Short Communication

Examining the structure of subjective well-being through meta-analysis of the associations among positive affect, negative affect, and life satisfaction

Michael A. Busseri

Department of Psychology, Brock University, 1812 Sir Isaac Brock Way, St. Catharines, Ontario L2S 3A1, Canada

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ABSTRACT

Despite the simplicity of Diener's (1984) tripartite formulation of subjective well-being (SWB) – comprising life satisfaction (LS), positive affect (PA), and negative affect (NA) – ambiguity remains concerning its structure. Emerging research suggests a resolution based on a hierarchical conceptualization comprising a latent SWB factor with three indicators (PA, NA, LS). Extending previous research, we meta-analysed correlations among PA, NA, LS ($k = 40$ samples, $N = 34{,}298$). Meta-analytic correlations were moderate in magnitude and in the anticipated directions, and did not vary significantly as a function of sample characteristics. Further, PA, NA, and LS had substantial loadings on a latent SWB factor. Results thus provide strong support for the generalizability of the associations among PA, NA, and LS, as well as the robustness of a hierarchical structural conceptualization of SWB.

1. Introduction

Subjective well-being (SWB; Diener, 1984) refers to how individuals evaluate and experience their lives in positive (vs. negative) ways. SWB is typically conceptualized as having three primary components: A global subjective judgment concerning one's life overall, referred to as life satisfaction (LS); and the frequency of one's positive (PA) and negative (NA) affective (NA) experiences (Diener, Suh, Lucas, & Smith, 1999). This tripartite conceptualization has spawned an enormous amount of research examining the characteristics, correlates, predictors, and potential consequences of SWB (Diener, Oishi, & Lucas, 2015; Eid & Larsen, 2008). Despite the simplicity of the tripartite formulation, uncertainty persists concerning the structure of SWB, that is, how LS, PA, and NA together define, reflect, or comprise the construct of SWB (Busseri & Sadava, 2011). Various structural approaches have been employed, including: treating LS, PA, and NA as three separate facets within a broad domain of inquiry (e.g., Diener & Biswas-Diener, 2002); specifying a causal system in which PA and NA are treated as joint influences on LS (e.g., Schimmack, Diener, & Oishi, 2002a); and conceptualizing SWB as a hierarchical construct operationalized as a latent factor reflected in LS, PA, and NA (e.g., Larsen, Diener, & Emmons, 1985). Importantly, the various prominent structural conceptualizations imply different – and sometimes conflicting – answers to fundamental questions concerning SWB including its definition, as well as how best to operationalize, analyze, and interpret SWB-related findings (for a detailed review of these issues see Busseri & Sadava, 2011).

In seeking to resolve this ambiguity, Busseri (2015) used a 10-year longitudinal study to compare results concerning sociodemographic, personality, and lifestyle predictors of SWB based on various structural models of SWB. Findings revealed several conflicting results between the structural models concerning the apparent longitudinal predictors of SWB. For example, conclusions concerning the predictive effects of extraversion and neuroticism on SWB varied depending on the structural model. Busseri (2015) also examined whether various structural approaches adequately accounted for the observed associations among LS, PA, and NA within and across time. A similar approach was employed by Metler and Busseri (2017) across varying longitudinal intervals (1 week, 3 months, 3 years). Metler and Busseri (2017, Study 2) also employed an experimental design to evaluate causal links between LS, PA, and NA. In each of these studies, only one structural conceptualization – SWB as a hierarchical construct – was fully supported, and not contradicted, by the empirical findings. According to this structural model, both the shared and unique variances in PA, NA, and LS are critical to understanding SWB (Busseri & Sadava, 2011; Busseri, Sadava, & DeCourville, 2007). A hierarchical conceptualization may provide a resolution to the ongoing ambiguity concerning the structure of SWB.

As a next step, a quantitative meta-analysis is critical to establishing the generalizability of the associations among LS, PA, and NA. In previous discussions of the structure of SWB (e.g., Busseri et al., 2007; Busseri & Sadava, 2011; Schimmack, 2008), it has been observed that LS is typically positively correlated with PA and negatively correlated with NA. The PA-NA correlation is typically negative in sign, but can vary widely across samples, ranging from positive, to near-zero, to very strongly negative (e.g., Schimmack, 2007; Schimmack, Diener, & Oishi, 2002b). Some of this variability may be related to how affective experiences are operationalized, including the specific affect

Table 1
Sample characteristics for studies examined in meta-analysis and scale reliabilities.

Characteristic	k	M	Range
No. of participants	40	857	30–21,322
Mean age (in years)	35	26.60	12.75–72.92
Female participants (%)	38	58%	5%–100%
Student (vs. community/adult) sample	40	60%	
Western/non-Asian (vs. Eastern/Asian) country	40	60%	
Reliability – PA	37	0.86	0.69–0.94
Reliability – NA	37	0.81	0.66–0.91
Reliability – LS	16	0.82	0.75–0.89

Notes. PA = positive affect. NA = negative affect. LS = life satisfaction.

terms, scale anchors, and time frames employed (e.g., Schimmack, 2007, 2008). The assessment of PA and NA also continues to be a source of debate in light of conflicting theories concerning the bipolar versus bivalent structure of affective experience (e.g., Feldman Barrett & Russell, 1998; Watson, Wiese, Vaidya, & Tellegen, 1999).

Importantly, previous studies suggest that happiness and well-being are most closely tied to the frequency of PA and NA, rather than to the intensity of such experiences (e.g., Diener, Sandvik, & Pavot, 1991). Further, SWB is thought to encompass both positive and negative affective experiences that are general and specific, as well as high and low in activation/arousal (Diener et al., 2009). Consequently, many self-report measures of affective experiences are not ideally suited to studying SWB, including the widely-used Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) which assesses the intensity of affective experience rather than frequency, and only includes high-activation affective experiences. To address these issues, Diener and colleagues developed the Scale of Positive and Negative Experiences (SPANE; Diener et al., 2009, 2010). This scale assesses the frequency of PA and NA for both general and specific types of low and high activation affective experiences. The SPANE has been used in hundreds of published research studies conducted around the globe, with strong evidence of its validity and reliability (Jovanović, 2015; Sumi, 2014a).

The main goal of the present work was to undertake a meta-analysis of the correlations among the three primary components of SWB, based on studies assessing PA and NA using the SPANE. We predicted moderate correlations among all three SWB components, including a positive PA-LS correlation, and negative PA-NA and NA-LS correlations. We also explored moderators of these correlations based on several sample characteristics, including sample size, participant age, sex mix, sample type (student vs. community/adult), and country (Western/non-Asian vs. Eastern/Asian; Schimmack et al., 2002b). In addition, we evaluated the generalizability of a hierarchical structure model of SWB by using the meta-analytic correlations to estimate a latent SWB factor. We predicted moderate positive loadings from PA and LS, and a moderate negative loading from NA, as well as reliable unique variance in each SWB component.

2. Method

Using two databases (PsycInfo and Google scholar), we identified 42 peer-reviewed English-language articles published up to 2015 in which PA and NA were assessed using the SPANE. For 34 of these articles ($k = 40$ samples) the PA-NA correlation was obtained from the report or through email correspondence with the authors. Nineteen of these articles ($k = 21$) also reported correlations involving LS.[1] From each of these works we tabulated the correlations among PA, NA, and LS, as well as their reliabilities

(Cronbach αs). Sample characteristics were also coded from each study, as detailed below. References for the studies included in the meta-analysis are provided in the Supplementary Information file.

Each study assessed SWB using the following measures. The SPANE (Diener et al., 2009, 2010) is a 12-item measure of the frequency of positive (six items; e.g., joyful, happy, contented) and negative (six items; e.g., sad, angry, afraid) affective experiences. Ratings are provided based on the past four weeks using a five-point scale (1-*very rarely or never*, to 5-*very often or always*), and are averaged or summed to compute separate PA and NA scores. The Satisfaction With Life Scale (SWLS, Diener, Emmons, Larsen, & Griffin, 1985) is five-item measure of global LS (e.g., "I am satisfied with my life"). Ratings are made on a seven-point scale (1-*strongly disagree*, to 7-*strongly agree*) and are averaged or summed (Pavot & Diener, 2008). Additions characteristics were recorded for each sample: sample size, mean participant age, percent female participants, sample type (student vs. community/adult), and country (coded as Eastern/Asian vs. Western/non-Asian; Schimmack et al., 2002b).

3. Results

Summary information is provided in Table 1. (Descriptive information for each study is provided in Supplementary Table 1) For each reported correlation between PA, NA, and LS, we computed Fisher's r to z transformation. Meta-analytic averages were then estimated for these transformed correlations using an SPSS macro (Wilson, 2005) based on the inverse variance-weighted (*n*-3) effect sizes in a random effects model; meta-analytic results were then converted back to r values. As shown in Table 2, each of the meta-analytic estimates of the correlations among SWB components was moderate in magnitude and in the prediction direction.[2]

The variance across studies for each meta-analytic correlation was statistically significant (*Q*-test *p*-values < 0.001). Accordingly, we explored potential moderators of these associations by regressing each of the three correlations on the sample characteristics using meta-analytic regressions (Wilson, 2005) based on the Fisher-transformed inverse variance-weighted effect sizes in a mixed effects model. The meta-analytic correlations did not vary significantly as a function of sample size, mean participant age, percent female respondents, sample type, or country (all *p*s > 0.05), with one exception: The correlation between PA and LS was significantly stronger in larger samples ($p = 0.04$).[3]

We used the meta-analytic correlations to estimate a latent SWB factor, indicated by PA, NA, and LS. Variance in the latent SWB factor was fixed to 1 for identification purposes. The model was saturated ($df = 0$). The latent SWB factor had moderate to strong loadings on all three indicators ($\lambda s = 0.84$, -0.54, 0.63; *p*s < 0.001) and explained

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[1] The meta-analysis excluded (a) four articles employing the SPANE but which did not report the PA-NA correlation and the authors of which did not respond to email enquiries; and (b) five articles employing a modified version of the SPANE to assess affective experiences in specific contexts or with respect to particular events, or which altered the response format to assess intensity of experience. Also, results concerning LS were not included from two articles employing a single four-point LS measure (Ben-Ezra, Palgi, Walker, Many, & Hamam-Raz, 2014; Soffer, Wolf, & Ben-Ezra, 2011).

[2] When we excluded the Li, Bai, and Wang, (2013) sample, which accounted for 62% of all participants, the meta-analytic results were nearly identical; see Table 2 for details.
[3] Without the Li et al. (2013) sample, none of the sample characteristics were significantly associated with the meta-analytic correlations among the SWB components (all *p*s > 0.05).