# **Supplemental Materials**

**Section 1: Development of an Initial Pool of Items and Its Refinement**

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**Supplemental References**

**Section 1: Development of an Initial Pool of Items and Its Refinement**

***Stage 1: Initial Item Construction and Selection***

The purpose of Stage 1 was to develop a large pool of items designed to measure each of these 10 components, to trial the item pool on a large, national representative sample, and to use evolving statistical analyses to select the best items to measure each of the 10 constructs. Starting with the 10 construct definitions items, the research team constructed additional items and adapted appropriate items from existing instruments designed to measure similar constructs (see subsequent discussion). In preparing items for the present study, we started with Huppert and So's (2013) ten original constructs but asked the question whether the inverse of the DSM/ICD criteria really covered well-being adequately.

Based on our review of the literature and in discussion with several clinical psychologist colleagues, we concluded that there were five important constructs missing from the original list. The additional factors were based on our review of the well-being literature in which we included positive psychology constructs that are not well-represented in clinical taxonomies of ill-being that were the basis of the original 10 constructs. We then independently verified the importance of these additional constructs through consultations with clinical psychologists. Three of these, Competence, Self-acceptance and Autonomy, have an individual focus like the ten original constructs; while two of the new components, empathy and prosocial behavior, have an interpersonal focus.

Competence was included in Huppert and So's (2013) original list of constructs, but the most suitable item available in the European Social Survey (ESS) was subsequently classified as "clear thinking" leading us to retain that component but to still add a more traditional measure of competence. Competence is arguably a core component of general wellness and thriving (Ryan & Deci, 2017). People who feel a sense of general competence have higher self-esteem (Thøgersen-Ntoumani & Ntoumanis, 2007), and greater satisfaction with life (Meyer, Enstrom, Harstveit, Bowles, & Beevers, 2007). Conversely, individuals with anxiety and depression have difficulty achieving goals and report feeling a lack of general competence (e.g., Ryan & Deci, 2017; Wei, Philip, Shaffer, Young, Zakalik & Hansen, 2005).

Considerable theory and research based on Self-Determination Theory (see overview by Ryan & Deci, 2017) argues that a lack of autonomy underpins all of the common mental disorders, even if it is not specifically mentioned as a symptom. Depression and anxiety are associated with decrements in perceived volition and control over one’s life, and the tendency to make decisions out of shame, guilt or avoidance, rather than one’s longer term values and aspirations (Ryan & Deci, 2017). All of these tendencies are linked to an absence of autonomy, meaning a general sense of autonomy is a core component of healthy functioning (Ryan & Deci, 2017).

Empathy and prosocial behaviour were included on the basis that prosocial emotions and behaviours are central to human functioning, vitality and wellness (Eisenberg, Fabes, & Spinrad, 2007; Weinstein & Ryan, 2010). Empathy is the tendency to vicariously experience other individuals’ emotional states (Davis, 1994). Individuals with mental health disorders have difficulty feeling the emotions of others and taking the perspective of others (Baron-Cohen, 2011). In contrast, empathy is essential to positive social functioning (Batson, 1991; Eisenberg et al., 2007) and has been associated with group cohesion (Henry, Sager, & Plunkett, 1996), and relationship satisfaction (Davis & Oathout, 1987), and as such is an important feature of healthy individual functioning.

Prosocial behavior has been defined as “voluntary behavior intended to benefit another” (Eisenberg et al., 2007, p. 646). It is related to empathy but conceptually distinct from it, in that the former describes observable behaviour, whereas the latter describes an internal state (Eisenberg et al., 2007). Depression and anxiety have also been negatively linked to prosocial behaviour, including social withdrawal, and less capacity to respond to the needs of others (Eisenberg et al., 2007). Although not directly derived from the inverse of DSM/ICD classifications, all are at least indirectly related to these classifications.

This large item pool for each of the 15 WB-Pro15 components was then critiqued by an expert panel of well-being researchers (colleagues of the authors). Each item was evaluated in relation to clarity of expression and an assessment of the factor to which it belongs. These responses were used to cull potentially inappropriate items and to revise the wording of potentially ambiguous items. This revised item pool was then administered to a large, representative sample of adult participants and advanced statistical analyses was used to select the best items.

***Stage 2: Final Item Selection and Testing***

The purpose of stage 2 was two-fold. Firstly, we sought to replicate, refine, and test the generalisability of the WB-Pro15 factor structure with a new, nationally representative sample of adults. Part of this sample consisted of some of participants from Stage 1 that allowed us to evaluate the test-retest stability of the WB-Pro15 constructs in addition to reliability. Based on the WB-Pro15 items from Stage 1 on the final WB-Pro15, we used "best practice" procedures (see Marsh, Ellis, Parada, Richards & Heubeck, 2005; Marsh, Martin & Jackson, 2010) to develop a brief instrument WB-Pro15 instrument, retaining only 3 or 4 items per factor that provide a well-defined, good-fitting factor structure, items that: best measured the intended construct as inferred on the basis of corrected item-total correlations (available in most reliability procedures) and the size of standardized factor loadings in CFA (these two criteria are combined as they provide essentially the same information); had minimal cross-loadings as evidenced by Mplus’s modification indexes based on CFA and cross-loadings based on ESEM, indicating the extent to which the fit would be improved if an item were allowed to load on a factor other than the one that it was intended to measure, and expected size of the cross-loading; had minimal correlated uniquenesses, particularly with other items in the same scale (if two items within the same scale had a substantial correlated uniqueness, only one item was retained); maintained the breadth of content of the original construct (based on subjective evaluations of the content of each item); and had a sufficient number of items to maintain a coefficient α estimate of reliability of at least .80 (and to retain more items for scales found to be less reliable). Based on these selection procedures and traditional criteria of a psychometrically sound instrument, we sought to construct the WB-Pro15 instrument such that it demonstrates:

• Good reliability: Median coefficient alpha ≥ .80 across the scales (Stages 1 & 2);

• Good test-retest stability over one year: median test-retest correlation ≥ .70 across the 15 scales (repeat sample from Stages 1 & 2);

• A well-defined, replicable factor structure as shown by structural equation modelling in relation to traditional indices of fit (Marsh, Hau & Wen, 2004; Stages 1 & 2);

• A factor structure that is invariant over gender, age, level of education, and time as shown by multiple-group structural equation models (Stages 1 & 2);

• Applicability for participants across the age range from late-adolescent/young adult, middle-age, and older adults (combined sample from stages 1 and 2);

• Convergent and discriminant validity as shown by multitrait-multimethod (MTMM) studies of WB-Pro15 responses in relation to time (test-retest stability) and to selected scales from other well-being instruments and indicators of well-being (Stage 2);

**Section 2: Wording of Selected Items and Constructs Considered in the Present Investigation**

Table S1

*Wording of Selected Items and Constructs Considered in the Present Investigation*

***Construct definitions of the original 10 constructs (Huppert & So, 2013).***

Competence: Feeling that one is a capable person (e.g. thinking clearly, concentrating, making decisions).

Emotional stability: Balanced emotional responses; feeling calm or relaxed; even-tempered.

Engagement: Being actively involved or taking an interest in most activities.

Meaning: The sense that one’s activities serve a wider purpose than self-interest.

Optimism: Having a positive attitude about the future; feeling hopeful.

Positive emotion: Tendency to experience positive feelings (e.g. happy, cheerful, contented).

Positive relationships: Experiencing good connections with people; having meaningful relationships.

Resilience: Ability to manage or recover from setbacks or from anxiety and worry.

Self-esteem: Positive evaluation of oneself as a person e.g. feelings of worth.

Vitality: Having sustained energy, particularly in relation to mental energy.

**15 Dimensions and 48 items for the WB-Pro**

|  |  |
| --- | --- |
| Autonomy | I feel free to do whatever I decide to do. |
| Autonomy | I feel free to make my own choices. (A) |
| Autonomy | I feel I can decide for myself how to live my life. |
| Clear Thinking | I am able to think clearly |
| Clear Thinking | I am able to stay focused when I need to. |
| Clear Thinking | I am easily able to concentrate when necessary. (A) |
| Competence | I am competent and capable in the activities that are important to me. |
| Competence | Most things I do, I do well. (A) |
| Competence | I am able to perform well and be successful in most things that I do |
| Emotional Stability | I do not get easily upset. (A) (B) |
| Emotional Stability | I usually maintain my composure. |
| Emotional Stability | I am emotionally balanced and even-tempered. |
| Empathy | My heart goes out to people who are unhappy. |
| Empathy | I feel others’ emotions. |
| Empathy | Other people’s misfortunes usually disturb me a great deal. |
| Empathy | I easily get caught up in other people’s feelings. (A) |
| Engagement | Most of the time I am really interested in what I am doing. (A) |
| Engagement | I am almost always engaged and interested in my daily activities. |
| Engagement | I feel excited by many of the things I do. |
| Meaning | I lead a purposeful and meaningful life. |
| Meaning | I feel I have a sense of direction in my life. |
| Meaning | My life has a clear sense of purpose. (A) |
| Optimism | I feel very optimistic about my future. (A) |
| Optimism | My future looks very bright to me. |
| Optimism | I am always optimistic about my future. (B) |
| Positive Emotions | I generally feel cheerful. |
| Positive Emotions | I am happy most of the time. |
| Positive Emotions | All things considered, I would describe myself as a happy person. (A) |
| Positive Relationships | There are people in my life who really care about me. (A) |
| Positive Relationships | I have close and secure relationships. |
| Positive Relationships | There are people with whom I can discuss intimate and personal matters. (B) |
| Positive Relationships | I receive help and support from others when I need it. |
| Prosocial Behavior | I frequently offer help to others. |
| Prosocial Behavior | I willingly give of my time to others in need. (A) |
| Prosocial Behavior | If a person needs help, I would do almost anything I could to assist. (B) |
| Resilience | I tend to bounce back quickly after hard times. |
| Resilience | It does not take me long to recover from a stressful event. |
| Resilience | I quickly get over and recover from significant life difficulties. (A) |
| Self-Acceptance | I am accepting of my own flaws and inadequacies. |
| Self-Acceptance | I can admit my shortcomings without shame or embarrassment. (A) |
| Self-Acceptance | I can see my own problems and shortcomings without getting distressed by them. |
| Self-Acceptance | I am accepting of who I am. |
| Self-Esteem | I feel that I’m a person of worth. (A) |
| Self-Esteem | A lot of things about me are good. |
| Self-Esteem | I feel that I have a number of good qualities. (B) |
| Vitality | I feel full of energy most of the time. |
| Vitality | I generally have a lot of energy. (A) |
| Vitality | I generally feel active and vigorous. |
| **14 WEMWBS Items** |
| WMWB1 | I've been feeling optimistic about the future. |
| WMWB2 | I've been feeling useful. |
| WMWB3 | I've been feeling relaxed. |
| WMWB4 | I've been feeling interested in other people. |
| WMWB5 | I've had energy to spare. |
| WMWB6 | I've been dealing with problems well. |
| WMWB7 | I've been thinking clearly. |
| WMWB8 | I've been feeling good about myself. |
| WMWB9 | I've been feeling close to other people. |
| WMWB10 | I've been feeling confident. |
| WMWB11 | I've been able to make up my own mind about things. |
| WMWB12 | I've been feeling loved. |
| WMWB13 | I've been interested in new things. |
| WMWB14 | I've been feeling cheerful. |
| **8 Flourishing Items** |
| FLOURISHING1  | I lead a purposeful and meaningful life. |
| FLOURISHING2  | My social relationships are supportive and rewarding. |
| FLOURISHING3  | I am engaged and interested in my daily activities. |
| FLOURISHING4  | I actively contribute to the happiness and well-being of others. |
| FLOURISHING5  | I am competent and capable in the activities that are important to me. |
| FLOURISHING6  | I am a good person and live a good life. |
| FLOURISHING7  | I am optimistic about my future. |
| FLOURISHING8  | People respect me. |

*Note*. A = Item included in 15 item WB-Pro scale. B = Item included in 5 item WB-Pro scale.

**Section 3: Application and Results of Exploratory and Confirmatory Structural Equation Modeling**

Full- and Set-Exploratory Structural Equation Modeling (ESEM) parameters can be identified with the maximum likelihood (ML), weighted least square, or with robust alternatives. Within a given model, is possible to posit a combination of Confirmatory Factor Analysis **(**CFA), Full-ESEM and Set-ESEM factors within the same model. If the model contains only a single factor, then CFA, Set-ESEM and Full-ESEM are equivalent.

In ESEM models when there is more than one factor (m > 1) with cross-loadings, model identification requires additional constraints (see Asparouhov & Muthén 2009; Marsh et al., 2009; Marsh, Martin & Martin, 2010; Sass & Schmitt, 2010). The initial (unrotated) unconstrained factor structure requires a total of m2 constraints to achieve identification. This initial, unrotated solution is then rotated using any one of a wide set of orthogonal and oblique rotations (Asparouhov & Muthén, 2009, Sass & Schmitt, 2010). Because the fit of the ESEM model does not depend on the particular rotation, goodness-of-fit does not provide a basis for choosing a particular rotation (Sass & Schmitt, 2010; also see Marsh, Morin, Parker & Kaur, 2014; Marsh, Guo et a., in press). However, comparison of fit with alternative model is facilitated by the fact that the traditional CFA model is nested under the Set-ESEM model which is nested under the Full-ESEM model. Geomin ration was used in early applications of ESEM (Marsh et al., 2009, 2010). However, more recently target rotation has been used to provide a compromise between the mechanical approach to EFA rotation and the a priori CFA model, based on partial knowledge of the factor structure. This is consistent with the emphasis of ESEM as a confirmatory tool rather than an exploratory tool.

Full- and Set-ESEM are highly flexible but, as initially operationalized, many CFA analyses could not be done with ESEM. Marsh, Lüdtke, Nagengast, Morin & Von Davier (2013; Morin, Marsh, & Nagengast, 2013) proposed ESEM within CFA (EwC) to resolve most of these limitations of ESEM. Identification of the ESEM requires m2 constraints where M = number of factors. Marsh and colleagues (2013) proposed that this could be accomplished that by retaining parameters estimates in the final ESEM solution, and fixing m2 factor loadings in initial solution. Thus, for example, fixing the all the factor loadings for the item with the highest factor loading for each factor for all the factors results in m2 constraints (i.e., there are m constraints associated with each of the m factors). The EwC solution is equivalent to the ESEM solution in terms of *df*, goodness of fit, and parameter estimates. However, the EwC is actually a CFA model based on the ESEM solution, thereby facilitating further models that are possible with CFA. Although previously applied in relation to Full-ESEM the some rationale can be applied to each set of ESEM factors within a Set-ESEM analysis (Marsh, Guo et a., in press), as illustrated in in the present investigation.

***Results of Factor Analyses in the Present Investigation***

Two sets of factor analyses—CFA and ESEM—were conducted on the entire set of 2,559 responses from participants at T1 and T2. Critical features of these analyses were the goodness-of-fit indices (see Models 1A & 1B in Table S2, below) and parameter estimates for both ESEM and CFA models (shown in Table S3A & S3B, below).

For the ESEM solution, all items load more highly on the factor that it was designed to measure (target loadings) than on other factors (non-target loadings; target loading are shown in Table S3A, and the full set of target and non-target loadings is presented in Section 6, below). The target loadings are all substantial, varying from .520 to .909 (median = .710). Nevertheless, some of the factor correlations are substantial, varying from .011 to .815 (Mean *r* = .476), with 8 of the 105 correlations greater than .700. Thus, the ESEM solution is well-defined.

For the CFA solution (see Table S3B, below), all the factor loadings are substantial, varying from .691 to .910 (Mean = .831; non-target loadings are all constrained to be zero in the CFA). However, the factor correlations are very high, varying from .284 to .918 (Mean *r* = .692), with 66 of 105 being greater than .700. Hence, although CFA structure is well-defined and well-fitting, the large factor correlations detract from the potential usefulness of the factors.

Both the ESEM and CFA solutions are well-defined in terms of goodness-of-fit and well-defined factors. Although the CFA solution is preferable in terms of parsimony, the ESEM solution is better fitting and resulted in more distinct factors. However, both CFA and ESEM solutions provide support for the a priori factor structure relating the 48 items to the WB-Pro factors.

Table S2

*Goodness of Fit for Models in the Present Investigation*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | N Parms | CHI  | df  | RMSEA | CFI  | TLI  | Description |  |
| 1 Total (stacked) Group Analysis |  |
| 1A | 711 | 1207 | 513 | .023 | .994 | .986 | ESEM-Total Group  |  |
| 1B | 249 | 4397 | 975 | .037 | .968 | .963 | CFA-Total Group |  |
| 1C | 30 | 10128 | .90 | .236 | .613 | .548 | HO Factor Analysis\* |  |
| 2 Multiple Group Invariance over Four Stacked Groups |  |
| 2A | 2844 | 3498 | 2052 | .035 | .976 | .946 | Configural-4 groups |  |
| 2B | 1359 | 4531 | 3537 | .021 | .985 | .981 | Metric-4 groups |  |
| 2C | 1260 | 4744 | 3636 | .022 | .984 | .980 | Scalar -4 groups |  |
| 3 Multiple Group Invariance over Three Educational Groups |  |
| 3A | 2133 | 2543 | 1539 | .028 | .984 | .965 | Configural-3 Educ Groups |  |
| 3B | 1143 | 3264 | 2529 | .018 | .988 | .984 | Metric-3 Educ Groups |  |
| 3C | 1077 | 3358 | 2595 | .019 | .988 | .984 | Scalar -3 Educ Groups |  |
| 4 Multiple Group Invariance over Four Age Groups |  |
| 4A | 2844 | 3358 | 2052 | .032 | .981 | .958 | Configural-4 Age Groups |  |
| 4B | 1359 | 4588 | 3537 | .022 | .985 | .980 | Metric-4 Age Groups |  |
| 4C | 1260 | 4747 | 3636 | .022 | .984 | .980 | Scalar -4 Age Groups |  |
| 5 Multiple Group Invariance over Two Gender Groups |  |
| 5A | 1422 | 1599 | 1026 | .021 | .98 | .979 | Configural-2 Gender Groups |  |
| 5B | 927 | 1988 | 1521 | .016 | .992 | .988 | Metric-2 Gender Groups |  |
| 5C | 894 | 2042 | 1554 | .016 | .992 | .988 | Scalar -2 Gender Groups |  |
| 6 Longitudinal Invariance & Multitrait-Multimethod Analyses |  |
| 6A | 1695 | 5522 | 3057 | .02 | .978 | .967 | Configural-2 Waves  |  |
| 6B | 1200 | 6335 | 3552 | .019 | .975 | .968 | Metric-2 Waves  |  |
| 6C | 1152 | 6686 | 3600 | .02 | .973 | .965 | Scalar -2 Waves  |  |
| 7 Total (stacked) Group Analysis Relating Demographic Variables to WB-Pro 15 Factors |  |
| 7 | 926 | 1186 | 843 | .015 | .995 | .99 | Demographic Variables |  |
| 8 Tests of Unidimesionality of WEMWBS & Flourishing Instruments |  |
| 8A | 24 | 190 | 20 | .075 | .955 | .937 | Deiner (D) 8-item (1 Factor) |  |
| 8B | 42 | 641 | 77 | .069 | .934 | .921 | Warwick (W) 14-Item (1 Factor) |  |
| 8C | 67 | 1589 | 208 | .066 | .906 | .891 | W+D 22 items (2 factors) |  |
| 9 WB-Pro 15 + Unidimentional WEMWBS & Flourishing Instruments |  |
| 9A | 750 | 2891 | 902 | .038 | .955 | .923 | D+WB- Pro 15 (1+15 Factors) |  |
| 9B | 768 | 3911 | 1247 | .037 | .947 | .920 | W+WB- Pro 15 (2+15 Factors) |  |
| 9C | 807 | 6396 | 1748 | .042 | .921 | .891 | W+D+WB- Pro 15 (2+15 Factors) |
| 10 WB-Pro 15 Absorbing WEMWBS & Flourishing Items |  |
| 10A | 847 | 1491 | 805 | .024 | .984 | .970 | D+WB-Pro 15 (15 Factors) |  |
| 10B | 949 | 1723 | 1066 | .020 | .987 | .977 | W+WB- Pro 15 (15 Factors) |  |
| 10C | 1085 | 2554 | 1470 | .022 | .982 | .970 | W+D+WB- Pro 15 (15 Factors) |  |

*Note*. Summary of Goodness-of-fit statistics for the different factor analyses considered in the present investigation. ESEM = exploratory factor analysis; CFA = confirmatory factor analysis; Parms = number of freely estimated parameters; *Chi* = chi-square; df = degrees of freedom ratio; CFI = Comparative fit index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation. Model. Models 1-6 were based on stacked (long format) data, using robust maximum likelihood estimator and type = complex to account for fact that some students had two sets of responses.

Table S3A

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Competence | Clear Thinking | EmotStablity | Engagement | Meaning | Optimism | Pos Emot | Pos Relat | Resilience | Self-Esteem | Vitality | Self-Accep | Autonomy\* | Empathy  | Pro-Social |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  CO  |  CT  |  ES  |  EN  |  ME  |  OP  |  PE  |  PR  |  RE  |  SE  |  VI  |  AC  |  AU  |  EM  |  PS  |
| Target Factor Loadings |
| Item 1 |  | .520 | .534 | .803 | .678 | .557 | .766 | .656 | .807 | .732 | .581 | .819 | .855 | .755 | .564 | .775 |
| Item 2 |  | .687 | .809 | .666 | .656 | .57 | .661 | .668 | .755 | .744 | .58 | .909 | .923 | .909 | .788 | .821 |
| Item 3 |  | .607 | .902 | .723 | .476 | .66 | .598 | .720 | .784 | .848 | .596 | .665 | .546 | .681 | .78 | .733 |
| Item 4 |  |  |  |  |  |  |  |  | .791 |  |  |  | .544 |  | .872 |  |
| Factor Correlations |
|  CO  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  CT  |  | .536 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  ES  |  | .259 | .685 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
|  EN  |  | .075 | .518 | .627 | 1 |  |  |  |  |  |  |  |  |  |  |  |
|  ME  |  | .724 | .448 | .284 | .013 | 1 |  |  |  |  |  |  |  |  |  |  |
|  OP  |  | .032 | .441 | .612 | .799 | .137 | 1 |  |  |  |  |  |  |  |  |  |
|  PE  |  | .689 | .533 | .446 | .114 | .815 | .244 | 1 |  |  |  |  |  |  |  |  |
|  PR  |  | .436 | .677 | .601 | .514 | .523 | .555 | .600 | 1 |  |  |  |  |  |  |  |
|  RE  |  | .372 | .638 | .751 | .515 | .441 | .545 | .555 | .584 | 1 |  |  |  |  |  |  |
|  SE  |  | .086 | .547 | .619 | .760 | .011 | .707 | .169 | .584 | .444 | 1 |  |  |  |  |  |
|  VI  |  | .365 | .558 | .579 | .505 | .494 | .529 | .583 | .518 | .644 | .318 | 1 |  |  |  |  |
|  AC  |  | .632 | .722 | .669 | .383 | .611 | .381 | .659 | .690 | .685 | .460 | .559 | 1 |  |  |  |
|  AU  |  | .487 | .695 | .607 | .528 | .464 | .522 | .529 | .696 | .598 | .540 | .522 | .713 | 1 |  |  |
|  EM  |  | .345 | .381 | .349 | .279 | .323 | .217 | .339 | .542 | .289 | .268 | .301 | .490 | .405 | 1 |  |
|  PS  |  | .324 | .47 | .415 | .378 | .263 | .318 | .295 | .535 | .389 | .402 | .313 | .508 | .431 | .731 |  1 |
| Higher-Order Factor Loadings and Residual Variances |
| Loading |  | .563 | .829 | .793 | .615 | .580 | .617 | .680 | .825 | .787 | .621 | .695 | .856 | .812 | .520 | .571 |
| Residual |  | .683 | .313 | .371 | .622 | .664 | .620 | .538 | .320 | .381 | .614 | .517 | .268 | .341 | .729 | .674 |

*WB-Pro15 Factor Structure: Exploratory Structural Equation Model (ESEM)*

*Note*. Presented are target loadings relating each of the 48 items to the factor that it was designed to measure. Items 1 to 3 (or 4) refer to the three or four items designed to measure each factor. Cross-loadings are not shown here but are available in Supplemental Materials, section 6. The higher-order factor analysis was based on fitting a single factor to the latent correlation matrix of correlations among the 15 first-order factors shown here. Whereas all 15 factors loaded substantially on the higher-order factor (loadings .520 to .856), much of the variance in each of the factors could not be explained by the higher-order factor (residual variance components = .268 to .729). We also note that the fit of the higher-order factor model was extremely poor (RMSEA = 236; CFI = .613; TLI = .548)

Table S3B

*Summary of Confirmatory Factor Analysis (CFA) Model*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Competence |  | Clear Thinking | EmotStablity | Engagement | Meaning | Optimism | Pos Emot | Pos Relat | Resilience | Self-Esteem | Vitality | Self-Accep  | Autonomy  | Empathy  | Pro-social |
|  |  |  CO  |  |  CT  |  ES  |  EN  |  ME  |  OP  |  PE  |  PR  |  RE  |  SE  |  VI  |  AC  |  AU  |  EM  |  PS  |
|  |  | Factor Loadings |
| item 1 |  | .855 |  | .837 | .788 | .816 | .888 | .91 | .91 | .766 | .879 | .853 | .927 | .77 | .825 | .724 | .837 |
| Item 2 |  | .798 |  | .832 | .865 | .846 | .879 | .901 | .901 | .831 | .859 | .827 | .918 | .706 | .871 | .784 | .857 |
| item 3 |  | .848 |  | .809 | .742 | .796 | .894 | .891 | .891 | .74 | .887 | .843 | .882 | .853 | .815 | .664 | .815 |
| Item 4 |  |  |  |  |  | .852 |  |  |  | .744 |  |  |  |  |  | .691 |  |
|  |  | Factor Correlations |
| CO |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CT |  | .861 |  | 1 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| ES |  | .733 |  | .775 | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| EN |  | .86 |  | .798 | .771 | 1 |  |  |  |  |  |  |  |  |  |  |  |
| ME |  | .806 |  | .739 | .748 | .918 | 1 |  |  |  |  |  |  |  |  |  |  |
| OP |  | .78 |  | .698 | .732 | .878 | .916 | 1 |  |  |  |  |  |  |  |  |  |
| PE |  | .782 |  | .748 | .827 | .889 | .88 | .889 | 1 |  |  |  |  |  |  |  |  |
| PR |  | .727 |  | .711 | .675 | .786 | .797 | .758 | .785 | 1 |  |  |  |  |  |  |  |
| RE |  | .751 |  | .721 | .786 | .792 | .771 | .762 | .799 | .65 | 1 |  |  |  |  |  |  |
| SE |  | .889 |  | .819 | .766 | .84 | .833 | .794 | .831 | .798 | .732 | 1 |  |  |  |  |  |
| VI |  | .667 |  | .655 | .685 | .825 | .754 | .778 | .777 | .59 | .726 | .632 | 1 |  |  |  |  |
| AC |  | .836 |  | .799 | .787 | .808 | .792 | .748 | .782 | .739 | .752 | .882 | .641 | 1 |  |  |  |
| AU |  | .792 |  | .755 | .686 | .797 | .761 | .736 | .737 | .717 | .687 | .766 | .616 | .786 | 1 |  |  |
| EM |  | .405 |  | .361 | .379 | .432 | .394 | .342 | .359 | .504 | .282 | .433 | .284 | .424 | .375 | 1 |  |
| PS |  | .587 |  | .528 | .501 | .582 | .555 | .496 | .504 | .59 | .478 | .583 | .429 | .565 | .496 | .756 | 1 |

**Section 4: Convergent and Discriminant Validity**

***Multitrait-Multimethod Approach: A Supplemental Rationale***

The multitrait-multimethod (see Campbell & Fiske, 1959) design is used widely to assess convergent and discriminant validity, and also is a standard criterion for evaluating psychological instruments. Although Campbell and Fiske’s original guidelines are still widely used to evaluate MTMM data, important problems with their guidelines are well known (see reviews by Marsh, 1988, 1993; Marsh & Grayson, 1995). Ironically, even in highly sophisticated CFA approaches to MTMM data, a single scale score—often an average of multiple items—is typically used to represent each trait–method combination. Marsh (1993; Marsh et al., 2005; Marsh & Hocevar, 1988), however, argued that it is stronger to incorporate the multiple indicators explicitly into the MTMM design. When multiple indicators are used to represent each scale, CFAs and ESEMs at the item level results in a MTMM matrix of latent correlations, thereby eliminating many of the objections to the Campbell–Fiske guidelines. We argue that because our analysis starts with a latent correlation matrix in which factors are represented by multiple items, our approach overcomes most of the limitations widely attributed to the original Campbell & Fiske (1959) guidelines. For this reason, the actual summary of the MTMM results based on the latent MTMM correlation matrix better represents the logic and intuitive appeal of the original Campbell-Fiske guidelines than do most current approaches to MTMM data.

***Multitrait-Multimethod Approach: Supplemental Discussion of Results***

The 30x30 correlation matrix based on this factor analysis (see Table 3 in the main manuscript) represents a MTMM matrix with 15 traits (the WB-Pro factors) and two methods (T1 and T2). The 15 test-retest correlations (.73 to .85; Mn = .80; the main diagonal in Table 3) represent convergent validities. These results provide good support for convergent validity in relation to time. The remaining correlations between T1 and T2 responses (.02 to .56; Mean *r* = .29; off-diagonal correlations in Table 3) represent heterotrait-heteromethod correlations in Campbell-Fiske terminology. Correlations among T1 factors (Mean *r* = .34) and among T2 factors (Mean *r* = .35) represent heterotrait-monomethod correlations (not shown to conserve space, but see Table 2, above). Because the convergent validities are substantially higher than the either heterotrait-heteromethod or heterotrait-monomethod correlations, there is good support for divergent validity.

Because the correlations among different factors at each wave (Mean *r*s = .34 & .35) are slightly higher than correlations among different factors for different waves (Mean *r* = .29), there is some evidence for a small method-halo effect associated with each wave considered separately.

***Relations with Other Constructs***

 Here, we discuss results (presented in Table 2 of the manuscript) of our tests of convergent and divergent validity of the 15 WB-Pro dimensions with other relevant scales.

**PERMA.** Four of the five PERMA factors (engagement, meaning, positive emotions and positive relations—all but accomplishment) directly parallel four of the WB-Pro factors. In support of the convergent validity of these four factors, correlations among each pair of PERMA and WB-Pro factors (.834 to .899) are extremely high. Correlations between these four PERMA factors and other WB-Pro factors are substantial, but systematically lower. The fifth PERMA factor, accomplishment, is highly correlated with WB-Pro factors to which it is most logically related (competence, engagement, meaning, optimism, and positive emotions—correlations of .721 to .808). Although correlations between PERMA and WB-Pro factors support the validity of the factors, we note that correlations among the five PERMA factors are very high (.768 to .937), meaning they are not ideally suited to testing discriminant validity in relation to other measures, or differentiating between the five PERMA factors.

**Basic Psychological Needs.** This instrument measures need satisfaction and need frustration in relation to three basic psychological needs—a total of 6 (3 needs x 2 directions). Each of the three psychological needs (autonomy, relatedness, and competence) matches a corresponding WB-Pro (autonomy, positive relations, and competence). Logically, the positively oriented WB-Pro factors should be most strongly (positively) related to the corresponding need satisfaction factors, and less strongly (negatively) related to the corresponding need frustration factors. Consistent with a priori predictions, the correlations between matching need satisfaction and WB-Pro factors are substantial (.700, .812, .786), whereas the corresponding correlations for need frustration are smaller in size and negative in direction (-.500, -.585, -.582). In each case, the WB-Pro factor is more positively related with the matching need satisfaction factor than to any other psychological need factor, and more negatively correlated with the matching need frustration factor than to any other psychological need factor. These results provide strong support for the convergent and discriminant validity of responses to both instruments.

**Big-Five Personality.** As noted earlier, there is not such a clear a priori matching of Big-Five personality and WB-Pro factors. Highlighted in Table S6 are the WB-Pro factors that are logically most related and highly correlated with each Big-Five personality factor. Thus, openness is most strongly related to engagement and prosocial behavior; conscientiousness is most highly correlated with competence and clear thinking; extraversion is most highly correlated with engagement and positive emotions; agreeableness is most highly correlated with empathy and prosocial behavior; and neuroticism is most highly correlated (negatively) with particularly emotional stability, but also with positive emotions, resilience, and self-acceptance. Particularly the correlations of agreeableness with prosocial behavior and empathy are larger than the correlations of between these WB-Pro factors and any of the PERMA or Psychological Needs factors (or any of the additional single-scale measures that were considered). This is not surprising as these well-being factors are not represented in the other measures, but the correlations between Big-Five and WB-Pro factors provide support for the convergent as well as discriminant validity of particularly these two WB-Pro factors. In summary, although not strictly a priori, this logical pattern of relations between Big-Five personality factors and WB-Pro factors provides support for the convergent and discriminant validity of the responses to the WB-Pro.

**Single-Scale Measures.** Next we evaluate convergent and discriminant validity in relation to selected single-scale measures (but see analyses of WEMWBS and flourishing, described below). Two multi-item single-factor instruments (CES-D and stress) reflect widely used measures of ill-being. Hence, it is logical that these measures are negatively correlated with most of the WB-Pro measures of well-being. Interestingly, the exception is the empathy scale that is nearly uncorrelated with these measures of ill-being. Logically and empirically, these two measures of ill-being are most negatively correlated with emotional stability (particularly stress) and positive emotions (particularly depression).

Life satisfaction and happiness are sometimes used as single-item constructs (or single construct if based on multiple items). Not surprisingly, both these measures are positively related with all WB-Pro factors. Although we did not postulate a priori predictions about the pattern of correlations, correlations greater than .700 are highlighted in Table S7. Life satisfaction tends to be more correlated with WB-Pro factors, with seven correlations greater than .700 (the highest being optimism, .812; and positive emotions, .799). In contrast, happiness is only correlated greater than .700 with positive emotions. Nevertheless, the pattern of correlations relating these two measures to WB-Pro is very similar (the profile similarity index, the correlation between the 15 correlations with happiness and the corresponding 15 correlations with life satisfaction, is .970).

Although sleep problems, general health, and exercise are not highly correlated with any of the WB-Pro factors, each of these three items are most highly correlated with the WB-Pro factor of vitality-- particularly general health (.559) and exercise (.394).

**Section 5: Goodness-of-fit, Golden Rules, and Interpretation of Parameter Estimates**

In applied CFA/SEM studies, applied researchers have sought universal “golden rules” as to what constitutes an acceptable goodness of fit (Marsh, Balla & McDonald, 1988; Marsh, Hau, & Wen, 2004). Generally, given the known sensitivity of the chi-square test to sample size, to minor deviations from multivariate normality, and to minor misspecifications, applied SEM research focuses on indices that are relatively sample-size independent (Hu & Bentler, 1999; Marsh, Hau, & Wen, 2004; Marsh, Hau, & Grayson 2005), such as the Root Mean Square Error of Approximation (RMSEA), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI). Population values of TLI and CFI vary along a 0-to-1 continuum, in which values greater than .90 and .95 typically reflect acceptable and excellent fits to the data, respectively. Values smaller than .08 and .06 for the RMSEA support acceptable and good model fits respectively.

The chi-square difference test can be used to compare two nested models, but this approach suffers from even more problems than does the chi-square test for single models—problems that led to the development of other fit indices (see Marsh, Hau et al., 2005). Cheung and Rensvold (2002) and Chen (2007) suggested that if the decrease in fit for the more parsimonious model is less than .01 for incremental fit indices such as the CFI, there is reasonable support for the more parsimonious model. For indices that incorporate a penalty for lack of parsimony, such as the RMSEA and the TLI, it is also possible for a more restrictive model to result in a better fit than would a less restrictive model. However, it is emphasized that these cut-off values constitute rough guidelines only, rather than “golden rules” (Marsh et al., 2004). Indeed, this emphasis of treating these cut-off values as rough guideline rather than golden rules applies even more strongly to Full- and Set-ESEM where there has not been a sufficient history of application to fully support the usefulness of cut-offs based on CFA models.

 The basic CFA model is nested under the corresponding Set-ESEM, and the Set-ESEM is nested under the Full-ESEM. This nested structure facilitated conventional model comparisons which can be used to compare the fit of three models– along with a detailed evaluation of parameter estimates based on the three approaches. The Set- and Full-ESEMs are most appropriate when they fit the data better than the corresponding CFA model, the multiple ESEM factors are well-defined in the measurement model, and there are substantively important differences in parameter estimates based on the CFA and the ESEM models. Starting with the initial ESEM publications (Asparouhov & Muthén, 2009; Marsh et al., 2009), Marsh et al. (2014) argued that factor correlations were typically positively biased unless the CFA assumption is met (all cross-loadings are exactly equal to zero in the population). Indeed, even when the ICM-CFA model apparently fits well, CFA factor correlations tend to be larger than ESEM factor correlations. Importantly, simulation studies show that ESEM is typically better at recovering known factor correlations and that even small cross-loadings can result in biased estimates of factor correlations when based on CFAs (Marsh et al., 2014). If ESEMs are sufficiently similar to CFA results, then there is robust support for the factor structure based on the CFA solution. Thus, it is always appropriate to test ESEMs even when CFA models are retained.

Marsh et al. (2014) also acknowledged that ESEM might lack parsimony (particularly in large, complex models based on moderate sample sizes). Set-ESEM was developed in part to achieve a better balance between the goodness-of-fit for the Full-ESEM and the parsimony of the CFA. However, because of the nesting relationship between the three models, parsimony based on the number of freely estimated parameters will always be best for CFA, followed by Set-ESEM, and then Full-ESEM, whereas the goodness of fit for indices that do not control for parsimony (e.g., the chi-square statistics and indices like the CFI that are monotonic with it) will always be better for ESEM, followed by Set-ESEM, and then CFA. However, for indices that control for parsimony (e.g., TLI and RMSEA), it is possible for the CFA model to fit better than the ESEM models, or for Set-ESEM to fit better than the Full-ESEM. Nevertheless, when these three models vary substantially in relation to parsimony, model evaluation should not rely solely—or even primarily—on the basis of goodness of fit.

**Section 6: Relations of the WB-Pro Dimensions with 10 Demographic Variables**

In support for our multidimensional perspective (but also substantively relevant), we found distinct patterns of relations between the 15 WB-Pro factors and 10 demographic variables. These patterns of relations appear in Table 4, below, and demonstrate a complex pattern of associations between the 15 WB-Pro dimensions and various demographic factors. For example, males reported more vitality, resilience and emotional stability than females, whereas females reported greater empathy than males. Similarly, there were positive correlations with age for self-acceptance, positive emotions, clear thinking and autonomy, while other WB-Pro factors (e.g., optimism) showed weaker or even negative relations with age. Further, there were also some quadratic effects associated with age. For example, competence initially increased, levelled out and then declined in older age (i.e. an inverted ‘U-shape’), whereas optimism, engagement, positive relations, vitality and resilience initially declined, levelled out and then increased in older age (i.e., a ‘U-shape’). Although most WB-Pro factors were positively related to education (the strongest were emotional stability, vitality, clear thinking, optimism, positive relations, self-esteem and engagement), others had little or no association. Lastly, being married was positively related to many WB-Pro factors (the largest associations were optimism, engagement and self-esteem) but were uncorrelated with other factors. Although these complex patterns of relations are substantively important in their own right, the overarching issue for present purposes is that these patterns of relations support our multidimensional approach to well-being. In particular, the complex multidimensional pattern of relations could not be represented with a single global measure of well-being.

Table S4

*Association between 15 WB factors and Background/Demographic Variables*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor Variables | Competence | clear thinking | EmotStablity | Engagement | Meaning | Optimism | Pos Emot | Pos Relat | Resilience | Self-Esteem | Vitality | Self- Accept | Autonomy\* | Empathy  | Pro-social |
|  CO  |  CT  |  ES  |  EN  |  ME  |  OP  |  PE  |  PR  |  RE  |  SE  |  VI  |  AC  |  AU  |  EM  |  PS  |
| Demographic |
| Married  | -.106 | .088 | .***131*** | .***247*** | -.048 | ***.287*** | -.031 | .***157*** | .***136*** | .***204*** | .***100*** | .035 | .041 | .038 | .042 |
| Male | .***088*** | .057 | .***115*** | -.018 | .066 | -.003 | .052 | -.033 | .***140*** | -.***056*** | .***156*** | .***120*** | .045 | -.***140*** | -.***095*** |
| Education | .054 | .***143*** | ***.161*** | .***123*** | .081 | .***136*** | .044 | .***125*** | .***082*** | .***130*** | .***148*** | .***058*** | .052 | .***066*** | .023 |
| English Fluency | -.***104*** | -.***119*** | -.054 | -.020 | -.022 | -.029 | -.055 | -.079 | -.***052*** | -.***081*** | -.028 | -.***082*** | -.***093*** | -.***048*** | -.***096*** |
| AGE-linear | ***.097*** | .***143*** | .***083*** | -.033 | .***091*** | -.***135*** | .***131*** | .042 | .046 | .***08***9 | ***-.058*** | .***143*** | .***101*** | -.018 | .020 |
| AGE-quad | -.***082*** | .011 | .058 | .***091*** | -.021 | .**115** | -.001 | .***066*** | .***059*** | .011 | .***065*** | -.031 | .034 | .038 | .005 |
| Married x AGE | -.049 | -.029 | -.022 | -.035 | -.005 | .003 | -.025 | -.011 | -.029 | -.053 | -.004 | -.039 | -.048 | -.042 | -.037 |
| Education x AGEMale x Age | .039-.026 | -.019-.028 | -.***057***-.***071*** | -.009-.065 | .015-.042 | -.047-.004 | .010-.058 | -.034-.051 | -.032-.***066*** | -.***062***-.012 | .019-.***087*** | -.001-.***096*** | -.004-.045 | -.011-.***1***01 | .011-.***056*** |
| Married x Male | -.013 | .016 | .024 | .***080*** | -.013 | .053 | -.026 | .***059*** | .028 | .060 | .021 | -.003 | .033 | .041 | .***077*** |
| Life Event Changes |
|  Negative | 0.07 | ***-0.42*** | ***-0.52*** | ***-0.38*** | ***-0.23*** | ***-0.56*** | ***-0.36*** | ***-0.34*** | ***-0.56*** | ***-0.28*** | ***-0.4*** | ***-0.32*** | ***-0.24*** | ***0.26*** | 0.2 |
|  Neutral | 0.08 | -0.04 | -0.36 | 0.05 | -0.09 | 0.15 | -0.17 | 0.04 | -0.2 | 0.01 | -0.08 | -0.11 | 0.02 | ***0.26*** | 0.12 |
|  Positive | 0.17 | 0.09 | -0.05 | 0.21 | 0.19 | ***0.33*** | 0.24 | ***0.28*** | 0.15 | 0.1 | ***0.28*** | 0.16 | 0.17 | 0.35 | ***0.37*** |

*Note*. In the structural equation model, each of the WB-Pro15 scales was represented by a latent factor and regressed on the eight predictor variables. To facilitate interpretation all first-order predictor variables were standardized and all interaction terms were the product of standardized predictor variables (but not restandardized). A separate analysis was done predicting each WB-Pro 15 factor from the set of three life event change scores. Statistically significant (p < .05) coefficients are presented in bold and underlined.

**Section 7: A Profile Approach to the Relation Between WB-Pro15 Factors and Selected Demographic Variables**

In this section (see Table 6) we evaluate a multidimensional profile approach to the representation of the WB-Pro15 scales in relation to three demographic variables (Married, Male, and Age) and compare it to a unidimensional approach.

The effect of being married was positive for life satisfaction (.228); however, it was even more positive for optimism, but less positive for all the other WB-Pro factors (significantly so for 11 factors). This differentiated profile of effects of being married on WB-Pro factors cannot be explained in terms of global Life Satisfaction.

Gender differences (male) were weakly positive for life satisfaction (.063); however, they were significantly more positive for vitality, emotional stability, and acceptance, but significantly negative for self-esteem, positive relations, optimism, engagement, and particularly empathy, pro-social behaviour. This differentiated profile of gender differences on WB-Pro factors cannot be explained in terms of global Life Satisfaction.

Age was not significantly related to life satisfaction (.016); however, age effects were significantly more positively for clear thinking, emotional stability, positive relations, positive emotions, reliance, acceptance and autonomy, but more negative for optimism and vitality. This differentiated profile of age effects on WB-Pro factors cannot be explained in terms of global Life Satisfaction.

In summary, this profile approach to the relation between the WB-Pro15 factors and selected demographic variables provides strong support for the multidimensional perspective underpinning the WB-Pro15 instrument. The differentiated effects of these demographic variables could not be explained in terms of a unidimensional perspective of well-being.

**Section 8: WB-Pro Short Forms: Machine Learning Using Genetic Algorithms**

To create a short-form of the WB-Pro, we utilized the latest advances in machine-learning methods in psychometrics employing genetic algorithms (GA). First introduced by Holland (1975) as optimization tools for game theory and pattern recognition problems, the GA have recently gained popularity in psychometrics for being highly convenient optimization tools for efficiently finding a short form of a long form (Sahdra, Ciarrochi, Parker & Scrucca, 2016; Schroeders, Wilhelm, & Olaru, 2016; Yarkoni, 2010). The GA implement the principles of biological evolution (e.g., mutation, crossover, and selection based on fitness) in a computational framework to find a suitable short form of the long form that is reliable, valid, and preserves most of the variance in the data of the original questionnaire (Sahdra et al., 2016; Yarkoni, 2010). The GA have been employed to abbreviate long forms of several psychological constructs, including personality traits (Yarkoni, 2010), psychopathy (Eisenbarth, Lilienfeld & Yarkoni, 2015), experiential avoidance (Sahdra et al., 2016) and body image (Basarkod, Sahdra & Ciarrochi, 2018).

We implemented the GA method in R, an open source statistical computing environment (R Core Team, 2018), using the GAabbreviate package (Scrurra & Sahdra, 2015). The details of the genetic algorithms procedure for questionnaire abbreviation are described in Yarkoni (2010), and the details of the GAabbreviate package can be found in Sahdra et al. (2016). Briefly, the GAabbreviate aims to minimise the ‘cost’ of an item in the abbreviated scale based on the ‘fitness function’ below, as described by Sahdra et al. (2016):

$$ Cost=Ik+ \sum\_{i=1}^{s}w\_{i}\left(1- R\_{i}^{2}\right)$$

Here, *I* is the item cost, *k* is the number of items to be retained, *s* is the number of subscales in the measure (if applicable), *wi* are the weights associated with the each subscale (if applicable), and *R2* is the variance that a linear combination of individual item scores can explain in the *i*th subscale or the original full scale if there are no subscales or the multidimensional structure is ignored. Consistent with the cross-validation recommendations for machine learning applications to minimize over-fitting (James, Witten, & Hastie, 2014), the GAabbreviate implements cross-validation by default by training the GA on 50% of the sample and testing the variance-explained criterion on the remaining 50%.

In our case, the GA procedure of finding a 15-item measure from the pool of 48 items of WB-Pro began with a random selection of several sets consisting of 15 items. Borrowing the terminology from genetics, the items of the original full scale represent the genes and the item sets of randomly selected short forms represent chromosomes. Two of the selected item sets represent two parents of an offspring, a short form that is a product of several computational procedures analogous to natural selection in biological evolution. Subsetting and recombining item sets is analogous to two chromosomes exchanging one or more of their genetic sequences. As in biological evolution, in which spontaneous changes in the genes alter the gene sequence, in the GA method, the mutated items are replaced with items of the initial item pool to alter the short forms. After such manipulations, the next generation of the short versions were evaluated using a fitness function (as described above). The best performing offspring was selected, representing ‘survival of the fittest’ in evolutionary terms. We following the same procedure for generating the 5-item measure, expect no constraint was set for item selection within subscales. The correlation of the 15-item short form with the long form (in the validation subset) was .90, and that of the 5-item version with the full form was .96.

**Section 9: Formative vs. Reflective Measures**

A starting point of the present investigation is that understanding the causes of well-being and how to enhance it requires clear conceptual framework and definitions for the multiple well-being factors. This multidimensional approach is in sharp contrast to unidimensional approaches. In one of the unidimensional approaches well-being is inferred from responses to a single item (e.g., "happiness" or "life satisfaction") or a tightly worded set of items designed to measure a narrowly defined construct. Such an approach is truly unidimensional, highly parsimonious and expedient. However, this approach provides a very narrowly defined measure of well-being and does not provide useful information about the profile of different components that make up well-being. In a second unidimensional approach, illustrated by the widely used Flourishing and WEMWBS measures, well-being is based on responses to a set of items implicitly designed to cover more broadly the breadth of the well-being construct. Clearly this approach results in a more broadly defined measure of well-being. However, because well-being is still represented by a single score, it does not provide useful information about the profile of different components that make up well-being, not even the components used to construct the measure. Furthermore, although purportedly unidimensional, the explicit logic of the design of these instruments is multidimensional, covering a range of different components of well-being. At best, the rationale underlying these measures is an expedient—not entirely satisfactory—compromise between a truly unidimensional and multidimensional measures of well-being.

Indeed, Flourishing and WEMWBS measures (as well as our WB-PRO15 short measures) should be considered formative rather than reflective measures of well-being, and this has caused considerable confusion in their appropriate description and application. The rationale for a formative measure (for further discussion see Bollen & Lennox, 1991; Edwards & Bagozzi, 2000) is to provide a composite index constructed from independent, albeit correlated indicators. In the factor structure the causal flow (the direction of the arrows in the path diagram) is from indicators to the composite construct. For a reflective the construct the causal flow is from the latent construct to the indicators so that correlations among indicators are zero once the after partialing out the latent factor. The theoretical rationale for reflective measures is that the indictors are essentially interchangeable so that deletion or addition of indicators does not change the nature of the construct, whereas for formative constructs "omitting an indicator is omitting a part of the construct" (Bollen & Lennox, 1991). For formative constructs, unidimensionality and internal consistency are inappropriate—even counter-productive—criteria for assessing a formative measure. Particularly if indicators for a formative construct are selected so as to be internally consistent and form a unidimensional construct, it is likely that the breadth of the construct has been compromised and that potentially important indicators of the formative construct have been excluded.

We argue that the Flourishing and WEMWBS measures should be considered formative rather than reflective measures. Support for this argument comes from the manner in which the measures were constructed, the nature of the items, and the results of our analyses showing that the measures reflect diverse components of well-being rather than a unidimensional construct. However, we do not argue that they are "bad" measures, but only that the internal consistency and undimensionality criteria used to support their usefulness are inappropriate. The critical evaluation of a formative measure is how well the indicators cover the breadth of content the index is intended to cover. This was an explicit basis of the selection of items for the WB-Pro15 short forms (see earlier discussion), but appears to be implicit at best in the construction of the Flourishing and WEMWBS measures. Furthermore, the use of internal consistency and undimensionality to reduce the length of the 14-item WEMWBS measure to the more widely used 7-item version (Stewart-Brown et al., 2009) is completely antithetical of the theoretical rationale of a formative measure and is likely to compromised the breadth of the measure. For example, WEMWBS item 5 (I've had energy to spare) was the only item that was a priori and empirically related to the WB-Pro15 vitality factor (see Table 6). However, this item was excluded from the 7-item version, apparently on the basis of providing a better fit to a unidimensional scale—removing the most misfitting items. Although a full evaluation of the construct validity of the Flourishing, and WEMWBS measures (or WB-Pro15 short measures) from the perspective of a formative measure is beyond the scope of the present investigation, this is an important direction for further research.

**Section 10: Additional Information on Validity of WB-Pro Short Forms**

Here, we provide supplementary presentation of the results of the development and validation of 5- and 15-item versions of the WB-Pro, in which these versions were validated against the WB-Pro (48-items) and selected external validation scales (see Table S5 below). Not surprisingly, the WB-Pro global 5- and 15-item scales are highly correlated with the single-scale measures designed to reflect a global sense of well-being (i.e., WEMWBS, Flourishing, life satisfaction: *r*s = .660 to .800). It is also interesting to note that the global scores are also highly correlated with the five PERMA factors (*r*s = .700 to .814) even though PERMA is designed to reflect distinct factors. This reflects, in part, the observation that correlations among the PERMA factors are very high. Nevertheless, the correlations between PERMA factors and the most logically related WB-Pro factor (*r*s = .808 to .899) are systematically higher. In contrast, the psychological needs satisfaction factors are less correlated with the WB-Pro global scales (*r*s = .652 to .695) due in part to the fact that the needs satisfaction factors are more distinct than the PERMA factors. However, the basic psychological need satisfaction factors are also somewhat more highly correlated with the mostly logically related WB-Pro factor (*r*s = .700 to .812) than with either of the WB-Pro global scales. It is also interesting to note that the pattern of results with psychological need frustration factors is similar to the pattern for need satisfaction factors. However, the sizes of the correlations with need satisfaction are systematically higher than the corresponding correlations with need frustration.

Table S5

*Comparisons between WB-Pro Short Global Measures and the full WB-Pro Scale. Correlations between each of the WB-Pro measures and existing measures of well-being and related constructs*

|  |  |  |  |
| --- | --- | --- | --- |
| Well-Being Correlates |  | WB-Pro-Short Global Summary Scores | Predicted Highest Correlating WB-Pro15 Factor |
|  |  | 15 item | 5 item  | Factor | Corr |
| **PERMA** |  |
|  Positive Emotion |  |  | .820 | .745 | Positive emotions | .899 |
|  Engagement |  |  | .779 | .697 | Engagement\* | .842 |
|  Pos Relationships |  |  | .700 | .644 | Pos relationships\* | .834 |
|  Meaning |  |  | .814 | .733 | Meaning\* | .899 |
|  Accomplishment |  |  | .794 | .693 | Meaning | .808 |
| **Psychological Needs** |  |
|  Satisf Autonomy |  |  | .695 | .605 | Autonomy\* | .700 |
|  Satisf Relation |  |  | .652 | .620 | Pos Relations\* | .812 |
|  Satisf Competence |  |  | .693 | .634 | Competence\* | .788 |
|  Frust Autonomy |  |  | -.464 | -.408 | Autonomy\* | -.500 |
|  Frust Relation |  |  | -.454 | -.420 | Positive Relations\* | -.585 |
|  Frust Competence |  |  | -.534 | -.469 | Competence\* | -.582 |
| **Big Five** |  |
|  Openness  |  |  | .405 | .402 | Engagement | .426 |
|  Conscientiousness  |  |  | .554 | .477 | Competence | .677 |
|  Extraversion  |  |  | .508 | .460 | Engagement | .511 |
|  Agreeable  |  |  | .523 | .559 | Pro-Social | .664 |
|  Neurotic  |  |  | -.510 | -.480 | Emotional Stability | -.617 |
| **Single Scale Measures** |  |
|  WEMWBS  |  |  | .800 | .731 | Positive Emotions | .818 |
|  Depression |  |  | -.543 | -.480 | Positive Emotions\* | -.620 |
|  Stress  |  |  | -.521 | -.468 | Emotional Stability | -.595 |
|  Diener (WB)  |  |  | .763 | .699 | Meaning | .783 |
|  Life Satisfaction |  |  | .733 | .660 | Optimism | .812 |
|  Happy  |  |  | .628 | .569 | Positive Emotions | .720 |
|  Sleep  |  |  | .160 | .142 | Vitality | .274 |
|  General Health |  |  | .414 | .358 | Vitality\* | -.559 |
|  Exercise  |  |  | .281 | .236 | Vitality\* | .394 |

*Note*. Correlations between global scores and well-being correlates are based on a large CFA with all 40 factors (15 WB-Pro plus 25 covariate factors). One short global score is based on the best 15 items, subject to the constraint that one item from each scale was included: the other is based on the best 5 items.

**Section 11: Mplus Syntax and Output for Model 1A in Table S2 and Full set of Factor Loadings for Factor Analysis Results in Table S3A**

 USEVARIABLES ARE

 CO2 CO5 CO6

 CO9 CO10 CO11

 ES2 ES4 ES7

 EN2 EN3 EN7

 ME1 ME5 ME9

 OP2 OP3 OP5

 PE2 PE3 PE7

 PR2 PR6 PR7 PR8

 RE3 RE5 RE6

 SE1 SE2 SE3

 VI1 VI4 VI7

 AC1 AC4 AC7 AC9

 AU2 AU3 AU5

 EM1 EM2 EM4 EM5

 HG1 HG3 HG5

 ;

 define: standardize all;

 ANALYSIS: ESTIMATOR = ML; ROTATION = TARGET; PROCESSORS =2;

 MODEL:

 CO by CO2-CO6~.80 CO9-hg5~0 (\*t1);

 COx by CO9-CO11~.80 es2-hg5~0 CO2-CO6~0 (\*t1);

 ES by ES2-ES7~.80 EN2-hg5~0 CO2-CO11~0(\*t1);

 EN by EN2-EN7~.80 ME1-hg5~0 CO2-ES7~0(\*t1);

 ME by ME1-ME9~.80 OP2-hg5~0 CO2-EN7~0(\*t1);

 OP by OP2-OP5~.80 PE2-hg5~0 CO2-ME9~0(\*t1);

 PE by PE2-PE7~.80 PR2-hg5~0 CO2-OP5~0(\*t1);

 PR by PR2-PR8~.80 RE3-hg5~0 CO2-PE7~0(\*t1);

 RE by RE3-RE6~.80 SE1-hg5~0 CO2-PR8~0(\*t1);

 SE by SE1-SE3~.80 VI1-hg5~0 CO2-RE6~0(\*t1);

 VI by VI1-VI7~.80 AC1-hg5~0 CO2-SE3~0(\*t1);

 AC by AC1-AC9~.80 AU2-hg5~0 CO2-VI7~0(\*t1);

 AU by AU2-AU5~.80 EM1-hg5~0 CO2-AC9~0(\*t1);

 EM by EM1-EM5~.80 HG1-hg5~0 CO2-AU5~0(\*t1);

 HG by HG1-HG5~.80 CO2-EM5~0(\*t1);

 OUTPUT: stdyx mod TECH1 tech4 sval MODINDICES (ALL);

THE MODEL ESTIMATION TERMINATED NORMALLY

MODEL FIT INFORMATION

Number of Free Parameters 711

Loglikelihood

 H0 Value -120791.378

 H1 Value -120187.619

Information Criteria

 Akaike (AIC) 243004.756

 Bayesian (BIC) 247162.237

 Sample-Size Adjusted BIC 244903.196

 (n\* = (n + 2) / 24)

Chi-Square Test of Model Fit

 Value 1207.518

 Degrees of Freedom 513

 P-Value 0.0000

RMSEA (Root Mean Square Error Of Approximation)

 Estimate 0.023

 90 Percent C.I. 0.021 0.025

 Probability RMSEA <= .05 1.000

CFI/TLI

 CFI 0.994

 TLI 0.986

Chi-Square Test of Model Fit for the Baseline Model

 Value 108152.958

 Degrees of Freedom 1128

 P-Value 0.0000

SRMR (Standardized Root Mean Square Residual)

 Value 0.006

MODEL RESULTS

 Two-Tailed

 Estimate S.E. Est./S.E. P-Value

 CO BY

 CO2 0.520 0.036 14.396 0.000

 CO5 0.687 0.043 16.168 0.000

 CO6 0.607 0.059 10.232 0.000

 CO9 0.114 0.029 3.870 0.000

 CO10 0.062 0.032 1.931 0.053

 CO11 -0.041 0.038 -1.094 0.274

 ES2 0.072 0.032 2.271 0.023

 ES4 0.177 0.032 5.593 0.000

 ES7 -0.027 0.030 -0.900 0.368

 EN2 0.284 0.033 8.517 0.000

 EN3 0.136 0.030 4.546 0.000

 EN7 0.136 0.031 4.358 0.000

 ME1 -0.128 0.028 -4.623 0.000

 ME5 -0.059 0.027 -2.186 0.029

 ME9 -0.168 0.030 -5.540 0.000

 OP2 0.162 0.029 5.634 0.000

 OP3 0.158 0.023 6.797 0.000

 OP5 0.102 0.026 3.991 0.000

 PE2 -0.118 0.028 -4.198 0.000

 PE3 -0.125 0.028 -4.446 0.000

 PE7 -0.094 0.025 -3.836 0.000

 PR2 0.099 0.029 3.366 0.001

 PR6 0.004 0.031 0.139 0.889

 PR7 0.033 0.031 1.081 0.280

 PR8 -0.086 0.032 -2.659 0.008

 RE3 0.058 0.026 2.219 0.026

 RE5 0.074 0.025 2.906 0.004

 RE6 -0.043 0.028 -1.547 0.122

 SE1 0.009 0.032 0.269 0.788

 SE2 0.177 0.036 4.939 0.000

 SE3 0.298 0.033 8.904 0.000

 VI1 -0.018 0.021 -0.872 0.383

 VI4 0.017 0.020 0.830 0.406

 VI7 -0.005 0.023 -0.204 0.838

 AC1 -0.106 0.031 -3.381 0.001

 AC4 -0.053 0.035 -1.510 0.131

 AC7 -0.074 0.030 -2.450 0.014

 AC9 0.034 0.029 1.191 0.234

 AU2 0.028 0.027 1.052 0.293

 AU3 -0.051 0.026 -1.928 0.054

 AU5 0.052 0.029 1.787 0.074

 EM1 -0.024 0.034 -0.702 0.482

 EM2 0.035 0.031 1.148 0.251

 EM4 -0.067 0.033 -2.009 0.045

 EM5 -0.031 0.032 -0.984 0.325

 HG1 0.027 0.027 1.014 0.311

 HG3 -0.023 0.026 -0.876 0.381

 HG5 0.039 0.028 1.422 0.155

 COX BY

 CO9 0.534 0.030 17.677 0.000

 CO10 0.809 0.037 21.728 0.000

 CO11 0.902 0.033 27.440 0.000

 ES2 -0.042 0.023 -1.794 0.073

 ES4 0.038 0.029 1.329 0.184

 ES7 0.074 0.024 3.058 0.002

 EN2 0.059 0.032 1.846 0.065

 EN3 0.040 0.027 1.488 0.137

 EN7 -0.023 0.030 -0.779 0.436

 ME1 -0.020 0.024 -0.812 0.417

 ME5 0.088 0.025 3.574 0.000

 ME9 0.001 0.027 0.031 0.975

 OP2 0.046 0.025 1.856 0.063

 OP3 0.019 0.020 0.985 0.324

 OP5 0.000 0.024 -0.013 0.990

 PE2 0.039 0.024 1.657 0.098

 PE3 0.028 0.023 1.205 0.228

 PE7 0.039 0.020 1.970 0.049

 PR2 0.027 0.026 1.056 0.291

 PR6 -0.041 0.027 -1.527 0.127

 PR7 -0.025 0.028 -0.910 0.363

 PR8 0.017 0.028 0.608 0.543

 RE3 -0.033 0.022 -1.522 0.128

 RE5 -0.014 0.020 -0.666 0.505

 RE6 0.047 0.018 2.536 0.011

 SE1 0.079 0.024 3.313 0.001

 SE2 0.050 0.029 1.704 0.088

 SE3 -0.012 0.029 -0.407 0.684

 VI1 0.021 0.017 1.219 0.223

 VI4 -0.003 0.015 -0.192 0.848

 VI7 0.047 0.020 2.330 0.020

 AC1 0.042 0.025 1.637 0.102

 AC4 -0.023 0.026 -0.893 0.372

 AC7 0.022 0.027 0.821 0.412

 AC9 0.007 0.025 0.261 0.794

 AU2 -0.031 0.022 -1.398 0.162

 AU3 0.079 0.019 4.064 0.000

 AU5 -0.023 0.025 -0.928 0.353

 EM1 0.049 0.032 1.537 0.124

 EM2 -0.011 0.028 -0.399 0.690

 EM4 0.048 0.030 1.635 0.102

 EM5 -0.087 0.027 -3.190 0.001

 HG1 0.005 0.023 0.232 0.817

 HG3 0.024 0.021 1.142 0.254

 HG5 -0.054 0.024 -2.211 0.027

 CO2 0.114 0.027 4.176 0.000

 CO5 0.023 0.032 0.740 0.459

 CO6 0.076 0.036 2.093 0.036

 ES BY

 ES2 0.803 0.033 24.606 0.000

 ES4 0.666 0.037 18.065 0.000

 ES7 0.723 0.034 21.205 0.000

 EN2 -0.063 0.034 -1.854 0.064

 EN3 0.087 0.025 3.508 0.000

 EN7 -0.106 0.029 -3.713 0.000

 ME1 0.068 0.026 2.583 0.010

 ME5 0.092 0.026 3.585 0.000

 ME9 0.110 0.027 4.001 0.000

 OP2 -0.076 0.025 -3.071 0.002

 OP3 -0.013 0.021 -0.605 0.545

 OP5 0.023 0.025 0.924 0.356

 PE2 0.045 0.026 1.696 0.090

 PE3 0.134 0.025 5.335 0.000

 PE7 0.073 0.022 3.312 0.001

 PR2 -0.016 0.027 -0.594 0.553

 PR6 0.010 0.027 0.360 0.719

 PR7 -0.053 0.029 -1.824 0.068

 PR8 0.029 0.029 1.007 0.314

 RE3 -0.051 0.024 -2.149 0.032

 RE5 0.093 0.022 4.162 0.000

 RE6 -0.017 0.021 -0.807 0.419

 SE1 -0.043 0.025 -1.684 0.092

 SE2 -0.033 0.031 -1.082 0.279

 SE3 -0.023 0.031 -0.722 0.470

 VI1 0.036 0.018 2.060 0.039

 VI4 -0.025 0.017 -1.521 0.128

 VI7 0.044 0.022 2.065 0.039

 AC1 -0.016 0.029 -0.570 0.569

 AC4 0.003 0.029 0.087 0.930

 AC7 0.096 0.029 3.328 0.001

 AC9 0.033 0.027 1.234 0.217

 AU2 0.038 0.024 1.596 0.111

 AU3 -0.021 0.021 -0.986 0.324

 AU5 -0.001 0.027 -0.053 0.958

 EM1 0.051 0.034 1.508 0.132

 EM2 0.000 0.029 0.008 0.993

 EM4 0.073 0.032 2.267 0.023

 EM5 -0.093 0.029 -3.198 0.001

 HG1 -0.034 0.024 -1.392 0.164

 HG3 0.046 0.023 2.012 0.044

 HG5 0.018 0.026 0.690 0.490

 CO2 0.074 0.027 2.708 0.007

 CO5 0.096 0.031 3.130 0.002

 CO6 0.090 0.031 2.916 0.004

 CO9 0.167 0.027 6.158 0.000

 CO10 -0.013 0.027 -0.474 0.636

 CO11 -0.085 0.023 -3.628 0.000

 EN BY

 EN2 0.678 0.052 13.080 0.000

 EN3 0.656 0.056 11.724 0.000

 EN7 0.476 0.051 9.382 0.000

 ME1 0.281 0.033 8.541 0.000

 ME5 0.128 0.038 3.403 0.001

 ME9 0.204 0.042 4.907 0.000

 OP2 -0.138 0.032 -4.272 0.000

 OP3 -0.072 0.028 -2.560 0.010

 OP5 -0.058 0.033 -1.773 0.076

 PE2 0.212 0.029 7.331 0.000

 PE3 0.124 0.029 4.310 0.000

 PE7 0.135 0.026 5.115 0.000

 PR2 -0.169 0.032 -5.217 0.000

 PR6 0.086 0.037 2.285 0.022

 PR7 0.037 0.036 1.031 0.303

 PR8 0.034 0.038 0.896 0.370

 RE3 0.016 0.031 0.499 0.618

 RE5 -0.013 0.029 -0.430 0.667

 RE6 -0.002 0.029 -0.071 0.944

 SE1 -0.108 0.032 -3.373 0.001

 SE2 -0.132 0.037 -3.612 0.000

 SE3 -0.056 0.038 -1.465 0.143

 VI1 0.003 0.027 0.097 0.922

 VI4 0.010 0.024 0.392 0.695

 VI7 0.121 0.029 4.241 0.000

 AC1 0.124 0.036 3.482 0.000

 AC4 0.028 0.035 0.798 0.425

 AC7 0.006 0.036 0.178 0.858

 AC9 -0.050 0.034 -1.479 0.139

 AU2 0.079 0.031 2.546 0.011

 AU3 -0.067 0.030 -2.257 0.024

 AU5 0.031 0.034 0.915 0.360

 EM1 -0.079 0.041 -1.919 0.055

 EM2 -0.022 0.037 -0.592 0.554

 EM4 -0.029 0.040 -0.710 0.478

 EM5 0.104 0.037 2.815 0.005

 HG1 0.026 0.031 0.820 0.412

 HG3 -0.026 0.030 -0.862 0.388

 HG5 -0.010 0.033 -0.308 0.758

 CO2 0.151 0.036 4.224 0.000

 CO5 0.227 0.036 6.226 0.000

 CO6 0.177 0.036 4.883 0.000

 CO9 -0.054 0.036 -1.511 0.131

 CO10 0.005 0.036 0.153 0.878

 CO11 0.047 0.038 1.252 0.210

 ES2 -0.087 0.035 -2.512 0.012

 ES4 -0.030 0.040 -0.748 0.454

 ES7 -0.058 0.034 -1.738 0.082

 ME BY

 ME1 0.557 0.035 15.995 0.000

 ME5 0.570 0.034 16.608 0.000

 ME9 0.660 0.039 16.774 0.000

 OP2 0.209 0.031 6.689 0.000

 OP3 0.215 0.027 7.968 0.000

 OP5 0.150 0.029 5.248 0.000

 PE2 -0.127 0.026 -4.928 0.000

 PE3 -0.091 0.027 -3.410 0.001

 PE7 -0.112 0.023 -4.871 0.000

 PR2 -0.011 0.031 -0.372 0.710

 PR6 -0.013 0.030 -0.430 0.668

 PR7 -0.021 0.034 -0.612 0.540

 PR8 0.062 0.034 1.830 0.067

 RE3 -0.014 0.028 -0.490 0.624

 RE5 -0.071 0.026 -2.697 0.007

 RE6 0.102 0.030 3.416 0.001

 SE1 0.270 0.030 8.985 0.000

 SE2 0.091 0.034 2.682 0.007

 SE3 0.171 0.033 5.124 0.000

 VI1 -0.061 0.022 -2.753 0.006

 VI4 -0.065 0.022 -2.938 0.003

 VI7 0.075 0.025 3.052 0.002

 AC1 -0.023 0.035 -0.667 0.505

 AC4 -0.146 0.032 -4.501 0.000

 AC7 0.014 0.032 0.417 0.677

 AC9 0.013 0.031 0.408 0.683

 AU2 -0.046 0.027 -1.663 0.096

 AU3 0.017 0.030 0.568 0.570

 AU5 0.082 0.030 2.779 0.005

 EM1 -0.034 0.037 -0.910 0.363

 EM2 -0.034 0.033 -1.011 0.312

 EM4 0.036 0.036 0.998 0.318

 EM5 -0.044 0.035 -1.249 0.212

 HG1 0.012 0.028 0.409 0.683

 HG3 0.055 0.028 1.952 0.051

 HG5 0.023 0.030 0.779 0.436

 CO2 -0.037 0.032 -1.145 0.252

 CO5 -0.208 0.035 -5.989 0.000

 CO6 -0.134 0.041 -3.295 0.001

 CO9 0.008 0.031 0.251 0.802

 CO10 -0.041 0.035 -1.190 0.234

 CO11 0.022 0.038 0.581 0.561

 ES2 0.062 0.034 1.814 0.070

 ES4 0.065 0.036 1.805 0.071

 ES7 0.092 0.032 2.881 0.004

 EN2 0.139 0.053 2.637 0.008

 EN3 0.291 0.032 9.108 0.000

 EN7 0.183 0.034 5.450 0.000

 OP BY

 OP2 0.766 0.030 25.334 0.000

 OP3 0.661 0.028 23.418 0.000

 OP5 0.598 0.030 19.969 0.000

 PE2 0.108 0.025 4.351 0.000

 PE3 0.150 0.024 6.153 0.000

 PE7 0.183 0.023 7.913 0.000

 PR2 -0.019 0.027 -0.702 0.483

 PR6 -0.037 0.029 -1.266 0.205

 PR7 0.028 0.029 0.957 0.339

 PR8 -0.004 0.031 -0.116 0.907

 RE3 0.045 0.024 1.850 0.064

 RE5 0.030 0.024 1.239 0.215

 RE6 -0.085 0.026 -3.244 0.001

 SE1 -0.034 0.027 -1.277 0.202

 SE2 -0.099 0.029 -3.421 0.001

 SE3 -0.116 0.028 -4.187 0.000

 VI1 0.073 0.019 3.748 0.000

 VI4 0.009 0.019 0.461 0.644

 VI7 0.021 0.023 0.925 0.355

 AC1 -0.047 0.030 -1.541 0.123

 AC4 0.076 0.029 2.597 0.009

 AC7 0.077 0.029 2.618 0.009

 AC9 0.042 0.028 1.504 0.133

 AU2 0.067 0.025 2.716 0.007

 AU3 -0.059 0.025 -2.371 0.018

 AU5 -0.025 0.027 -0.930 0.353

 EM1 -0.021 0.034 -0.608 0.543

 EM2 0.040 0.030 1.322 0.186

 EM4 -0.035 0.033 -1.056 0.291

 EM5 0.009 0.031 0.301 0.763

 HG1 0.021 0.025 0.840 0.401

 HG3 -0.003 0.025 -0.119 0.905

 HG5 -0.030 0.026 -1.143 0.253

 CO2 0.061 0.028 2.148 0.032

 CO5 0.130 0.037 3.526 0.000

 CO6 0.233 0.029 7.912 0.000

 CO9 -0.029 0.027 -1.065 0.287

 CO10 0.027 0.028 0.936 0.349

 CO11 0.001 0.034 0.022 0.983

 ES2 0.039 0.029 1.362 0.173

 ES4 -0.078 0.030 -2.589 0.010

 ES7 -0.119 0.026 -4.539 0.000

 EN2 -0.127 0.042 -3.033 0.002

 EN3 -0.153 0.026 -5.871 0.000

 EN7 0.011 0.030 0.355 0.723

 ME1 0.081 0.028 2.910 0.004

 ME5 0.282 0.026 10.722 0.000

 ME9 0.215 0.029 7.365 0.000

 PE BY

 PE2 0.656 0.030 21.695 0.000

 PE3 0.668 0.030 22.603 0.000

 PE7 0.720 0.028 26.020 0.000

 PR2 0.015 0.027 0.550 0.582

 PR6 0.078 0.028 2.752 0.006

 PR7 -0.080 0.029 -2.734 0.006

 PR8 0.013 0.030 0.419 0.675

 RE3 0.052 0.024 2.159 0.031

 RE5 0.033 0.024 1.398 0.162

 RE6 -0.025 0.025 -1.008 0.314

 SE1 0.098 0.029 3.428 0.001

 SE2 0.186 0.030 6.144 0.000

 SE3 0.070 0.029 2.391 0.017

 VI1 0.031 0.019 1.601 0.109

 VI4 -0.024 0.018 -1.342 0.180

 VI7 0.000 0.022 0.015 0.988

 AC1 -0.051 0.029 -1.750 0.080

 AC4 -0.095 0.030 -3.204 0.001

 AC7 -0.021 0.029 -0.728 0.467

 AC9 0.067 0.028 2.447 0.014

 AU2 0.016 0.025 0.635 0.526

 AU3 0.004 0.024 0.174 0.862

 AU5 0.012 0.027 0.446 0.655

 EM1 0.040 0.033 1.183 0.237

 EM2 -0.002 0.030 -0.070 0.944

 EM4 -0.042 0.032 -1.308 0.191

 EM5 -0.044 0.030 -1.458 0.145

 HG1 -0.007 0.025 -0.258 0.796

 HG3 -0.009 0.025 -0.346 0.730

 HG5 0.035 0.026 1.337 0.181

 CO2 -0.119 0.028 -4.313 0.000

 CO5 -0.110 0.034 -3.259 0.001

 CO6 -0.086 0.029 -2.954 0.003

 CO9 0.029 0.027 1.061 0.289

 CO10 -0.018 0.028 -0.651 0.515

 CO11 0.034 0.031 1.079 0.281

 ES2 -0.004 0.030 -0.125 0.900

 ES4 0.037 0.032 1.176 0.240

 ES7 0.167 0.029 5.697 0.000

 EN2 0.224 0.030 7.400 0.000

 EN3 0.055 0.027 2.020 0.043

 EN7 0.196 0.028 6.955 0.000

 ME1 0.026 0.026 0.975 0.330

 ME5 -0.184 0.024 -7.823 0.000

 ME9 -0.118 0.026 -4.615 0.000

 OP2 0.161 0.026 6.287 0.000

 OP3 0.050 0.023 2.155 0.031

 OP5 0.239 0.024 10.003 0.000

 PR BY

 PR2 0.807 0.030 26.907 0.000

 PR6 0.755 0.031 24.222 0.000

 PR7 0.783 0.033 24.056 0.000

 PR8 0.791 0.032 24.402 0.000

 RE3 -0.022 0.021 -1.084 0.278

 RE5 0.029 0.020 1.449 0.147

 RE6 0.031 0.018 1.702 0.089

 SE1 0.036 0.024 1.479 0.139

 SE2 0.027 0.027 1.027 0.304

 SE3 -0.013 0.024 -0.522 0.602

 VI1 0.033 0.016 2.041 0.041

 VI4 0.004 0.015 0.294 0.769

 VI7 -0.014 0.020 -0.695 0.487

 AC1 0.006 0.025 0.242 0.808

 AC4 -0.011 0.024 -0.475 0.635

 AC7 0.021 0.027 0.788 0.431

 AC9 0.023 0.025 0.893 0.372

 AU2 0.020 0.022 0.919 0.358

 AU3 0.018 0.019 0.913 0.361

 AU5 -0.031 0.025 -1.258 0.208

 EM1 0.046 0.032 1.427 0.154

 EM2 -0.054 0.028 -1.934 0.053

 EM4 -0.022 0.030 -0.719 0.472

 EM5 -0.003 0.027 -0.095 0.924

 HG1 0.041 0.023 1.804 0.071

 HG3 0.008 0.021 0.376 0.707

 HG5 -0.013 0.024 -0.552 0.581

 CO2 0.102 0.026 3.878 0.000

 CO5 0.026 0.024 1.084 0.278

 CO6 0.003 0.023 0.119 0.905

 CO9 0.046 0.026 1.788 0.074

 CO10 -0.005 0.022 -0.206 0.837

 CO11 -0.035 0.020 -1.788 0.074

 ES2 -0.058 0.023 -2.538 0.011

 ES4 0.002 0.025 0.075 0.940

 ES7 0.051 0.023 2.271 0.023

 EN2 0.012 0.022 0.558 0.577

 EN3 0.031 0.022 1.398 0.162

 EN7 0.044 0.025 1.719 0.086

 ME1 0.055 0.022 2.484 0.013

 ME5 0.049 0.022 2.210 0.027

 ME9 0.028 0.022 1.288 0.198

 OP2 0.037 0.018 2.035 0.042

 OP3 0.096 0.020 4.887 0.000

 OP5 -0.057 0.021 -2.780 0.005

 PE2 0.017 0.021 0.799 0.424

 PE3 0.032 0.020 1.620 0.105

 PE7 0.071 0.019 3.777 0.000

 RE BY

 RE3 0.732 0.025 28.990 0.000

 RE5 0.744 0.024 30.729 0.000

 RE6 0.848 0.024 34.870 0.000

 SE1 0.030 0.021 1.403 0.161

 SE2 0.072 0.024 2.963 0.003

 SE3 0.049 0.024 2.032 0.042

 VI1 -0.001 0.015 -0.082 0.935

 VI4 0.019 0.014 1.394 0.163

 VI7 0.024 0.018 1.308 0.191

 AC1 -0.010 0.024 -0.415 0.678

 AC4 -0.049 0.023 -2.152 0.031

 AC7 0.224 0.025 9.139 0.000

 AC9 -0.080 0.023 -3.473 0.001

 AU2 0.003 0.020 0.125 0.901

 AU3 0.029 0.017 1.701 0.089

 AU5 -0.003 0.022 -0.118 0.906

 EM1 0.009 0.029 0.320 0.749

 EM2 -0.028 0.025 -1.140 0.254

 EM4 -0.003 0.027 -0.116 0.907

 EM5 -0.009 0.024 -0.365 0.715

 HG1 0.029 0.021 1.391 0.164

 HG3 -0.026 0.019 -1.376 0.169

 HG5 0.009 0.022 0.408 0.683

 CO2 0.002 0.024 0.075 0.941

 CO5 0.072 0.025 2.829 0.005

 CO6 0.061 0.026 2.314 0.021

 CO9 -0.060 0.023 -2.612 0.009

 CO10 -0.019 0.020 -0.969 0.332

 CO11 0.063 0.018 3.513 0.000

 ES2 0.099 0.023 4.330 0.000

 ES4 -0.062 0.024 -2.534 0.011

 ES7 -0.029 0.022 -1.351 0.177

 EN2 -0.002 0.026 -0.073 0.942

 EN3 0.005 0.022 0.224 0.823

 EN7 0.062 0.024 2.544 0.011

 ME1 0.014 0.021 0.638 0.524

 ME5 0.036 0.021 1.728 0.084

 ME9 0.036 0.022 1.630 0.103

 OP2 0.003 0.020 0.132 0.895

 OP3 0.028 0.018 1.539 0.124

 OP5 0.028 0.021 1.343 0.179

 PE2 0.050 0.020 2.475 0.013

 PE3 0.024 0.020 1.203 0.229

 PE7 0.036 0.017 2.059 0.039

 PR2 -0.036 0.023 -1.570 0.116

 PR6 0.039 0.023 1.700 0.089

 PR7 -0.030 0.025 -1.207 0.228

 PR8 0.026 0.025 1.042 0.297

 SE BY

 SE1 0.581 0.040 14.488 0.000

 SE2 0.580 0.045 12.910 0.000

 SE3 0.596 0.043 13.803 0.000

 VI1 0.002 0.022 0.114 0.909

 VI4 0.037 0.021 1.741 0.082

 VI7 0.054 0.025 2.127 0.033

 AC1 0.075 0.036 2.084 0.037

 AC4 -0.010 0.038 -0.273 0.785

 AC7 -0.063 0.032 -1.994 0.046

 AC9 0.287 0.030 9.477 0.000

 AU2 -0.126 0.027 -4.668 0.000

 AU3 0.020 0.027 0.741 0.459

 AU5 0.042 0.031 1.373 0.170

 EM1 0.057 0.037 1.555 0.120

 EM2 0.061 0.033 1.876 0.061

 EM4 0.010 0.036 0.273 0.785

 EM5 -0.051 0.035 -1.469 0.142

 HG1 -0.035 0.028 -1.256 0.209

 HG3 0.010 0.027 0.353 0.724

 HG5 -0.017 0.030 -0.558 0.577

 CO2 0.117 0.033 3.538 0.000

 CO5 0.185 0.039 4.755 0.000

 CO6 0.183 0.036 5.042 0.000

 CO9 0.118 0.030 3.957 0.000

 CO10 0.014 0.033 0.409 0.682

 CO11 -0.085 0.036 -2.368 0.018

 ES2 -0.153 0.031 -4.957 0.000

 ES4 -0.047 0.036 -1.334 0.182

 ES7 0.023 0.031 0.759 0.448

 EN2 -0.174 0.042 -4.109 0.000

 EN3 -0.093 0.032 -2.892 0.004

 EN7 -0.012 0.034 -0.353 0.724

 ME1 0.238 0.027 8.830 0.000

 ME5 0.111 0.029 3.831 0.000

 ME9 0.184 0.030 6.100 0.000

 OP2 -0.110 0.027 -4.028 0.000

 OP3 -0.060 0.025 -2.412 0.016

 OP5 -0.063 0.027 -2.332 0.020

 PE2 0.096 0.029 3.369 0.001

 PE3 0.145 0.027 5.441 0.000

 PE7 0.110 0.026 4.285 0.000

 PR2 0.109 0.031 3.462 0.001

 PR6 0.040 0.034 1.194 0.232

 PR7 -0.040 0.032 -1.242 0.214

 PR8 -0.157 0.033 -4.780 0.000

 RE3 0.117 0.027 4.359 0.000

 RE5 -0.096 0.025 -3.819 0.000

 RE6 0.084 0.030 2.807 0.005

 VI BY

 VI1 0.819 0.019 43.519 0.000

 VI4 0.909 0.018 49.242 0.000

 VI7 0.665 0.019 34.776 0.000

 AC1 -0.024 0.019 -1.230 0.219

 AC4 -0.024 0.019 -1.285 0.199

 AC7 0.020 0.021 0.963 0.336

 AC9 0.044 0.020 2.209 0.027

 AU2 0.021 0.017 1.238 0.216

 AU3 -0.004 0.015 -0.254 0.799

 AU5 -0.010 0.019 -0.519 0.604

 EM1 -0.068 0.025 -2.761 0.006

 EM2 -0.041 0.021 -1.949 0.051

 EM4 0.037 0.023 1.605 0.109

 EM5 0.019 0.021 0.909 0.364

 HG1 0.025 0.017 1.455 0.146

 HG3 0.027 0.016 1.654 0.098

 HG5 -0.003 0.018 -0.165 0.869

 CO2 0.023 0.021 1.138 0.255

 CO5 -0.008 0.020 -0.384 0.701

 CO6 0.013 0.020 0.641 0.521

 CO9 0.043 0.020 2.167 0.030

 CO10 -0.002 0.017 -0.141 0.888

 CO11 -0.004 0.016 -0.267 0.790

 ES2 0.017 0.018 0.929 0.353

 ES4 -0.025 0.020 -1.268 0.205

 ES7 0.034 0.018 1.956 0.050

 EN2 -0.013 0.021 -0.627 0.531

 EN3 0.104 0.022 4.703 0.000

 EN7 0.092 0.022 4.134 0.000

 ME1 0.006 0.017 0.337 0.736

 ME5 0.030 0.017 1.722 0.085

 ME9 -0.022 0.017 -1.311 0.190

 OP2 0.029 0.016 1.745 0.081

 OP3 0.088 0.016 5.568 0.000

 OP5 0.038 0.017 2.231 0.026

 PE2 0.043 0.016 2.607 0.009

 PE3 0.022 0.016 1.397 0.163

 PE7 -0.021 0.014 -1.489 0.136

 PR2 -0.058 0.019 -2.999 0.003

 PR6 0.041 0.020 2.120 0.034

 PR7 -0.024 0.021 -1.147 0.252

 PR8 0.016 0.021 0.744 0.457

 RE3 -0.032 0.016 -2.017 0.044

 RE5 0.028 0.016 1.794 0.073

 RE6 0.029 0.014 1.999 0.046

 SE1 0.069 0.018 3.837 0.000

 SE2 0.038 0.020 1.920 0.055

 SE3 0.011 0.019 0.554 0.579

 AC BY

 AC1 0.855 0.042 20.476 0.000

 AC4 0.923 0.038 24.292 0.000

 AC7 0.546 0.036 15.363 0.000

 AC9 0.544 0.034 16.053 0.000

 AU2 0.055 0.026 2.092 0.036

 AU3 -0.031 0.023 -1.378 0.168

 AU5 0.067 0.029 2.289 0.022

 EM1 -0.063 0.036 -1.764 0.078

 EM2 0.026 0.031 0.849 0.396

 EM4 -0.084 0.034 -2.488 0.013

 EM5 0.008 0.031 0.255 0.798

 HG1 -0.005 0.026 -0.179 0.858

 HG3 0.021 0.025 0.835 0.403

 HG5 0.001 0.027 0.051 0.960

 CO2 0.022 0.030 0.720 0.472

 CO5 -0.017 0.032 -0.539 0.590

 CO6 -0.096 0.030 -3.218 0.001

 CO9 0.039 0.029 1.350 0.177

 CO10 0.037 0.026 1.440 0.150

 CO11 -0.013 0.025 -0.535 0.592

 ES2 0.064 0.028 2.299 0.022

 ES4 0.022 0.031 0.702 0.482

 ES7 0.045 0.028 1.588 0.112

 EN2 0.096 0.030 3.252 0.001

 EN3 0.052 0.026 1.998 0.046

 EN7 0.027 0.029 0.906 0.365

 ME1 -0.014 0.026 -0.527 0.598

 ME5 0.000 0.026 -0.007 0.994

 ME9 -0.006 0.027 -0.211 0.833

 OP2 0.097 0.023 4.179 0.000

 OP3 0.004 0.023 0.179 0.858

 OP5 0.114 0.025 4.615 0.000

 PE2 0.021 0.025 0.839 0.401

 PE3 -0.028 0.024 -1.192 0.233

 PE7 -0.002 0.022 -0.091 0.928

 PR2 -0.004 0.029 -0.139 0.889

 PR6 -0.062 0.029 -2.117 0.034

 PR7 0.070 0.031 2.265 0.024

 PR8 0.021 0.031 0.689 0.491

 RE3 0.081 0.024 3.304 0.001

 RE5 0.086 0.024 3.589 0.000

 RE6 -0.048 0.023 -2.120 0.034

 SE1 0.144 0.029 4.967 0.000

 SE2 0.078 0.034 2.278 0.023

 SE3 0.136 0.033 4.180 0.000

 VI1 0.001 0.019 0.039 0.969

 VI4 0.022 0.018 1.243 0.214

 VI7 0.034 0.023 1.491 0.136

 AU BY

 AU2 0.755 0.028 27.423 0.000

 AU3 0.909 0.026 34.449 0.000

 AU5 0.681 0.028 24.398 0.000

 EM1 0.005 0.027 0.192 0.847

 EM2 0.025 0.023 1.075 0.282

 EM4 -0.055 0.025 -2.186 0.029

 EM5 -0.010 0.022 -0.432 0.666

 HG1 -0.009 0.019 -0.464 0.643

 HG3 -0.018 0.018 -0.979 0.327

 HG5 0.045 0.020 2.224 0.026

 CO2 0.048 0.023 2.069 0.039

 CO5 -0.004 0.023 -0.195 0.845

 CO6 0.059 0.024 2.429 0.015

 CO9 0.048 0.021 2.263 0.024

 CO10 -0.002 0.019 -0.100 0.920

 CO11 -0.022 0.017 -1.285 0.199

 ES2 -0.026 0.019 -1.347 0.178

 ES4 0.077 0.022 3.510 0.000

 ES7 -0.035 0.019 -1.819 0.069

 EN2 0.057 0.024 2.337 0.019

 EN3 0.019 0.020 0.935 0.350

 EN7 0.047 0.023 2.060 0.039

 ME1 0.029 0.019 1.492 0.136

 ME5 0.047 0.019 2.432 0.015

 ME9 0.061 0.019 3.177 0.001

 OP2 0.006 0.018 0.315 0.753

 OP3 0.022 0.017 1.284 0.199

 OP5 0.035 0.019 1.891 0.059

 PE2 0.044 0.018 2.420 0.016

 PE3 0.054 0.018 3.040 0.002

 PE7 -0.005 0.016 -0.315 0.753

 PR2 0.013 0.021 0.603 0.546

 PR6 -0.024 0.021 -1.129 0.259

 PR7 0.030 0.023 1.301 0.193

 PR8 -0.040 0.023 -1.736 0.083

 RE3 0.030 0.017 1.723 0.085

 RE5 -0.023 0.017 -1.345 0.179

 RE6 0.038 0.016 2.415 0.016

 SE1 0.018 0.020 0.908 0.364

 SE2 0.001 0.022 0.059 0.953

 SE3 -0.014 0.021 -0.661 0.508

 VI1 0.037 0.014 2.729 0.006

 VI4 0.029 0.013 2.305 0.021

 VI7 -0.031 0.017 -1.833 0.067

 AC1 -0.061 0.022 -2.843 0.004

 AC4 0.005 0.022 0.237 0.813

 AC7 0.034 0.023 1.492 0.136

 AC9 0.096 0.022 4.470 0.000

 EM BY

 EM1 0.564 0.031 17.912 0.000

 EM2 0.788 0.030 26.511 0.000

 EM4 0.780 0.032 24.459 0.000

 EM5 0.872 0.029 30.574 0.000

 HG1 0.028 0.022 1.305 0.192

 HG3 0.007 0.021 0.341 0.733

 HG5 0.095 0.023 4.223 0.000

 CO2 0.005 0.023 0.223 0.824

 CO5 0.003 0.022 0.114 0.909

 CO6 0.000 0.022 -0.017 0.987

 CO9 0.025 0.022 1.148 0.251

 CO10 0.017 0.019 0.877 0.380

 CO11 0.005 0.018 0.287 0.774

 ES2 0.010 0.020 0.479 0.632

 ES4 0.024 0.023 1.027 0.304

 ES7 0.041 0.020 2.046 0.041

 EN2 0.036 0.022 1.642 0.101

 EN3 -0.043 0.021 -2.085 0.037

 EN7 0.058 0.023 2.519 0.012

 ME1 -0.015 0.019 -0.784 0.433

 ME5 0.024 0.019 1.258 0.209

 ME9 0.014 0.020 0.723 0.470

 OP2 0.026 0.017 1.549 0.121

 OP3 0.014 0.017 0.815 0.415

 OP5 0.013 0.018 0.704 0.482

 PE2 0.030 0.018 1.618 0.106

 PE3 0.001 0.018 0.074 0.941

 PE7 0.002 0.016 0.098 0.922

 PR2 -0.053 0.022 -2.439 0.015

 PR6 -0.045 0.022 -2.049 0.040

 PR7 0.069 0.024 2.896 0.004

 PR8 0.042 0.024 1.762 0.078

 RE3 0.016 0.018 0.880 0.379

 RE5 -0.016 0.018 -0.880 0.379

 RE6 0.011 0.016 0.703 0.482

 SE1 0.020 0.021 0.960 0.337

 SE2 0.075 0.023 3.333 0.001

 SE3 0.050 0.022 2.299 0.022

 VI1 -0.006 0.014 -0.449 0.654

 VI4 0.005 0.013 0.349 0.727

 VI7 0.002 0.018 0.094 0.925

 AC1 -0.003 0.022 -0.138 0.890

 AC4 -0.010 0.021 -0.492 0.623

 AC7 -0.015 0.023 -0.659 0.510

 AC9 -0.034 0.022 -1.539 0.124

 AU2 0.017 0.019 0.866 0.387

 AU3 -0.008 0.017 -0.480 0.631

 AU5 0.007 0.021 0.330 0.742

 HG BY

 HG1 0.775 0.024 31.798 0.000

 HG3 0.821 0.024 33.760 0.000

 HG5 0.733 0.025 29.305 0.000

 CO2 0.010 0.022 0.456 0.648

 CO5 0.033 0.022 1.447 0.148

 CO6 0.045 0.023 1.954 0.051

 CO9 -0.091 0.021 -4.449 0.000

 CO10 0.002 0.018 0.109 0.913

 CO11 0.060 0.017 3.531 0.000

 ES2 0.005 0.019 0.237 0.812

 ES4 0.077 0.022 3.525 0.000

 ES7 -0.055 0.019 -2.901 0.004

 EN2 -0.004 0.023 -0.171 0.864

 EN3 0.005 0.019 0.253 0.800

 EN7 0.041 0.022 1.906 0.057

 ME1 0.082 0.019 4.253 0.000

 ME5 0.010 0.019 0.503 0.615

 ME9 0.043 0.020 2.137 0.033

 OP2 -0.002 0.018 -0.124 0.901

 OP3 -0.003 0.016 -0.209 0.834

 OP5 0.039 0.018 2.142 0.032

 PE2 0.027 0.018 1.513 0.130

 PE3 0.008 0.017 0.490 0.624

 PE7 0.015 0.016 0.956 0.339

 PR2 0.045 0.021 2.190 0.029

 PR6 0.072 0.021 3.456 0.001

 PR7 -0.059 0.022 -2.612 0.009

 PR8 -0.050 0.022 -2.239 0.025

 RE3 0.029 0.017 1.662 0.097

 RE5 0.001 0.017 0.079 0.937

 RE6 -0.013 0.015 -0.870 0.384

 SE1 -0.028 0.020 -1.446 0.148

 SE2 -0.001 0.022 -0.039 0.969

 SE3 0.034 0.022 1.588 0.112

 VI1 0.024 0.013 1.795 0.073

 VI4 0.034 0.013 2.708 0.007

 VI7 0.004 0.017 0.264 0.792

 AC1 0.020 0.021 0.949 0.342

 AC4 0.073 0.021 3.516 0.000

 AC7 -0.038 0.022 -1.744 0.081

 AC9 -0.053 0.021 -2.573 0.010

 AU2 -0.040 0.018 -2.143 0.032

 AU3 0.024 0.016 1.488 0.137

 AU5 0.029 0.020 1.431 0.152

 EM1 0.174 0.028 6.237 0.000

 EM2 0.002 0.025 0.063 0.950

 EM4 -0.060 0.026 -2.278 0.023

 EM5 -0.084 0.024 -3.566 0.000

 COX WITH

 CO 0.536 0.083 6.459 0.000

 ES WITH

 CO 0.259 0.062 4.187 0.000

 COX 0.685 0.037 18.285 0.000

 EN WITH

 CO -0.075 0.058 -1.298 0.194

 COX 0.518 0.083 6.239 0.000

 ES 0.627 0.046 13.579 0.000

 ME WITH

 CO 0.724 0.015 48.289 0.000

 COX 0.448 0.054 8.362 0.000

 ES 0.284 0.069 4.121 0.000

 EN -0.013 0.090 -0.145 0.885

 OP WITH

 CO -0.032 0.061 -0.519 0.604

 COX 0.441 0.050 8.877 0.000

 ES 0.612 0.035 17.304 0.000

 EN 0.799 0.014 58.889 0.000

 ME 0.137 0.077 1.788 0.074

 PE WITH

 CO 0.689 0.020 35.007 0.000

 COX 0.533 0.051 10.443 0.000

 ES 0.446 0.071 6.269 0.000

 EN 0.114 0.070 1.623 0.105

 ME 0.815 0.017 48.065 0.000

 OP 0.244 0.066 3.689 0.000

 PR WITH

 CO 0.436 0.043 10.129 0.000

 COX 0.677 0.014 48.956 0.000

 ES 0.601 0.023 26.565 0.000

 EN 0.514 0.050 10.355 0.000

 ME 0.523 0.048 10.871 0.000

 OP 0.555 0.035 15.947 0.000

 PE 0.600 0.040 15.037 0.000

 RE WITH

 CO 0.372 0.062 5.967 0.000

 COX 0.638 0.016 40.692 0.000

 ES 0.751 0.023 32.149 0.000

 EN 0.515 0.059 8.729 0.000

 ME 0.441 0.045 9.898 0.000

 OP 0.545 0.039 13.934 0.000

 PE 0.555 0.044 12.612 0.000

 PR 0.584 0.016 36.446 0.000

 SE WITH

 CO 0.086 0.099 0.865 0.387

 COX 0.547 0.064 8.479 0.000

 ES 0.619 0.038 16.179 0.000

 EN 0.760 0.018 41.497 0.000

 ME 0.011 0.058 0.188 0.851

 OP 0.707 0.014 50.997 0.000

 PE 0.169 0.084 2.011 0.044

 PR 0.584 0.053 10.968 0.000

 RE 0.444 0.040 11.009 0.000

 VI WITH

 CO 0.365 0.048 7.533 0.000

 COX 0.558 0.017 33.695 0.000

 ES 0.579 0.023 24.828 0.000

 EN 0.505 0.063 7.991 0.000

 ME 0.494 0.040 12.476 0.000

 OP 0.529 0.042 12.690 0.000

 PE 0.583 0.037 15.908 0.000

 PR 0.518 0.017 30.841 0.000

 RE 0.644 0.014 45.853 0.000

 SE 0.318 0.033 9.739 0.000

 AC WITH

 CO 0.632 0.043 14.701 0.000

 COX 0.722 0.020 35.363 0.000

 ES 0.669 0.048 13.970 0.000

 EN 0.383 0.061 6.241 0.000

 ME 0.611 0.045 13.507 0.000

 OP 0.381 0.045 8.554 0.000

 PE 0.659 0.028 23.651 0.000

 PR 0.690 0.018 38.005 0.000

 RE 0.685 0.024 28.863 0.000

 SE 0.460 0.082 5.598 0.000

 VI 0.559 0.020 28.306 0.000

 AU WITH

 CO 0.487 0.059 8.221 0.000

 COX 0.695 0.014 50.301 0.000

 ES 0.607 0.023 26.130 0.000

 EN 0.528 0.064 8.274 0.000

 ME 0.464 0.042 11.025 0.000

 OP 0.522 0.042 12.556 0.000

 PE 0.529 0.041 13.020 0.000

 PR 0.696 0.013 54.504 0.000

 RE 0.598 0.016 37.364 0.000

 SE 0.540 0.039 13.855 0.000

 VI 0.522 0.017 31.089 0.000

 AC 0.713 0.022 32.973 0.000

 EM WITH

 CO 0.345 0.042 8.162 0.000

 COX 0.381 0.021 17.751 0.000

 ES 0.349 0.035 9.936 0.000

 EN 0.279 0.056 5.032 0.000

 ME 0.323 0.033 9.649 0.000

 OP 0.217 0.038 5.717 0.000

 PE 0.339 0.032 10.703 0.000

 PR 0.542 0.019 28.283 0.000

 RE 0.289 0.023 12.739 0.000

 SE 0.268 0.044 6.029 0.000

 VI 0.301 0.021 14.109 0.000

 AC 0.490 0.019 25.914 0.000

 AU 0.405 0.021 19.129 0.000

 HG WITH

 CO 0.324 0.045 7.119 0.000

 COX 0.470 0.019 24.406 0.000

 ES 0.415 0.022 19.208 0.000

 EN 0.378 0.042 8.984 0.000

 ME 0.263 0.037 7.099 0.000

 OP 0.318 0.031 10.177 0.000

 PE 0.295 0.032 9.205 0.000

 PR 0.535 0.017 30.799 0.000

 RE 0.389 0.020 19.884 0.000

 SE 0.402 0.034 11.731 0.000

 VI 0.313 0.020 15.318 0.000

 AC 0.508 0.023 22.454 0.000

 AU 0.431 0.019 22.846 0.000

 EM 0.731 0.017 42.445 0.000

 Intercepts

 CO2 0.000 0.020 -0.004 0.997

 CO5 0.000 0.020 0.007 0.994

 CO6 0.000 0.020 -0.005 0.996

 CO9 0.000 0.020 0.011 0.992

 CO10 0.000 0.020 0.012 0.990

 CO11 0.000 0.020 -0.004 0.997

 ES2 0.000 0.020 -0.003 0.997

 ES4 0.000 0.020 -0.004 0.997

 ES7 0.000 0.020 -0.004 0.997

 EN2 0.000 0.020 0.009 0.993

 EN3 0.000 0.020 0.009 0.993

 EN7 0.000 0.020 0.009 0.993

 ME1 0.000 0.020 0.006 0.995

 ME5 0.000 0.020 0.010 0.992

 ME9 0.000 0.020 -0.005 0.996

 OP2 0.000 0.020 0.012 0.991

 OP3 0.000 0.020 -0.005 0.996

 OP5 0.000 0.020 -0.005 0.996

 PE2 0.000 0.020 -0.005 0.996

 PE3 0.000 0.020 0.003 0.998

 PE7 0.000 0.020 -0.005 0.996

 PR2 0.000 0.020 0.005 0.996

 PR6 0.000 0.020 -0.005 0.996

 PR7 0.000 0.020 0.006 0.995

 PR8 0.000 0.020 0.007 0.994

 RE3 0.000 0.020 -0.004 0.997

 RE5 0.000 0.020 -0.004 0.997

 RE6 0.000 0.020 -0.004 0.997

 SE1 0.000 0.020 -0.005 0.996

 SE2 0.000 0.020 0.006 0.995

 SE3 0.000 0.020 0.007 0.994

 VI1 0.000 0.020 -0.004 0.997

 VI4 0.000 0.020 -0.004 0.997

 VI7 0.000 0.020 -0.004 0.997

 AC1 0.000 0.020 -0.004 0.996

 AC4 0.000 0.020 -0.004 0.996

 AC7 0.000 0.020 -0.004 0.997

 AC9 0.000 0.020 -0.005 0.996

 AU2 0.000 0.020 0.006 0.995

 AU3 0.000 0.020 -0.005 0.996

 AU5 0.000 0.020 -0.004 0.996

 EM1 0.000 0.020 0.008 0.993

 EM2 0.000 0.020 -0.004 0.997

 EM4 0.000 0.020 -0.003 0.997

 EM5 0.000 0.020 0.009 0.992

 HG1 0.000 0.020 -0.005 0.996

 HG3 0.000 0.020 -0.005 0.996

 HG5 0.000 0.020 0.008 0.993

 Variances

 CO 1.000 0.000 999.000 999.000

 COX 1.000 0.000 999.000 999.000

 ES 1.000 0.000 999.000 999.000

 EN 1.000 0.000 999.000 999.000

 ME 1.000 0.000 999.000 999.000

 OP 1.000 0.000 999.000 999.000

 PE 1.000 0.000 999.000 999.000

 PR 1.000 0.000 999.000 999.000

 RE 1.000 0.000 999.000 999.000

 SE 1.000 0.000 999.000 999.000

 VI 1.000 0.000 999.000 999.000

 AC 1.000 0.000 999.000 999.000

 AU 1.000 0.000 999.000 999.000

 EM 1.000 0.000 999.000 999.000

 HG 1.000 0.000 999.000 999.000

 Residual Variances

 CO2 0.372 0.012 30.442 0.000

 CO5 0.321 0.021 15.662 0.000

 CO6 0.252 0.019 13.258 0.000

 CO9 0.316 0.011 29.088 0.000

 CO10 0.286 0.015 18.649 0.000

 CO11 0.269 0.019 14.406 0.000

 ES2 0.352 0.016 22.082 0.000

 ES4 0.359 0.014 25.451 0.000

 ES7 0.266 0.013 20.730 0.000

 EN2 0.254 0.025 10.200 0.000

 EN3 0.255 0.013 19.590 0.000

 EN7 0.292 0.011 27.342 0.000

 ME1 0.209 0.008 25.264 0.000

 ME5 0.223 0.008 26.234 0.000

 ME9 0.184 0.010 19.267 0.000

 OP2 0.136 0.010 13.713 0.000

 OP3 0.194 0.008 25.401 0.000

 OP5 0.210 0.008 26.341 0.000

 PE2 0.194 0.008 25.114 0.000

 PE3 0.160 0.007 22.106 0.000

 PE7 0.160 0.007 22.047 0.000

 PR2 0.353 0.015 23.304 0.000

 PR6 0.313 0.013 24.219 0.000

 PR7 0.430 0.016 26.740 0.000

 PR8 0.411 0.016 25.630 0.000

 RE3 0.233 0.010 23.963 0.000

 RE5 0.240 0.010 23.288 0.000

 RE6 0.190 0.011 16.908 0.000

 SE1 0.270 0.011 25.678 0.000

 SE2 0.312 0.012 25.506 0.000

 SE3 0.254 0.012 21.298 0.000

 VI1 0.143 0.007 19.197 0.000

 VI4 0.129 0.008 15.246 0.000

 VI7 0.226 0.008 29.581 0.000

 AC1 0.355 0.017 20.987 0.000

 AC4 0.392 0.020 19.935 0.000

 AC7 0.354 0.012 29.708 0.000

 AC9 0.302 0.011 28.422 0.000

 AU2 0.314 0.014 22.980 0.000

 AU3 0.194 0.016 12.140 0.000

 AU5 0.351 0.013 27.067 0.000

 EM1 0.500 0.016 30.331 0.000

 EM2 0.388 0.016 23.740 0.000

 EM4 0.526 0.020 26.419 0.000

 EM5 0.425 0.020 21.543 0.000

 HG1 0.302 0.013 23.517 0.000

 HG3 0.255 0.013 19.443 0.000

 HG5 0.328 0.013 24.856 0.000

R-SQUARE

 Observed Two-Tailed

 Variable Estimate S.E. Est./S.E. P-Value

 CO2 0.628 0.013 47.136 0.000

 CO5 0.679 0.021 32.022 0.000

 CO6 0.748 0.020 38.113 0.000

 CO9 0.684 0.012 56.450 0.000

 CO10 0.714 0.016 44.110 0.000

 CO11 0.731 0.019 37.690 0.000

 ES2 0.648 0.017 38.612 0.000

 ES4 0.641 0.015 42.455 0.000

 ES7 0.734 0.014 53.116 0.000

 EN2 0.746 0.025 29.440 0.000

 EN3 0.745 0.014 53.326 0.000

 EN7 0.708 0.012 59.383 0.000

 ME1 0.791 0.009 84.168 0.000

 ME5 0.777 0.010 80.425 0.000

 ME9 0.816 0.010 78.642 0.000

 OP2 0.864 0.010 82.821 0.000

 OP3 0.806 0.009 92.078 0.000

 OP5 0.790 0.009 86.490 0.000

 PE2 0.806 0.009 91.317 0.000

 PE3 0.840 0.008 103.607 0.000

 PE7 0.840 0.008 103.152 0.000

 PR2 0.647 0.016 40.219 0.000

 PR6 0.687 0.014 49.180 0.000

 PR7 0.570 0.017 34.081 0.000

 PR8 0.589 0.017 35.211 0.000

 RE3 0.767 0.011 71.033 0.000

 RE5 0.760 0.011 66.736 0.000

 RE6 0.810 0.012 67.560 0.000

 SE1 0.730 0.012 62.392 0.000

 SE2 0.688 0.013 51.535 0.000

 SE3 0.746 0.013 57.715 0.000

 VI1 0.857 0.008 104.888 0.000

 VI4 0.871 0.009 96.613 0.000

 VI7 0.774 0.009 86.401 0.000

 AC1 0.645 0.018 36.293 0.000

 AC4 0.608 0.020 29.946 0.000

 AC7 0.646 0.013 49.403 0.000

 AC9 0.698 0.012 58.719 0.000

 AU2 0.686 0.015 46.698 0.000

 AU3 0.806 0.017 48.639 0.000

 AU5 0.649 0.014 46.238 0.000

 EM1 0.500 0.016 30.356 0.000

 EM2 0.612 0.017 35.750 0.000

 EM4 0.474 0.020 24.179 0.000

 EM5 0.575 0.020 28.438 0.000

 HG1 0.698 0.014 50.271 0.000

 HG3 0.745 0.014 53.024 0.000

 HG5 0.672 0.014 47.140 0.000

**Section 12: Mplus Syntax Used for Analyses Presented in the Main Manuscript (Relations between Individual items from the WEMWBS and The Flourishing, and the 15 WB-Pro Factors: The Multidimensionality of Unidimensional Scales)**

 USEVARIABLES ARE

 t2CO2 t2CO5 t2CO6

 t2CO9 t2CO10 t2CO11

 t2ES2 t2ES4 t2ES7

 t2EN2 t2EN3 t2EN7

 t2ME1 t2ME5 t2ME9

 t2OP2 t2OP3 t2OP5

 t2PE2 t2PE3 t2PE7

 t2PR2 t2PR6 t2PR7 t2PR8

 t2RE3 t2RE5 t2RE6

 t2SE1 t2SE2 t2SE3

 t2VI1 t2VI4 t2VI7

 t2AC1 t2AC4 t2AC7 t2AC9

 t2AU2 t2AU3 t2AU5

 t2EM1 t2EM2 t2EM4 t2EM5

 t2HG1 t2HG3 t2HG5

 t2WMWB1 t2WMWB2 t2WMWB3 t2WMWB4 t2WMWB5 t2WMWB6

 t2WMWB7 t2WMWB8 t2WMWB9 t2WMWB10 t2WMWB11 t2WMWB12

 t2WMWB13 t2WMWB14

 ;

 define: standardize all;

 t2DIEN1 = -t2DIEN1 ;

 t2DIEN2 = -t2DIEN2 ;

 t2DIEN3 = -t2DIEN3 ;

 t2DIEN4 = -t2DIEN4 ;

 t2DIEN6 = -t2DIEN6 ;

 t2DIEN7 = -t2DIEN7 ;

 t2DIEN8 = -t2DIEN8 ;

 t2DIEN9 = -t2DIEN9 ;

 ANALYSIS: ESTIMATOR = MLR;

 ROTATION = TARGET;

 PROCESSORS =4;

 MODEL:

 CO by t2CO2-t2CO6~.80 t2CO9-t2hg5~0 t2WMWB1-t2DIEN9~0

 T2WMWB2~.8 T2WMWB6~.8 T2WMWB10~.8 T2DIEN6~.8 (\*t1);

 CT by t2CO9-t2CO11~.80 t2es2-t2hg5~0 t2CO2-t2CO6~0 t2WMWB1-t2DIEN9~0

 T2WMWB7~.8 T2WMWB11~.8 T2DIEN6~.8 (\*t1);

 ES by t2ES2-t2ES7~.80 t2EN2-t2hg5~0 t2CO2-t2CO11~0 t2WMWB1-t2DIEN9~0

 T2WMWB3~.8 (\*t1);

 EN by t2EN2-t2EN7~.80 t2ME1-t2hg5~0 t2CO2-t2ES7~0 t2WMWB1-t2DIEN9~0

 T2WMWB3-T2WMWB5~.8 T2WMWB13~.8 T2DIEN3~.8 (\*t1);

 ME by t2ME1-t2ME9~.80 t2OP2-t2hg5~0 t2CO2-t2EN7~0 t2WMWB1-t2DIEN9~0

 T2WMWB2~.8 T2DIEN1~.8 T2DIEN7~.8 T2DIEN8~.8 (\*t1);

 OP by t2OP2-t2OP5~.80 t2PE2-t2hg5~0 t2CO2-t2ME9~0 t2WMWB1-t2DIEN9~0

 T2WMWB1~.8 T2WMWB13~.8 T2DIEN8~.8 (\*t1);

 PE by t2PE2-t2PE7~.80 t2PR2-t2hg5~0 t2CO2-t2OP5~0 t2WMWB1-t2DIEN9~0

 T2WMWB3~.8 T2WMWB8~.8 T2WMWB12~.8 T2WMWB14~.3 T2DIEN1~.8 (\*t1);

 PR by t2PR2-t2PR8~.80 t2RE3-t2hg5~0 t2CO2-t2PE7~0 t2WMWB1-t2DIEN9~0

 T2WMWB4~.8 T2WMWB9~.8 T2WMWB12~.8 T2DIEN2~.8 T2DIEN4~.8 T2DIEN9~.8 (\*t1);

 RE by t2RE3-t2RE6~.80 t2SE1-t2hg5~0 t2CO2-t2PR8~0 t2WMWB1-t2DIEN9~0

 T2WMWB6~.8 (\*t1);

 SE by t2SE1-t2SE3~.80 t2VI1-t2hg5~0 t2CO2-t2RE6~0 t2WMWB1-t2DIEN9~0

 T2WMWB8~.8 T2WMWB10~.8 T2DIEN6~.8 T2DIEN7~.8 T2DIEN9~.8 (\*t1);

 VI by t2VI1-t2VI7~.80 t2AC1-t2hg5~0 t2CO2-t2SE3~0 t2WMWB1-t2DIEN9~0

 T2WMWB5~.8 (\*t1);

 AC by t2AC1-t2AC9~.80 t2AU2-t2hg5~0 t2CO2-t2VI7~0 t2WMWB1-t2DIEN9~0

 (\*t1);

 AU by t2AU2-t2AU5~.80 t2EM1-t2hg5~0 t2CO2-t2AC9~0 t2WMWB1-t2DIEN9~0

 T2WMWB11~.8 (\*t1);

 EM by t2EM1-t2EM5~.80 t2HG1-t2hg5~0 t2CO2-t2AU5~0 t2WMWB1-t2DIEN9~0

 T2WMWB5~.8 T2WMWB9~.8 (\*t1);

 HG by t2HG1-t2HG5~.80 t2CO2-t2EM5~0 t2WMWB1-t2DIEN9~0

 T2WMWB4~.8 T2WMWB9~.8 T2DIEN4~.8 (\*t1);

 OUTPUT: sampstat stdyx mod TECH1 tech4 sval;! MODINDICES (ALL);

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