Development of an Intentional BiFactor Engagement Measure

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Abstract

Employee engagement has, in recent years, enjoyed a surge in popularity as a positive employee outcome. Despite this burgeoning interest, disagreement still remains regarding its factor structure and nomological relationship with similar concepts, such as burnout.

One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.

Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.

One sentence clearly stating the **general problem** being addressed by this particular study.

One sentence summarizing the main result (with the words "**here we show**" or their equivalent).

Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.

One or two sentences to put the results into a more **general context**.

Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline.

Keywords: Engagement, engagement

Word count: X

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The roots of employee (aka work; e.g., Schaufeli & Bakker, 2010) engagement research likely started with theoretical expansions of forms of employee participation (see, for example, Ferris & Hellier, 1984) and job involvement (e.g., Elloy, Everett, & Flynn, 1991). This exploration extended into broader considerations of attitudes and emotions (Staw, Sutton, & Pelled, 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 (for example, a dissertation; Leone (1995) or actual semantic reference; Kahn (1990)). 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 (1990) 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 & Leiter, 2008), these two constructs are currently most commonly conceptualized as being distinct (Goering, Shimazu, Zhou, Wada, & Sakai, 2017; Kim, Shin, & Swanger, 2009; Schaufeli, Taris, & Van Rhenen, 2008; Timms, Brough, & Graham, 2012), although certainly not universally (Cole, Walter, Bedeian, & O'Boyle, 2012; Taris, Ybema, & Beek, 2017). Comparing the two, Goering et al. (2017) concluded that they 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 self-efficacy), which is experienced in response to chronic job stressors (e.g., Leiter & Maslach, 2004; Maslach & Leiter, 1997).

Alternatively, engagement refers to an individual worker's involvement and satisfaction as well as enthusiasm for work (Harter, Schmidt, & Hayes, 2002). Schaufeli and Bakker (2003) 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, Salanova, González-Romá, & Bakker, 2002). The dimension of absorption 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 & Harter, 1999). The Utrecht Work Engagement Scale (UWES) is another self-report questionnaire developed by Schaufeli and Bakker (2003) 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**)

Methods

Choice of focus on BIC versus AIC discussed in Dziak, Coffman, Lanza, Li, and Jermiin (2020).

Participants

330 individuals provided ratings across 36 candidate items. These participants were gathered via snowball sampling, with an initial population of undergraduate and graduate students, as well as professional acquaintances of faculty members.

Participant job title, hours worked per week, and organizational tenure were recorded. Mean hours worked per week was NA

Mean organizational tenure was INSERT HERE, with a standard deviation of INSERT HERE. YOU NEED TO RECODE TENURE TO ACCOUNT FOR MONTHS/YEARS. Participants who did not exactly specify their tenure (e.g. "A bit over a year") were not included in this average.

Material

Our survey was administered on Qualtrics

Item generation. We generated a set of 36 items for our engagement measure, with the ultimate goal of reducing them to a final set of 18. These items were generated according to a review of extant tripartite engagement measures, as well as *WHAT RESEARCH DID WE USE FOR ATTITUDINAL WORDING? WAS IT LITERALLY JUST "I THINK", "I FEEL", "I DO"?* Each item was worded to reflect both a substantive dimension as well as an attitudinal dimension, for example *EXAMPLE ITEM HERE*

Our 3x3 bifactor model produced nine pairs of dimensions (e.g., Vigor-Cognitive, Vigor-Affective, Vigor-Behavioral, etc.). With 36 initial items, this left four items per pair

of substantive and attitudinal dimensions. *DON'T KNOW HOW IN RMARKDOWN BUT CAN WE INSERT A 3x3 TABLE TO VISUALIZE HOW THERE ARE 4 ITEMS FOR EACH PAIRING OF THE SUB/ATT DIMENSIONS. ALSO, THIS WORDING SUCKS, MAKE IT BETTER*

See table *X* for a full list of items and their respective dimensions.

Procedure

Looking into the specification of polychoric covariances (Jöreskog, 1994). This seems to be not very commonly leveraged (only package that seems to estimate these is `semPlot`). We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study. We took two different approaches to determining final scale definitions: 1) focus on corrected item-total correlations, and 2) focus on CFA modificiation indices.

CFA Modification Indices. Looking at the substantive and attitudinal models independently, we requested modification indices from each, with the intent of retaining indicators whose shared residual covariances were implicated as being "freed". The path with the highest modification index across both CFA's was between item2 and item4, which are both indicators of "Absorption" and "Cognition". One of these items was therefore a candidate for deletion, and semantic preference was given to item4, "I find it difficult to mentally disconnect from work" over item2, "I have a hard time detaching mentally from my work". After item2 was excluded from both scale definitions (substantive and attitudinal), the CFAs were re-run and modification indices re-checked for bi-factor structure optimizing modifications.[1]

We prioritized item deletions such that an item was implicated for deletion if: 1)

[1] Probably put a table in here highlighting certain modification indices (with a key to intended factor-item association).

modification index was high (relative to others) and 2) error residual was within same "cell". The choice of itme to delete was based on author preference for wording/semantics as well as construct element coverage (considering the possible consequences for construct deficiency). Item variance was also consulted (retention more likely with greater item variance).

Actually it doesn't matter that much with only 1 item deletion -
probably go ahead and do a few before recheck modification indices

Single factor versus bifactor approaches.

Data analysis

We used R (Version 4.0.3; R Core Team, 2021) and the R-packages *dplyr* (Version 1.0.2; Wickham et al., 2021), *DT* (Version 0.16; Xie, Cheng, & Tan, 2021), *forcats* (Version 0.5.0; Wickham, 2021a), *ggplot2* (Version 3.3.2; Wickham, 2016), *kableExtra* (Version 1.3.1; Zhu, 2021), *lavaan* (Version 0.6.8; Rosseel, 2012), *magrittr* (Version 2.0.1; Bache & Wickham, 2020), *papaja* (Version 0.1.0.9997; Aust & Barth, 2020), *purrr* (Version 0.3.4; Henry & Wickham, 2020), *readr* (Version 1.4.0; Wickham & Hester, 2020), *sem* (Version 3.1.11; Fox, Nie, & Byrnes, 2020; Epskamp, 2019), *semPlot* (Version 1.1.2; Epskamp, 2019), *stringr* (Version 1.4.0; Wickham, 2019), *tibble* (Version 3.1.0; Müller & Wickham, 2021), *tidyr* (Version 1.1.2; Wickham, 2021b), and *tidyverse* (Version 1.3.0; Wickham, Averick, et al., 2019) for all our analyses.

Results

CFA drafts below

Discussion

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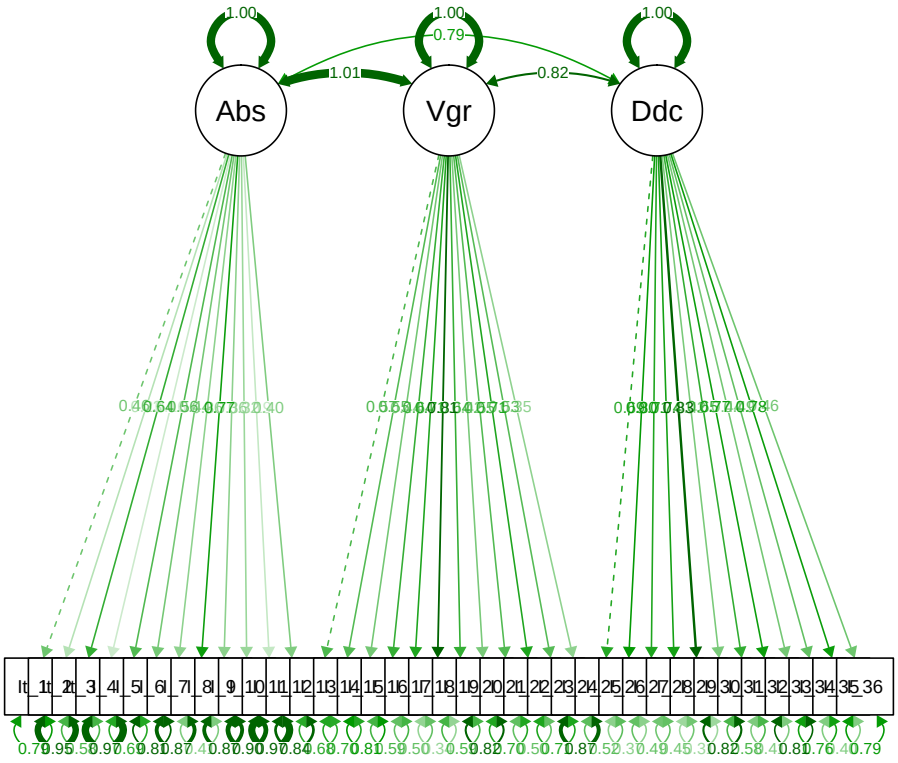

Figure 1. (#fig:CFA.sub)Substantive factor structure CFA

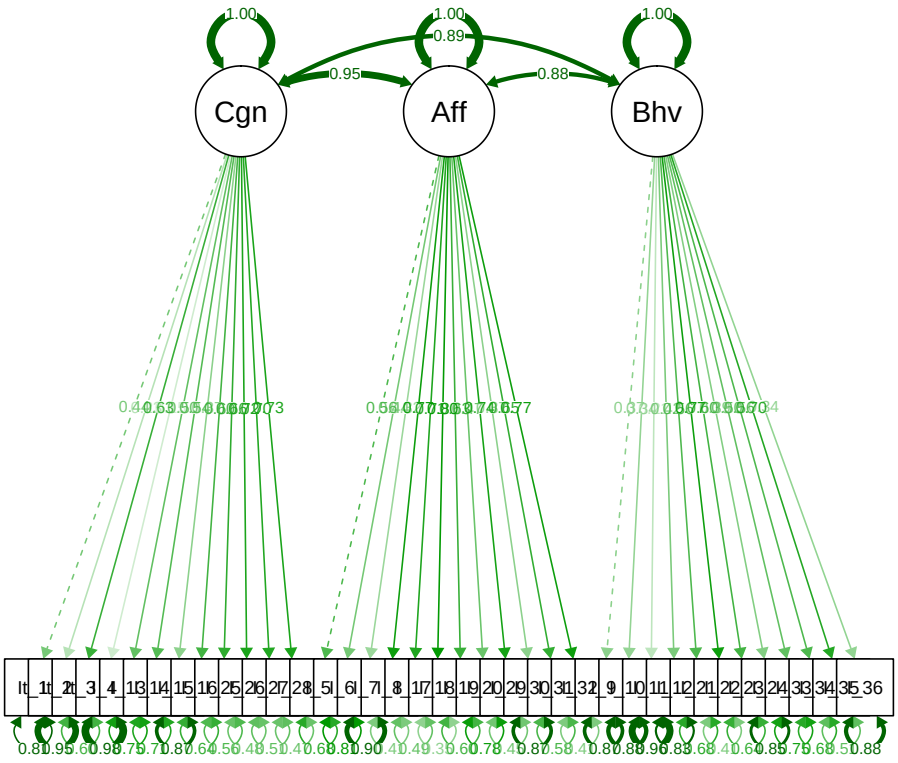

Figure 2. (#fig:CFA.att)Attitudinal factor structure CFA