

RESEARCH PAPER

*Further examination of the naturally emerging structure of well-being: Another look at the 'Big Two'**Carmel Proctor¹, Roger G. Tweed², and John Maltby³***Corresponding author**

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School of Psychology Experiment Participation Requirement (EPR) Scheme.

Consent to Participate

The participant consent form informed participants that participation was voluntary
and that individuals were free to withdraw at any time without penalty. Participants
were fully informed with regards to the confidentiality and handling of their data.
All participants received EPR credit.

Author Contributions

Data collection was performed by Dr John Maltby and data analysis conducted by
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Dr Roger Tweed jointly.

Abstract

Background: This study further explores the naturally emerging structure of well-being. Practitioners often measure the subjective well-being (SWB) construct, though a "Big Two" (hedonic vs eudaimonic) or "Big Three" (hedonic, eudaimonic, psychosocial/tripartite) model may deserve more attention. Furthermore, theories of well-being often involve virtue, without its operationalization.

Methodology: This study explored naturally emerging constructs of well-being. University students ($n = 269$) completed measures of well-being (positive and negative affect, depression, basic psychological needs, authenticity, hope, life satisfaction, psychological well-being), and virtue (empathy, dark triad traits). Goldberg's (2006) Bass-Ackward procedure of component analysis provided a quantitative approach to examine the emerging constructs of well-being.

Results: Results provide further confirmation of the philosophical distinction between well-being and dysphoria, hedonia and eudaimonia, and the nonspecificity of life satisfaction. Virtue was associated with eudaimonia but was not redundant with other elements. Unexpected evidence emerged that the rejecting-influence element of authenticity may load more with dysphoria than with well-being.

Discussion: The separation of well-being from dysphoria and of hedonia from eudaimonia suggest the analysis worked well. The nonspecificity of life satisfaction brings further evidence that the SWB construct may be imbalanced. Results also support calls for a return to the Aristotelian inclusion of virtue in modern conceptualizations of eudaimonia. The Bass-Ackward approach also provided unexpected insights regarding authenticity.

Conclusions: Overall, results suggest a justification for a broader Big Three (tripartite) model of well-being. The Bass-Ackward approach also showed further potential with its combination of quantitative methods while allowing for the emergence of unexpected new insights.

Keywords: eudaimonia; well-being; happiness; hedonia; Bass-Ackward; life satisfaction

INTRODUCTION

Well-being researchers often presume value in distinguishing hedonic and eudaimonic forms of well-being (Joshani, 2016; Proctor, Tweed, & Morris, 2015; Ryan & Deci, 2001), thereby building on thousands of years of theory (e.g., Epicurus vs Aristotle). Hedonia represents pleasure and absence of pain, while eudaimonia represents excellence and virtue. Modern researchers often operationalize hedonic well-being (HWP) as equivalent to subjective well-being (SWB; i.e., life satisfaction, positive affect, and low negative affect) ¹ (Keyes, Shmotkin, & Ryff, 2002; Linley, Maltby, Wood, Osborne, & Hurling, 2009; Vittersø, 2016b) and they often operationalize eudaimonic well-being (EWB) as psychological well-being ² (PWB; e.g., autonomy, environmental mastery, personal growth, positive relations with

Table 1
Constructs and Relationships

Big Two of Well-Being	a) Hedonia: Positive affect less negative affect b) Eudaimonia: Excellence and virtue
Affect	Emotion or mood
Big Three (Tripartite Model) of Well-Being	a) Hedonia b) Eudaimonia c) Psychosocial Well-Being: Satisfying and/or beneficial relationships, Meeting other psychological needs
Subjective Well-Being	a) Positive affect b) Low negative affect c) Life satisfaction
Life Satisfaction	Cognitive evaluation of the overall quality of one's life
Big 5	Personality traits: Extraversion, Conscientiousness, Agreeableness, Emotional stability, Openness
Dysphoria	Subjective ill-being: Undesired psychological states such as anxiety and depression

others, purpose in life, and self-acceptance (Ryff, 1989). The thousands of years of tradition and ongoing work distinguishing hedonia and eudaimonia, seem to justify referring to these as the “Big Two” of well-being (see Table 1).

Eudaimonia and Hedonia as the Big Two

The structure of well-being, however, is not as settled as this long tradition might initially suggest. The distinction has recently been questioned by some, due to strong correlations between indicators of these two constructs (Disabato, Goodman, Kashdan, Short, & Jarden, 2016; Joshanloo, 2016), and due to lack of agreement on their measurement and operationalization (Biswas-Diener, Kashdan, & King, 2009; Proctor et al., 2015). A number of the failures to find a meaningful distinction between hedonia and eudaimonia can be attributed to a reliance on hedonia measures of well-being that conflate hedonia and eudaimonia (e.g., life satisfaction; Proctor et al., 2015). When more pure measures of eudaimonia are utilized, structural

distinctions will often emerge (Proctor et al., 2015).

Furthermore, hedonia and eudaimonia, when measured distinctly, can produce distinct relations to other constructs (Thorsteinsen & Vittersø, 2019). Joshanloo (2016) presented evidence that the previously reported high correlations between hedonic and eudaimonic well-being have resulted from using confirmatory factor analysis, instead of less restrictive techniques more aptly applied to multidimensional constructs, such as exploratory structural equation modeling. Using the data from Gallagher et al.'s (2009) study of the tripartite model of well-being, Joshanloo (2016) demonstrated a clear distinction between hedonia and eudaimonia.

Life Satisfaction as a Confounding Element

In much-applied research, life satisfaction is included in indicators of hedonia even though the construct can be confounded with eudaimonia, which adds to the debate and confusion (Proctor et al., 2015). This occurs when researchers operationalize *hedonic*

well-being as a combination of positive affect, negative affect, and life satisfaction. Relying on this three-part indicator of SWB as an accurate measure of hedonia is problematic. As previously noted, an important confound exists because life satisfaction overlaps with hedonia and eudaimonia (see Proctor et al., 2015). Thus, a composite score from this three-part indicator of SWB not only fails to provide a pure measure of hedonia because it partially represents eudaimonia but also fails to provide a balanced assessment of hedonia and eudaimonia because it includes two measures of hedonia (i.e., positive and negative affect) and a single measure that assesses both hedonia and eudaimonia (i.e., life satisfaction). However, in accordance with Joshanloo (2016), we note the potential benefits of a further indicator of well-being that is maximally distinct from hedonia and eudaimonia in future conceptualizations of a Big Three or *tripartite model of well-being*. The common use of positive affect, negative affect, and life satisfaction to represent well-being, however, is problematic, so there is value in exploring the extent to which life satisfaction emerges as a distinct construct among modern measures of well-being.

Virtue: A Neglected Element of Eudaimonia

One element central to the original conception of eudaimonia receives little direct assessment in much modern research on eudaimonia. Aristotle, who provided an extensive discussion of the nature of eudaimonia, presumed that virtue was inextricably involved in eudaimonia. Virtue, however, receives limited attention in modern discussions of eudaimonia even though one could argue that elements of eudaimonia, such as personal growth, the achievement of excellence, and serving a greater purpose all tend to involve elements of virtue (see Proctor & Tweed, 2016 for a discussion). Thus, Aristotle's idea that virtue is part of eudaimonia may deserve more attention. If traditional Aristotelian perspectives have value, one might also expect a virtue dimension to emerge, even though it rarely is discussed among well-being researchers. In particular, Aristotle argued that eudaimonia is contingent on virtue – that is, it requires rational, virtuous activity (Aristotle, c. 330 BCE/1980). However, although virtue is necessary for eudaimonia, virtue is not sufficient – that is, eudaimonia also consists of other “goods” that contribute to well-being (Aristotle, c. 330 BCE/1980).

Nevertheless, virtue is strangely absent from modern indicators of eudaimonia. One could question whether this absence is deserved, based on empirical grounds, or whether the absence is

indicative of a blind spot among modern well-being researchers (Sandstrom & Dunn, 2011). Indeed, according to Sheldon (2018), it would seem that psychologists have made a serious error in joining eudaimonia with well-being into a conceptual whole (i.e., *eudaimonic well-being*), given that Aristotle (c. 330 BCE/1980) was clear to distinguish eudaimonia as *activity* and happiness (well-being) as *feeling*. As noted by Sheldon (2018), “Eudaimonia, as originally conceived, was not a *feeling*, *psychological condition*, or *type of well-being*; rather, the concept referred to particular *ways of thinking and/or behaving*, ways which might subsequently affect or contribute to well-being” (p. 116). Aristotle asserted a direct and essential relationship between virtue and eudaimonia – that is, eudaimonia is achieved through the exercising of virtue.

Furthermore, several cultural traditions and the iconic figures within them have esteemed virtue as central to well-being (e.g., Buddhism and Confucianism), and indeed the centrality of virtue to well-being continues to be echoed in some modern work. For example, Robbins noted: “the virtue hypothesis predicts that happiness is derived from the cultivation of virtue” (Robbins, 2008, p. 103). However, modern positive psychological research has failed to include measures of virtue in examinations of eudaimonia (Proctor & Tweed, 2016). Virtue is central to Aristotle's definition of eudaimonia; therefore, failure to include measurement of virtue in considerations of eudaimonic well-being appears to be a glaring oversight on behalf of the field of positive psychology. Moreover, as highlighted by Ng and Tay (2020), if researchers are empirically investigating Aristotelian theory, “then they should do so according to the specifications of Aristotelian theory to yield the outcome of accurate knowledge about those ideas...and align measurement methods and models in such a way that it does justice to the theory from which the construct sprang” (p. 3; cf. Waterman, 1988).

Arguments for a Tripartite Model of Well-Being

Others have argued that the Big Two conceptualization of well-being is incomplete because more dimensions are needed. These suggest that a tripartite (or broader “Big Three”) model of well-being (Gallagher et al., 2009; Joshanloo, 2016, 2018, 2019) provides a more accurate and complete representation.

Basic Psychological Need Satisfaction

Some research points in the direction of basic psychological needs satisfaction as a third dimension (Proctor et al., 2015). In that

research, the third dimension related to the fulfillment of needs, including the need for autonomy and competence – elements empirically established as essential psychosocial conditions for well-being (Ryan & Deci, 2000, 2017). Recently, Martela and Sheldon (2019) proposed basic psychological needs satisfaction (Ryan & Deci, 2000, 2017) as the additional indicator, along with eudaimonic motives/activity (“eudaimonic well-being”) and SWB (“hedonic well-being”), making up a tripartite model of well-being. Their model makes making psychological needs essential in assessing eudaimonic dimensions of wellness (Martela & Sheldon, 2019).

Psychosocial Well-Being

Others suggest a tripartite (or broader “Big Three”) model of well-being consisting of hedonic, eudaimonic, and psychosocial dimensions (Gallagher et al., 2009; Joshanloo, 2016, 2018, 2019). Recently, Joshanloo (2018) set out to create a new index of eudaimonic well-being across 166 countries. Seven key areas of eudaimonic well-being were assessed based on prominent and widely used models, including Ryff’s (1989) model of psychological well-being, Ryan and Deci’s (2001) model of basic psychological needs satisfaction, and Keyes’ (1998) social well-being model. Results supported their distinction. Further, the results demonstrate a need to understand the psychosocial elements of well-being to improve human flourishing (see Joshanloo, 2018).

Value of the Emerging Structure of Well-Being.

Thus, more work is needed to clarify the structure of well-being among commonly used indicators of this construct. Because of the current state of the field, space has emerged for exploratory analyses of the naturally emerging structure of well-being among measures of well-being. Frequently, analysts assess dimensionality or structure of constructs such as well-being and report their conclusion as to the ideal structure or number of dimensions. Still, consumers of research could also benefit by gaining insight into the process and emergent nature of structure among well-being measures. Doing so could help address which of many theoretical orientations represent the emergent structure rather than testing one or a very small set of possible theoretical structures. Goldberg’s (2006) *Bas-Ackward* method of structure analysis, despite its odd name and methodological simplicity, provides such an approach by providing a visual means of representing the emergence of structure among a set of psychometric measurement items or scales. Because of the wide variety of theoretical orientations in well-being research,

consumers of research could benefit from seeing which of the orientations describe the results of such exploratory analyses of collections of well-being measures.

One could expect, for example, that hedonia and eudaimonia will be distinct. For instance, Kryza-Lacombe, Tazini, and O’Neil (2019) found eudaimonic motives to be associated with GPA among college students, suggesting that eudaimonic motives are associated with striving for excellence, whereas hedonic motives are not. Similarly, Sheldon (2018) notes the importance of eudaimonic *activities* in promoting positive psychological or emotional states associated with SWB. Indeed, research has long supported the positive impact on well-being of eudaimonic behaviors versus hedonic behaviors (e.g., Steger, Kashdan, & Oishi, 2008). One could also expect that a third dimension related to psychosocial well-being, or basic psychological needs satisfaction, or virtue will emerge as discussed above.

Sheldon’s Focus on Aristotelian Roots

Accordingly, Sheldon (2018) has called for a return to the Aristotelian roots of eudaimonia, proposing a “eudaimonic activity model” (EAM) that refers specifically to eudaimonia being defined as conative activity and not psychological or emotional states – that is, it distinguishes between “doing well” and “feeling well” (Martela & Sheldon, 2019). The EAM (Sheldon, 2016, 2018) also provides a good reason for the accurate measurement of eudaimonia, in that eudaimonia contributes to SWB (Proctor et al., 2015). According to Sheldon, any constructs failing to contribute to SWB are not real forms of eudaimonia. Indeed, Martela and Sheldon noted, there are at least 45 ways of conceptualizing and measuring EWB, including 63 distinct constructs, without a single element common across measurements (e.g., Martela & Sheldon, 2019; cf. Proctor & Tweed, 2016). Therefore, this study aims not only to explore further the naturally emerging structure of well-being (i.e., the Big Two) and add support for a broader Big Three or tripartite model of well-being but also to support calls for more clarity in the field to determine the key elements of EWB (e.g., Martela & Sheldon, 2019; Sheldon, 2016) – which we believe inherently also requires the inclusion of virtue.

THE CURRENT STUDY

The current study aims to build on previous research findings (Proctor et al., 2015) by further exploring the naturally emerging

structure of well-being. A clear distinction between hedonia and eudaimonia has been uncovered. However, previous research did not include pure measures of virtue. Therefore the current study was designed to extend the findings by examining a data set which included a pure measure of virtue and its opposite (i.e., Interpersonal Reactivity Index and Dark Triad Dirty Dozen scales). Also, the inclusion of a measure of basic psychological needs can help clarify whether these will again emerge as a third element of a tripartite model of well-being (Proctor et al., 2015). Moreover, this study sought to demonstrate further that the naturally emerging relationship between hedonia and eudaimonia occurs whether or not data has been explicitly collected for this purpose; data collected for this study was undertaken as part of the School of Psychology's Experiment Participation Requirement (EPR) Scheme.

STUDY HYPOTHESES

Hypothesis 1: Well-being and dysphoria (subjective ill-being) components will separate as suggested by many positive psychologists, and as found in prior research (Proctor et al., 2015), and as indicated by Diener and Emmons' (1984) classic analyses of positive and negative affect.

Hypothesis 2: The results will support the philosophical distinction between hedonic well-being (e.g., positive and negative affect) and eudaimonic well-being (e.g., psychological needs, empathy, and virtue). In particular, the hedonic items are expected to load together early in the extraction process.

Hypothesis 3: Life satisfaction includes eudaimonic elements, so life satisfaction will show relationships to both hedonic and eudaimonic well-being. Life satisfaction is neither purely hedonic nor purely eudaimonic, so it will load on both types of components.

Hypothesis 4: Indicators of virtue or its absence will load with eudaimonic well-being, as suggested by Aristotle's notion that eudaimonia is achieved through the exercising of virtue.

Hypothesis 5: The Bass-Ackward method's exploratory nature will contribute additional information regarding well-being that was not anticipated by the other hypotheses.

METHOD

Participants

Participants were 269 university students aged 18-36 (35 males, 234 females). The mean age of participants was 19.75 (SD =

2.65). Participants were 87% female; 59% of all participants were Caucasian.

MEASURES

Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item self-report measure made up of two subscales, each consisting of ten items: ten positive affects (e.g., Interested) and ten negative affects (e.g., Distressed). Respondents are required to respond to each item, based on how they have been feeling over the course of the past week, using a 5-point Likert scale (Very Slightly or Not At All to Extremely). Intercorrelations and internal consistency reliabilities are all acceptably high, ranging from 0.86 to 0.90 for PA and from 0.84 to 0.87 for NA, whereas the correlation between the PA and NA scales is invariably low, ranging from -.12 to -.23 (Watson et al., 1988). The PANAS has been demonstrated to have good external validity and to have good convergent correlations (.76 to .92) and acceptable divergent correlations (under -.20) with the appropriate factors of these mood scales (Watson et al., 1988). Overall, the PANAS is a valid and reliable measure of positive and negative affect.

Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) is a 20-item self-report measure of depression, comprised of six scales: 1) depressed mood; 2) feelings of guilt and worthlessness; 3) feelings of helplessness and hopelessness; 4) psychomotor retardation; 5) loss of appetite; and 6) sleep disturbance. Respondents are required to respond to each item using a 4-point Likert scale (Rarely or None of the Time [less than 1 day] to Most or All of the Time [5-7 days]). The CES-D has been demonstrated to have high internal consistencies, with alpha coefficients in the .85 to .90 range reported across studies (Radloff, 1977). Overall, the CES-D has been shown to be a useful measure of depressive symptoms in non-clinical populations.

Basic Psychological Needs Scale (BPNS; Gagne, 2003; Kasser, Davey, & Ryan, 1992) is a 21-item self-report measure of basic psychological needs satisfaction. Respondents are required to respond to each item using a 7-point Likert scale (Not At All True to Very True) across three psychological needs: 1) Autonomy (7 items, e.g., "I generally feel free to express my ideas and opinions"); 2) Competence (6 items, e.g., "In my life I do not get much chance to show how capable I am"); and 3) Relatedness (8 items, e.g., "People in my life care about me"). Higher scores indicated increased satisfaction. The BPNS has

been demonstrated to have acceptable internal consistency, with alpha coefficients reported at .68, .75, .85, and .90 for the Autonomy, Competence, and Relatedness domains and total scores, respectively (Wei, Shaffer, Young, & Zakalik, 2005).

Authenticity Scale (AS; Wood, Linley, Maltby, Baliousis, & Joseph, 2008) is a 12-item scale designed to measure dispositional authenticity across three domains: Authentic Living (e.g., “I think it is better to be yourself, than to be popular”), Accepting External Influence (e.g., “I am strongly influenced by the opinions of others”), and Self-Alienation (e.g., “I don’t know how I really feel inside”). Respondents are required to respond to each item using a 7-point Likert scale (Does Not Describe Me At All to Describes Me Very Well). The scale has been shown to have substantial discriminant validity from the Big Five personality traits, non-significant correlations with social desirability, and 2- and 4-week test-retest correlations ranging from $r = .78$ to $.91$ (Wood et al., 2008). High scores on the Authentic Living subscale and low scores on the Accepting External Influence and Self-Alienation subscales indicate authenticity.

Trait Hope Scale (HS; Snyder et al., 1991) is a 12-item self-report scale of hope, consisting of eight hope items and four filler items. There are two subscales that tap the two components of hope (i.e., agency and pathways). The Agency subscale, comprised of four items (e.g., “I energetically pursue my goals”), measures the degree to which an individual has the perceived motivation to move toward their goals. The Pathways subscale, comprised of four items (e.g., “There are lots of ways around any problem”), measures the degree to which an individual has the perceived ability to generate workable routes or goals, under both unimpeded and impeded goal-pursuit circumstances. Responses are scored on an 8-point Likert scale (Definitely False to Definitely True). Higher scores indicated higher levels of hopeful thoughts. Both subscales also have adequate internal reliability. Cronbach’s alphas range from .70 to .84 for the Agency subscale, and from .63 to .86 for the Pathways subscale (Snyder et al., 1991). Overall, the scale is a valid and reliable measure of hope.

Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) is a 5-item self-report measure of global life satisfaction. Respondents are required to respond to each item (e.g., “In most ways my life is close to my ideal”) using a 7-point Likert scale (Strongly Disagree to Strongly Agree). Higher scores indicate higher life satisfaction. The scale has been shown to have high internal reliability (.87), moderate temporal stability (.82, two-month test-retest reliability; Diener et al., 1985), and to correlate

appropriately with criterion measures (Pavot, Diener, Colvin, & Sandvik, 1991).

Psychological Well-Being (PWB; Ryff & Keyes, 1995) is an 18-item self-report measure of psychological well-being. The scale is the mid-length version of the Ryff Scales of Psychological Well-being (Ryff, 1989), consisting of three items for each of the six subscales: autonomy (e.g., “Sometimes I change the way I act or think to be more like those around me”), environmental mastery (e.g., “I am quite good at managing the many responsibilities of my daily life”), personal growth (e.g., “I am the kind of person who likes to give new things a try”), positive relations with others (e.g., “Most people see me as loving and affectionate”), purpose in life (e.g., “I have a sense of purpose and direction in life”), and self-acceptance (e.g., “In general, I feel confident and positive about myself”). Respondents are required to respond to items using a 6-point Likert scale (Strongly Disagree to Strongly Agree). High scores indicate high self-ratings. The scale has produced modest internal consistency ratings ranging from .33 (Purpose in Life) to .56 (Positive Relations with Others) (Ryff & Keyes, 1995; cf. van Dierendonck, 2004). When compared to other frequently used scales of well-being (e.g., positive and negative affect, life satisfaction), the scale demonstrates key aspects of positive functioning captured by the six-factor model neglected by other scales.

Interpersonal Reactivity Index (IRI; Davis, 1980) is a 28-item self-report measure of individual differences in empathy. The scale consists of four subscales, each made up of seven different items. The four subscales are 1) Perspective Taking – measures the tendency to adopt the point of view of other people in everyday life [e.g., “I sometimes try to understand my friends better by imagining how things look from their perspective”]; 2) Fantasy – measures the tendency to transpose oneself into the feelings and actions of fictitious characters in books, movies, and plays [e.g., “I really get involved with the feelings of the characters in a novel”]; 3) Empathic Concern – measures the tendency to experience feelings of warmth, compassion, and concern for other people [e.g., “I often have tender, concerned feelings for people less fortunate than me”]; and 4) Personal Distress – measures “self-oriented” feelings of personal unease and discomfort in reaction to the emotions of others [“Being in a tense emotional situation scares me”]] (taken directly from Davis, 1983, p. 117). **Dark Triad Dirty Dozen** (DTDD; Jonason & Webster, 2010) is a 12-item self-report personality inventory that assesses three socially maladaptive dark triad traits: Machiavellianism, narcissism, and psychopathy. The scale consists of four items per subscale.

Respondents are required to respond to each item using a 7-point Likert scale (Strongly Disagree to Strongly Agree). The scale has been demonstrated to have high test-retest correlations ranging from .76 to .89 and satisfactory internal reliability (.84 to .92). Factor analysis of the scale indicates a three-factor structure (i.e., measuring Machiavellianism, narcissism, and psychopathy) over a single-factor model (i.e., measuring a compound dark triad factor). The scale has also been demonstrated to have acceptable convergent validity coefficients (see Jonason & Webster, 2010).

Procedure

The study questionnaire was an online survey administered via a university School of Psychology Experiment Participation Requirement (EPR) Scheme. The participant consent form informed participants that participation was voluntary and that individuals were free to withdraw at any time without penalty. Participants were fully informed with regards to the confidentiality and handling of their data. All participants received EPR credit.

Analytic Procedure

The Bass-Ackward approach to data reduction, developed by Goldberg (2006), allows a visual representation of the amalgamation of variance and thus is a helpful tool for understanding relations between psychometric items (cf. Proctor et al., 2015). In contrast to more typical data reduction procedures, which produce a single extraction and rotation purported to display the one best result, Goldberg's (2006) method allows a visual representation of the process of data reduction. The *R Psych* package (Revelle, 2019) was used with pairwise deletion for computing the components. Because so many theoretical orientations are competing within the domain of well-being, an exploratory approach can be justified. In particular, the Bass-Ackward approach provides a visual representation of the process by which indicators of well-being cohere and by which dimensions emerge. Rather than representing one single conclusion regarding an ideal number and set of dimensions, this approach provides a representation of the overall process of the change in dimensions across extractions.

Within the Bass-Ackward approach, Goldberg (2006) specifically called for the use of principal components analysis with varimax rotation. Admittedly, data reduction in psychology more typically involves nonorthogonal rotations because one would not have reason to expect that the measures will be completely orthogonal. Goldberg, however, argued that for this particular application, a varimax

rotation functions best because the orthogonality (a) allows a visual representation of the amount of variance independently accounted for by each component, (b) typically produces results sufficiently similar to that of a nonorthogonal rotation, yet (c) produces greater consistency in the items receiving maximum loadings across extractions. These features can help produce a clearer narrative of data reduction. Because of the large number of items and limited sample size, the focus here will not be on interpreting individual loadings but instead examining patterns of multiple items from a given scale loading on each particular component.

RESULTS

Understanding the Bass-Ackward Diagram

The figure represents a key result from this analytic procedure (Goldberg, 2006), so an explanation of the figure is required (see Figure 1). Each horizontal row represents one set of components extracted (i.e., the first row represents the single component extraction; the second row represents the two-component extraction, etc.). The arrows represent correlations between components. Within a given horizontal row, all components are orthogonal.

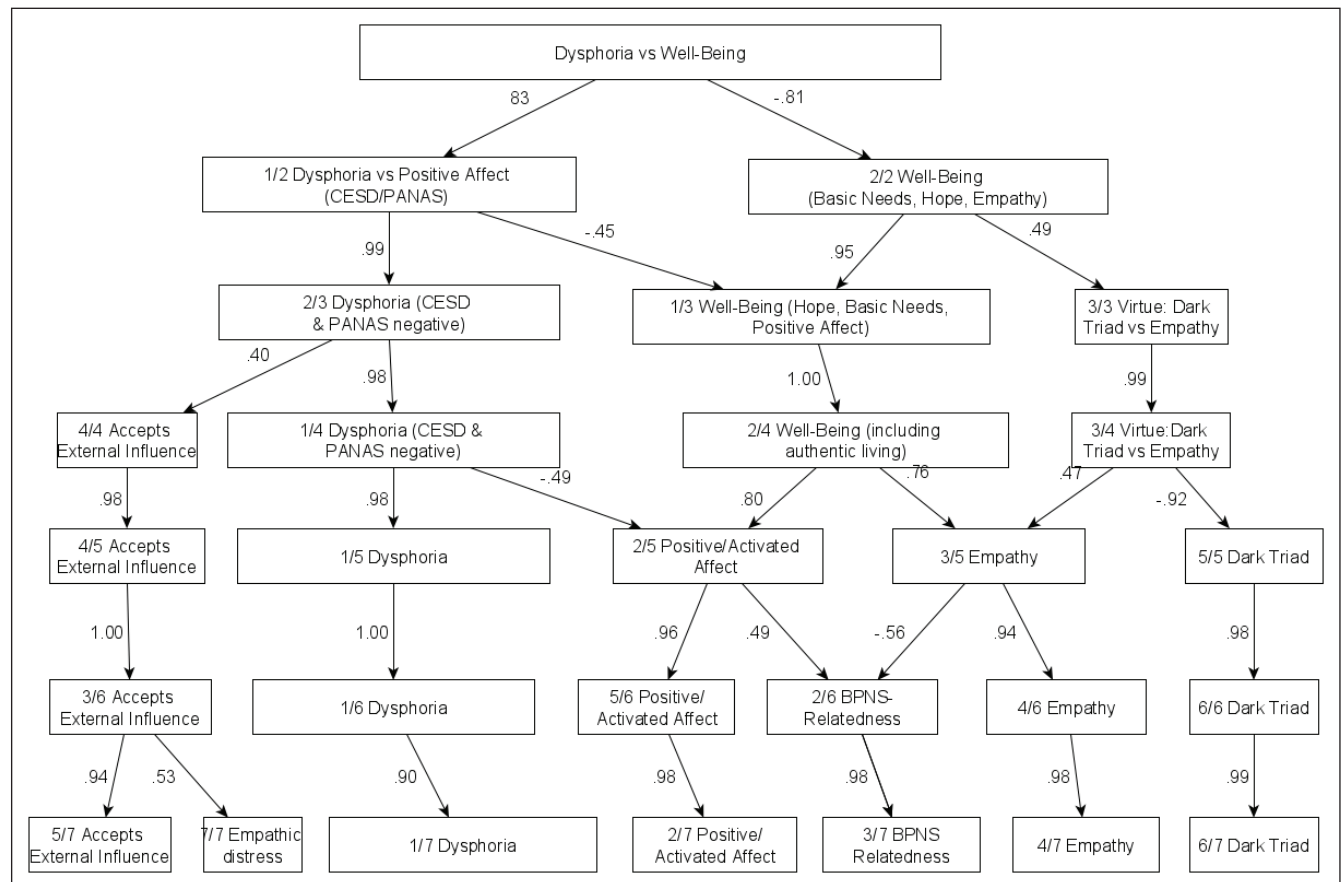
The width of each box represents the amount of variance explained, and that proportionality is one of the reasons that Goldberg (2006), who originally advocated the Bass Ackward method, selected orthogonal extractions for this procedure. Thus, the second-row boxes representing the extraction of two principal components are each narrower than the first principal component, indicating that each accounts for less variance than does the first principal component. The sum of those widths indicates, however, that jointly they account for more variance than does the one component alone.

The first row containing the first principal component (i.e., 1/1, the box at the top of the diagram) represents dysphoria (primarily negative affect) versus well-being. In that first component, negative affect items loaded positively, and well-being items loaded negatively.

In the second row, the first component was dominated by affect items (positive vs negative). The more eudaimonic type of items (autonomy, competence, relatedness, empathy vs dark triad) tended to load more strongly on a second component. Arrows indicate that the first component (i.e., the top row) correlated .83 with the second-row component containing the affect items (component 1/2, i.e., hedonia) and -.81 with the second-row well-being component (2/2).

Figure 1

Hierarchical relationships between latent variables for seven extraction and rotation process



In the third row (i.e., three-component extraction), the virtue-related items separated into their own component. Surprisingly, the positive affect items rejoined the other eudaimonia-related items before separating again into their own component in the five-component extraction.

HYPOTHESES

Hypothesis 1 stated that well-being and dysphoria (subjective ill-being) components would separate, as suggested by many positive psychologists, as found in prior research (Proctor et al., 2015), and suggested by Diener and Emmons' (1984) analyses of positive and negative affect. This hypothesis was supported by the pattern of

separation in the third row of Figure 1 (component 2/3 vs 1/3).

Hypothesis 2 stated that the results would support the philosophical distinction between hedonic well-being (e.g., PANAS) and eudaimonic well-being (e.g., BPNS, Empathy, Dark Triad). In particular, the hedonic items were expected to load together early in the extraction process and separately from eudaimonic items. As expected, the PANAS affect items separated from the eudaimonic items early, even by the second row (i.e., the two-component extraction, 1/2 & 2/2). However, the message is not completely simple because even though the positive affect items remained separate from the virtue oriented eudaimonia items, they rejoined other eudaimonia items (Hope, Basic Psychological Needs Satisfaction, Authentic Living) at the

second and third levels in component 1/3 and 2/4 before again separating from the eudaimonia items in row five. This suggests that some eudaimonia items (virtue-related items) may be more distinct from hedonia than are other eudaimonia items (e.g., Hope, Basic Psychological Needs Satisfaction, Authentic Living).

Hypothesis 3 stated that life satisfaction includes eudaimonic elements, so life satisfaction will show relationships to both hedonic and eudaimonic well-being. Life satisfaction is neither purely hedonic nor purely eudaimonic, so it will load on both types of components. This hypothesis received support. Life satisfaction did not form a distinct factor and loaded inconsistently. For example, in the five component extraction, several life satisfaction items loaded with the positive affect factor (2/5), but in the six component extraction, a number of life satisfaction items loaded with the BPNS relatedness factor (2/6).

Hypothesis 4 stated that indicators of virtue or its absence would load with eudaimonic well-being, as suggested by Aristotle's notion that eudaimonia is achieved through the exercising of virtue. This hypothesis was only partially supported. Some virtue-related items from the empathy scale and, to some extent, negatively weighted dark triad items loaded on the well-being component in the two-component extraction (2/2), but virtue separated off into a separate component at level three, prior to any separation between hedonia and eudaimonia. Thus, the virtue measures of eudaimonia tended to separate from the other indicators of eudaimonia used in this study. Nonetheless, the arrow between component 2/2 and 3/3 in figure 1 suggests a strong link between the original eudaimonia component (2/2) and the first more pure virtue component (3/3).

Hypothesis 5 stated that the Bass-Ackward method's exploratory nature would contribute additional information regarding well-being that was not anticipated by the other hypotheses. As mentioned above, the virtue-focused indicators of eudaimonia utilized here tended to separate early from the other indicators of eudaimonia used here. Virtue items loaded more closely with well-being than with dysphoria (subjective ill-being), yet virtue was not redundant with well-being.

Also, the accepting influence subscale (e.g., "I am strongly influenced by the opinions of others") which indicates lack of authenticity in the Authenticity Scale and some other authenticity items tended to separate from other indicators of eudaimonia and hedonia, and instead cohered more closely with dysphoria and anhedonia. This suggests that at least one of the dimensions of authenticity coheres more closely with low levels of dysphoria than with well-being.

DISCUSSION

These analyses provide further confirmation that a Big Two distinction between hedonia and eudaimonia naturally emerges in exploratory analyses of well-being data. The finding also confirms an earlier analysis relying on the same analytic technique used here, but a different collection of indicators of well-being (Proctor et al., 2015). In the prior analysis, eudaimonia was represented by a sense of meaning. Again, however, the hedonic and eudaimonic elements naturally separated. This fits with the long-held philosophical distinction between hedonia and eudaimonia.

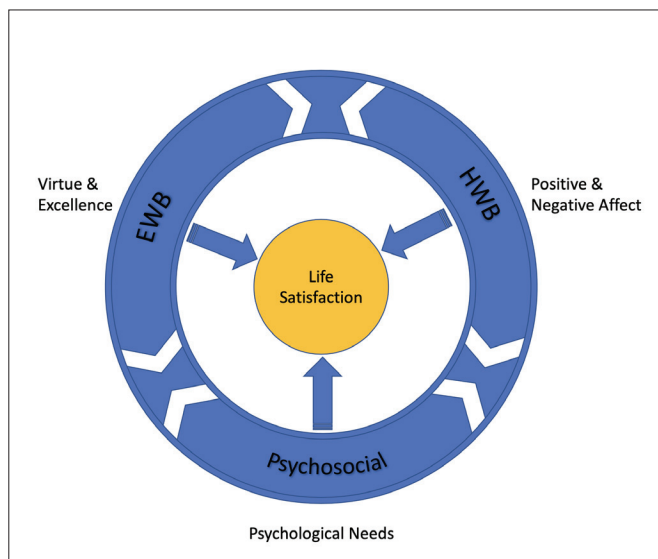
The results also support Aristotle's idea that eudaimonia involves exercising virtue. The first more pure virtue component (i.e., 2/2) produced a strong relation with the original eudaimonia component (3/3). The virtue items were more closely related to eudaimonia than to hedonia. Aristotle treated excellence and virtue as mostly indistinguishable. He presumed that the good life (i.e., eudaimonia or human flourishing) involved doing acts at the right time for the right reason and in the right way.

This affirmation of the relation of virtue to other elements of eudaimonia may seem intuitively unsurprising. Still, modern psychological indicators of eudaimonia seldom explicitly include items related to virtue or its absence or, as noted by Sheldon (2018), its activity. Thus, this relation between virtue and other elements of eudaimonia deserves attention.

Nonetheless, the message regarding virtue is not completely clear from this analysis. The virtue items separated quite early from the other eudaimonia items. This could indicate a relatively low coherence among distinct eudaimonic indicators of well-being. This could help explain why there is such vast variance in how well-being researchers define eudaimonia (Vittersø, 2016a). Eudaimonia may be a relatively low coherence construct, and emphasis on different elements may lead to the widely differing definitions (cf. Martela & Sheldon, 2019).

This analysis further supports the suggestion that the typical measure of subjective well-being (i.e., positive affect, negative affect, and life satisfaction) is problematic because the construct involves two more pure and one conflated indicator of well-being. The first two elements in this common indicator represent fairly pure measures of related but distinct parts (positive and negative elements) of hedonia. These elements seem justified for inclusion in conceptualizations of hedonic well-being because of the emergence within this analysis of hedonia and these particular elements as distinct dimensions. Also, the whole field of positive psychology is based on the presumption that value is derived by measuring

Figure 2
Tripartite model of well-being



positive outcomes in addition to the traditional indicators of negative outcomes (Linley, Joseph, Harrington, & Wood, 2006), so including both positive and negative affect makes sense from that perspective. Furthermore, positive and negative affect fit within a long stream of scholarly work not only within psychology but also within philosophy using utilitarianism as the indicator of human achievement. In particular, Jeremy Bentham (1832) argued for what he called the “greatest happiness principle.” By that, he specifically referred to the idea that the “greatest happiness of the greatest number is the foundation of morals and legislation,” so far as the English-speaking world was concerned (cf. Arnett, 2008). Thus, the measurement of positive and negative affect have good psychometric and philosophical roots. However, the inclusion of life satisfaction, as it exists in the three-part indicate of SWB, is problematic. As a sole measure of outcome, life satisfaction may have great value because it seems to represent elements of both the hedonic and eudaimonic tradition. It does not quickly emerge as a distinct dimension within this analysis or earlier analyses (Proctor et al., 2015), possibly because it has strong relations to many of the elements in this collection of measures. As a third element within a measure of well-being, life satisfaction makes less sense. If the purpose is to add variance related to hedonia, then life satisfaction is a poor choice because it is not a pure measure of

hedonia. If the purpose is to add elements related to eudaimonia, then life satisfaction is a less pure measure of eudaimonia than other possible measures such as meaning or virtue, which quickly emerge as distinct from hedonia (see Proctor et al., 2015). Thus, as previously suggested, operationalizations of SWB from the hedonic perspective should include measures of hedonic well-being (affect) or subjective happiness, but not life satisfaction (Proctor & Tweed, 2016; Proctor et al., 2015) unless the researchers are content with a SWB measure that is neither a pure measure of hedonia nor a pure measure of eudaimonia, nor a balanced measure of both.

This analysis also supports research calling for a tripartite or Big Three model of well-being that includes a psychosocial element (see Figure 2). Indeed, as evidenced in this study and in previous research (Proctor et al., 2015), a naturally emerging additional element comprised of basic psychological need satisfaction emerges. Furthermore, as argued and evidenced by Martela and Sheldon (2019), basic psychological need satisfaction (autonomy, competence, and relatedness), is essential for human wellness and hold promise as a parsimonious and universal set of psychosocial elements completing a tripartite model of well-being alongside hedonic and eudaimonic well-being (cf. Joshanloo, 2018). Moreover, in accordance with Ng and Tay (2020), we not only argue for the inclusion of virtue in considerations of eudaimonia but also agree that “[we] align our measurement methods and models in such a way that it does justice to the theory from which the construct sprang” (p. 4).

In accordance with Martela and Sheldon (2019), we therefore support calls for more clearly delineated and agreed upon core components of EWB upon which future research can concentrate. Furthermore, we also suggest that this begins with making a clear distinction between the three prominent sub-categories of well-being in general (i.e., hedonic well-being, eudaimonic well-being, and psychosocial/psychological need-satisfaction). Figure 2 depicts a tripartite model of well-being that takes into consideration the essential components discussed and analysed in this study. That is, a model that includes the interplay between eudaimonic well-being (virtue and empathy), hedonic well-being (positive and negative affect), and psychosocial well-being (basic psychological needs satisfaction), all of which impact one’s cognitive evaluation of life as a whole (i.e., life satisfaction).

Unexpected evidence emerged that the rejecting-influence element of authenticity and some other authenticity items may load more with low dysphoria than with well-being. The Bass-Ackward method allows for unexpected findings such as this to

emerge, and could indicate a topic for further research.

The findings of this study must be considered in light of several limitations. Firstly, the results are based on a small non-representative, primarily female sample of university students. Secondly, although the sample was made up of university students, it is not representative of the general population with respect to age, gender, or ethnicity, and therefore caution is warranted in making generalizations. Further, participants received an incentive for their participation by way of course credit, which may have impacted the sample structure. Nonetheless, the sample does represent a group of young people at a stage in life when they are volitional, often removed from familiar support structures of friends and/or family, and living in a stressful environment that challenges their mental health. Nevertheless, this change is stressful for many individuals, with 87% of first-year students reporting having problems coping with university, with a series of sources of stress including the initial transition to university, studying, isolation, financial difficulties, and living independently (Wakeford, 2017; YouthSight, 2017), 74-77% of students reporting having experienced anxiety, and 69-77% reporting having felt depressed within an academic year (National Union of Students, 2015; YouGov, 2016). Moreover, this research utilized an existing data set in order to explore the emerging structure of well-being. Future research would benefit from the utilization of a purposefully collected data set resulting from randomized sampling procedures. Finally, this study and the underlying structure of well-being considered (i.e., life satisfaction, subjective well-being, psychological well-being, hedonic well-being, and eudaimonic well-being) are based almost entirely on Western and English-speaking world conceptualizations and philosophical traditions. Indeed, as highlighted by Arnett (2008), research published in journals of the American Psychological Association are overwhelmingly focused on Americans, who make up only 5% of the world's population, which results in a psychological understanding that does not represent humanity (i.e., the other 95%) (cf. Muthukrishna et al., in press). As suggested by Arnett (2008), future research should seek to address the gaps in knowledge that exist from an excessive focus on Western (predominantly American) and English-speaking

conceptualizations of psychological constructs that stem from a failure to attend to the diverse cultural, contextual, and circumstantial variations that inform the human experience. Arnett also suggested that psychological conceptions need to be less American. Arnett's suggestion for wider conceptualization is partly adhered to here. Sandstrom and Dunn (2011) argued that many people are blind to the role of virtue in promoting well-being, but the blindspots regarding conceptions of well-being might differ across cultures; some cultures, more than others, socialize members to more spontaneously and frequently consider issues related to moral rectitude (Domino & Hannah, 1987).

CONCLUSION

Overall, findings of this research add support to the Big Two model of well-being, justifying the distinction between hedonia and eudaimonia. These results also support previous findings indicating that life satisfaction is neither purely hedonic nor eudaimonic but is related to both constructs, and thus operationalizations of subjective well-being (i.e., a composite score composed of positive affect, negative affect, and life-satisfaction) as hedonic well-being are problematic. Results also support calls for a return to the Aristotelian roots of eudaimonia and the inclusion of virtue in modern Western and English-speaking world conceptualizations of the construct. Indeed, results suggest a justification for a movement away from the longstanding narrower Big Three *measurement* of hedonic well-being (positive affect, negative affect, life satisfaction) towards a broader Big Three (tripartite or Bigger Three) *model* of well-being – one that includes virtue in measures of eudaimonic well-being, pure measures of hedonic well-being, and a psychosocial component. ■

Endnotes

1 Subjective well-being has been conceptualized throughout according to Diener's (1984) definition – with life satisfaction being a cognitive evaluation of life as a whole, accordingly.

2 Please see Martela and Sheldon (2019) for a review and discussion of the various operationalizations of EWB in the literature.

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