect one dimension each from the substantive and attitudinal models. For example, "I speak positively about this organization to others" indicates both the dedication and behavioral dimensions from the substantive and attitudinal models respectively. Graduate students and faculty sorted each item twice to their corresponding dimension within the substantive and attitudinal models. The 36 items that were most consistently sorted were retained for the study. 330 working adult participants were gathered via snowball sampling and responded to this set of items.

Item Reduction

Our team used two parallel scale development methods: one focusing on corrected item-total correlations, the other focusing on CFA modification indices. In the former approach, the item with the lowest corrected item-total correlation was removed from the scale definition. This process was iterated after each item deletion until only two items per each of the nine pairs of substantive and attitudinal dimensions remained.

The CFA modification index approach focused on item retention rather than deletion. We ran two parallel CFAs, one on the substantive model and the other on the attitudinal model. We prioritized the alternative model predicted model associations as items to retain.

The parallel item reduction approaches yielded two very similar, yet distinct, 18-item scale definitions. We merged these scales into a final 20-item scale definition based on wording preference and maximizing content domain coverage.

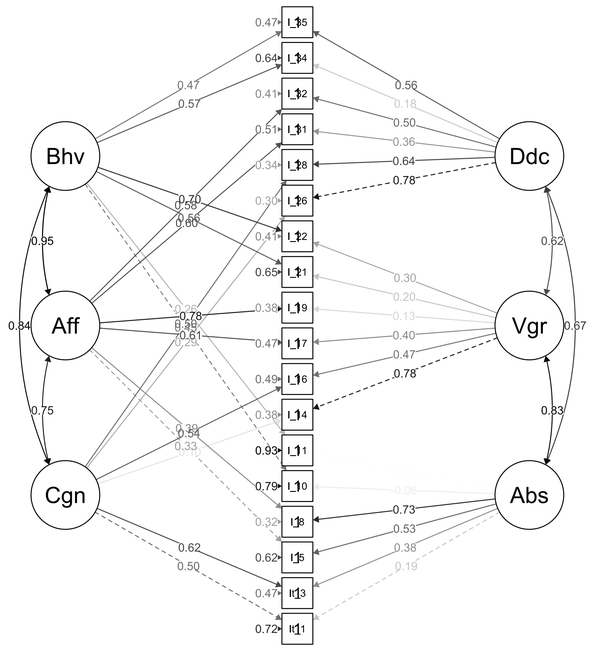

Figure 1: Bifactor structure

Table 1: Final 20-item scale definition

Substantive	Attitudinal	Corrected item-total correlation
Absorption	Cognitive	I am able to concentrate on my work without getting distracted
Absorption	Cognitive	I find it difficult to mentally disconnect from work
Absorption	Cognitive	Time passes quickly while I'm working
Absorption	Affective	I enjoy thinking about work even when I'm not at work
Absorption	Affective	I love starting my workday
Absorption	Behavioral	I have to be reminded to take breaks while I'm at work
Absorption	Behavioral	I never miss a work deadline
Vigor	Cognitive	Thinking about work saps my energy
Vigor	Cognitive	I'm able to maintain good levels of energy throughout the workday
Vigor	Affective	I enjoy spending time completing my job tasks
Vigor	Affective	I feel motivated to go beyond what is asked of me at work
Vigor	Behavioral	When work is slow I find ways to be productive
Vigor	Behavioral	I express enthusiasm for my job while at work
Dedication	Cognitive	I believe this company cares about my career goals
Dedication	Cognitive	I plan to stay with this company as my career advances
Dedication	Cognitive	This organization challenges me to work at my full potential
Dedication	Affective	I feel proud of my accomplishments within this organization
Dedication	Affective	My job makes me feel like I'm part of something meaningful
Dedication	Behavioral	I embrace challenging situations at work
Dedication	Behavioral	I speak positively about this organization to others

Results

Table 1 shows the final set of 20 items. All data analysis was conducting in R 4.1.0 using the packages `tidyverse` (Wickham et al., 2019), `DT` (Xie et al., 2021), `lavaan` (Rosseel, 2012), `semPlot` (Epskamp, 2019), `psych` (Revelle, 2021) and `posterdown` (Thorne, 2022).

Coefficient alphas for subscales ranged from 0.69 for absorption to 0.86 for affective. The bifactor model with Full Information Maximum Likelihood estimation displayed strong fit, $\chi^2(111, N = 282) = 264.70$, $p < .001$, CFI = 0.92, AIC = 14113.31, RMSEA = 0.07.

Figure 1 shows the factor loadings of each item on its respective substantive and attitudinal dimensions. Figure 2 shows subscale-level intercorrelations. Note that correlations between subscales inheriting from different models (e.g., cognitive and vigor) are artificially inflated due to one third of items being shared. Correlations *within* models are uninflated.

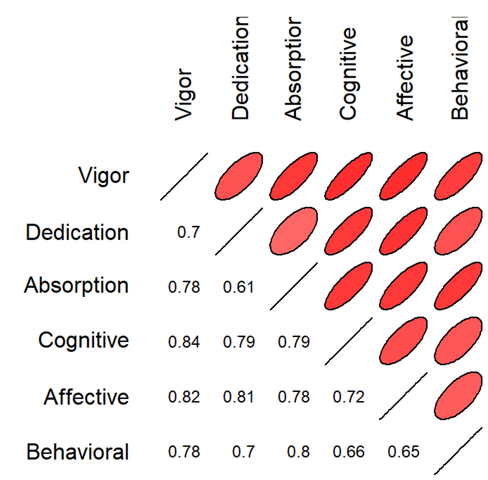

Figure 2: Correlations among subscales

Discussion

The present research introduces a novel measure of engagement, developed in English and available for free. By designing items to correspond to two separate factor structures, we effectively double our content domain coverage with the same number of items. A convergent and discriminant validation study is currently underway, which is also intended to further reduce the scale definition to 18 items. Most novelly, we intentionally embrace complexity in scale development. We believe this approach has promising implications for developing measures which reconcile, rather than reject, disparate models of constructs. It it our hope that future researchers will weigh the benefits of broadening item complexity against the understandable desire for parsimony.