



An Investigation of the Emotional Balance Inventory

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ABSTRACT

Using experience sampling methodology, this study investigated the scaling format and validity of an alternative affect measure, the Emotional Balance Inventory (EBI). Signaling occurred twice per day for a week, directing undergraduate students ($n = 79$) to report the frequencies of their emotions using either a dichotomized or Likert scaled format of the EBI. At the conclusion of the daily ratings, participants completed two measures of psychological well-being. Results revealed little evidence in the distinction of the response formats, and there was marginal evidence supporting the monotonic relationship between the affect measure and psychological well-being measures. External validity and generalizability are discussed, along with implications for future research utilizing clinical populations.

Keywords: affect balance, emotion, scale validity, psychological well-being

INTRODUCTION

Numerous measures exist that allow researchers and clinicians to evaluate the frequency, intensity, and valence of one's affective experiences. Nevertheless, researchers who wish to examine the construct of affect balance, which is the balance between positive and negative affect, may find themselves at a disadvantage. Many widespread affect and mood assessments, such as the positive and negative affect schedule (PANAS; [60]) and the differential emotions scale (DES; [27]), were not constructed to measure affect balance. Moreover, other issues regarding conventional affect measures pose problems for affect balance research. These problems include moderately valenced inventory items, items that depict arousal rather than hedonic states, and inventories with an unequal distribution of positive and negative items [15, 56]. Consequently, these inventories may exclude extreme affective states seen in those with mood disorders [8], and they may lead to mathematical complications in calculating balance scores. Developed by Schwartz [48], the Emotional Balance Inventory (EBI) is a unique measure of affect balance that resolves these problems and possesses several methodological and statistical advantages over standard affect and affect balance measures.

The EBI yields a quantitatively distinct affect balance ratio. According to the States of Mind (SOM) model from which the EBI is derived, the ratio of positive to positive plus negative affects or cognitions ($P/[P+N]$) defines an individual's state of mind [44, 45]. Under the initial SOM model, a functionally optimal state of mind associated with psychological adaptation arose when the balance ratio equaled .618. Using Boolean algebra from Lefebvre's [31] theory of self-reflection, Schwartz [47, 48] amended the original SOM model by redefining the optimal balanced SOM ratio as .813, and he associated it with positive mood and well-being. The reformulated model also outlined new parameters and setpoints for SOM categories, which delineate distinct degrees of psychological functioning based upon the affect balance ratio. Table 1 reports these revised SOM categories. Since its formulation, the EBI has been successfully used in clinical intervention studies whereby patients' affect balance ratios were assessed pre- and post-treatment, with reports of patient's affect balance moving from the extreme negative (.34) to normal (0.72) values after treatment [22, 48, 56]. Moreover, preliminary evidence suggests that the affect balance ratios correlate with other measures of well-being such as Friedman's well-being ($r = .73$) and Scheier and Carver's life orientation optimism scale ($r = .47$ [21]).

The structure and content of the EBI provide several methodological and mathematical advantages over standard affect and affect balance measures. First, the EBI is theoretically grounded in the SOM model which offers a precise operationalization of the measure's construct compared to other affect balance measures. For example, the affective balance construct in Bradburn's Affect Balance Scale [6] was based on empirical evidence from Bradburn and Capolvit's [7] findings on life satisfaction, not general affect. Second, the EBI's ability to differentiate among varying categories of psychological functioning and psychopathology yields more qualitative information about individuals which has proven beneficial in clinical assessment and therapeutic interventions [48, 56]. Third, the EBI's utilization of the $P/[P+N]$ ratio in measuring affect balance offers several advantages in terms of computational analyses over other affect balance constructs that rely upon either a difference score (positive affect minus negative affect) or a simple P:N ratio [17, 20]. These advantages include eliminating the need for data transformations and imputation methods for undefined values, simplifying statistical procedures, and the affordance for cross-sectional comparison of results across studies [3, 4]. For example, the affect balance ratio ($P/[P+N]$) avoids positively skewed distributions and undefined values often found with P:N ratios and difference scores as the balance ratio contains an upper bound of 1, a lower bound of zero, and a non-zero denominator [4].

Although the EBI has been successfully implemented and has many benefits, due to the limited number of studies that have utilized the EBI, more evidence is needed to establish its criterion and external validity. In addition, the item format of the EBI needs to be examined as many researchers and psychometricians contend that Likert-type scales are superior in terms of validity and reliability compared to dichotomous scales [42, 59]. Contrary evidence suggests, however, marginal or no differences in validity and reliability outcomes between dichotomous and polychotomous scales [2, 9, 19, 34, 35, 43, 55]. When studies compare these two scaling formats often, they fail to find any differences in the validity estimates between the two forms, particularly for criterion and convergent validity estimates [13, 26, 32]. Moreover, the assumption that a scale's reliability increases as the number of response options increases has not always been proven [28, 34, 36]. Factor analysis studies comparing polychotomous and

dichotomous scales have also reported adequate or equivalent fit indices for dichotomous scales [9, 32].

The notion that dichotomous scales are a poor choice for scale development is not as straightforward as some researchers may claim because dichotomous scales offer several benefits over Likert-type scales. These benefits include shorter completion time, precision, and ease of scoring. First, dichotomous inventories allow respondents to answer more items in a short period, yielding more information compared to Likert-type scales [11]. Thus, dichotomous scales would likely prove beneficial to those respondents in repeated measure design studies, as these scales would reduce respondent fatigue. Second, since dichotomous scales are a forced-choice format, these scales extract exact answers, and there is little misunderstanding regarding the question posed. Though the level of precision in dichotomous scales has been a noted critique made by those in favor of Likert-type scales [23, 38], Matell and Jacoby [34] reported that the number of response options (2 to 19) did not impact the quality of the data. Moreover, this level of precision has proven useful for emotion researchers interested in the frequency of affective states [57]. Third, dichotomous scores have been historically implemented in personality assessments for their ease of scoring, especially for instruments with clinical applications [12, 52]. Considering the evidence that indicates marginal differences between polychotomous and dichotomous scales, the benefits that dichotomous scales pose, and the design of the EBI to deliver the affect balance ratio ($P/[P+N]$), it stands to reason the EBI measure may benefit from incorporating a dichotomous item format.

RESEARCH AIMS AND HYPOTHESES

The primary aim of the current study was to determine if dichotomizing the EBI items would lead to better psychometric outcomes over the Likert-type format of the inventory. A secondary aim of this study was to provide more evidence concerning the EBI's criterion validity. To investigate the validity of the EBI, we correlated the EBI's affect balance ratios with previously validated measures of well-being, particularly life satisfaction [16] and psychological flourishing [17]. Since the EBI measures affect balance, we hypothesize that the EBI's affect balance scores should exhibit a monotonic association with the two psychological well-being constructs, as previous research has indicated a positive correlation between affect balance and life satisfaction [40, 64] and psychological flourishing [17, 54]. We moreover employed an experience sampling design (ESM) to allow for a momentary assessment of affect balance scores for approximately one week [30]. Daily assessment of affect balance scores allowed for assessment of the scale's variability and dispersion of the EBI ratios. Experience sampling designs have several noted advantages over one-time assessments, such as reducing recall bias and improved ecological validity, and are often utilized to assess affect and mood [1, 50, 58].

METHOD

Sample

Recruitment was conducted through the university's SONA administration system, where in exchange for their participation, participants received prorated course credit which was contingent upon the number of responses given. Participants included 79 undergraduate students from a midwestern public university (14 men, 65 women, $M_{age} = 21.33$, $SD_{age} = 5.38$). Two-thirds of the sample identified their ethnicity as Caucasian (67.1%), with the remaining

participants identifying as African American (6.3%), Hispanic/Latino (6.3%), Asian American (5.1%), Native American (12.7%), Native Hawaiian (1.3%), and other (1.3%).

Measures

Emotional Balance Inventory (EBI)

Participants completed the 42-item emotional balance inventory (EBI). The EBI assesses emotional balance measured by dimensions of positive and negative affect. The positive affect dimension was comprised of 21 items and three subscales of happiness, friendliness, and vitality. The three subscales were summed to yield the positive (P) score. The negative affect dimension was comprised of 21 items and three subscales of anger, sadness, and fear. The three subscales were summed to yield the negative (N) emotion score. Participants' *emotional balance* was calculated by dividing the positive emotion score by the sum of the positive and negative totals; viz., $P / (P+N)$. The emotional balance ratios were categorized by the SOM levels of psychological functioning [46, 47]: *Extreme Negative* (.000 - .437), *Conflicted* (.438 - .563), *Subnormal/Coping* (.564 - .672), *Normal* (.673 - .766), *Optimal* (.767 - .844), *Deep Optimal* (.845 - .900), and *Extreme Positive* (.901 - 1.00).

Participants were administered either the polychotomous or dichotomous version of the EBI (see Appendix). To report the frequency of an emotion, participants given the polychotomous version responded using a five-point Likert scale ranging from 0 (*never*) to 4 (*almost always*). Example polychotomous EBI items included asking participants, "*how frequently have you experienced feeling proud within the past three to four hours?*" and "*how frequently have you experienced feeling hopeful within the past three to four hours?*" The dichotomous EBI utilized a forced-choice format, and participants responded to the frequency of the EBI items using a yes or no format, which indicated either the presence or absence of the emotion. An example dichotomized EBI question asked participants, "*have you experienced feeling exuberant within the past three to four hours?*"

Depending upon the participants' response, ten situational contexts were presented as a list to participants, and they selected the context in which the emotion occurred. Potential situational contexts included education, work, leisure and physical activities, interpersonal and romantic relationships, basic needs, spiritual or religious activities, social or political involvement, and loneliness. Those in the dichotomous group reporting yes to the exhibited emotion were given the list of contexts. If participants reported feeling the emotion frequently (3) or almost always (4), representing higher ends of the polychotomous scale, then the list of situational contexts followed the preceding EBI question. The situational contexts were not analyzed in the results below.

Psychological Well-Being Measures

Participants completed the five-item Satisfaction with Life Scale (SWLS; [16]) that assessed the individuals' cognitive judgments of life satisfaction. Based upon a seven-point Likert scale (from 1, *strongly disagree*, to 7, *strongly agree*), scores on the SWLS can range from 5 to 35. Total scores were obtained by summing all items from the measure, with lower scores indicating dissatisfaction with one's life and higher scores indicating satisfaction. Previous research by Pavot & Diener [41] demonstrated high internal reliability of SWLS, with reports of Cronbach's alpha ranging from 0.79 to 0.89. The Flourishing Scale (FS; [17]) measured individuals' propensity to engage in social-psychological functioning, such as having positive relationships.

Comprised of eight items, the Flourishing Scale is a seven-point Likert scale anchored by 1 (*strongly disagree*) and 7 (*strongly agree*), with scores ranging from 8 to 56. Lower levels of social-psychological functioning were represented by low scores obtained on the FS, and higher scores represented higher levels of social-psychological functioning. Diener and colleagues [17] reported high reliability, with a reported Cronbach's alpha of .87 and temporal reliability of .71.

Procedure

Participants enrolled in the SONA system and were directed to the Qualtrics online server (<http://www.qualtrics.com>). After signing an electronic consent form, participants were given a demographics questionnaire. Next, participants provided basic contact information, such as their email address and phone number; then, participants created a unique code to ensure the anonymity of their data collected during the week. The phone numbers collected were converted to email addresses, allowing text message reminders to be sent to the participants' phones. Participants were randomly assigned to either take the dichotomous or polychotomous version of the EBI. Using the signal-contingent approach [62], twice per day, over seven days, participants were emailed and texted at random times between the waking hours of 8:00 a.m. 8:00 p.m., prompting them with a message containing a link to take their respective EBI measures whenever it was convenient for them. Previous research restricted response collection 20 to 30 minutes after signaling occurred [10, 14]; however, this response range was arbitrarily set. Responses were included in the data analyses if the response occurred on the same day as the signal was sent and the response from the second signal was at least three or four hours apart from the first response. If the second response did not have a timestamp of at least three or four hours apart from the first recorded response, then the response was treated as a missing case. Moreno et al. [37] pilot findings suggested that a time frame of three to four hours between each signal is ideal time window for college students. Each participant received a total of fourteen signals. The fourteenth signal prompted participants to report their emotional balance and psychological well-being, whereas signals 1 through 13 prompted participants to report only their emotional balance. Of the participants in the sample, two-thirds ($n = 54$) completed the psychological well-being measures, and the participants who failed to complete the measures appropriately were treated as missing cases in the analyses below.

RESULTS

Distributional Comparisons

Frequencies of missing observations are reported in Table 2. The frequency of missing observations was calculated by dividing the number of missing observations by the total number of observations. The frequency of missing data was estimated to be 34%, which is similar to missing response data reported in other studies using ESM procedures [51]. The impact of using the dichotomous or polychotomous response format was assessed by first comparing the distributions of EBI ratios from the two scaling methods. As can be seen in Table 3, descriptive statistics revealed highly similar mean and median values for the ratios for the two scaling methods. The standard deviations for the ratios, however, were typically higher for the dichotomous scoring method compared to the polychotomous method across the fourteen time points. Examination of the ratios, grouped into the seven categories of functioning and tallied across all participants and all fourteen time points, revealed the nature of this difference in variability; specifically, the dichotomous scaling format yield greater proportions of "extreme negative" and "extreme positive" ratios compared to the polychotomous format. As

can be seen in Figure 1, the dichotomous format yielded approximately 19% more EBI ratios in the two extreme categories than the polychotomous format. A randomization test moreover indicated that the difference between the two distributions in the figure was not plausibly the result of physical chance (c -value $< .001$; see [24]).

Given these between-group differences in variability, the within-person standard deviations for the fourteen daily EBI ratios were also computed and examined. Figure 2 shows two cases in which the variability of ratios across the fourteen time points was dramatically different. As can be seen, Case #3, who completed the polychotomous version of the EBI, showed very little variability in their emotion balance ratios across time ($SD = .08$). By comparison, Case #32 completed the dichotomous version of the EBI and varied greatly in their emotional balance scores across the fourteen days ($SD = .28$). Across all participants the standard deviations of the ratios were generally higher for those who used the dichotomous scale ($M_{SD} = .26$, $Mdn_{SD} = .25$) compared to those who used the polychotomous scale ($M_{SD} = .14$, $Mdn_{SD} = .15$). As a simple non-parametric test of these individual differences, the standard deviation for each person in the dichotomous group ($n = 36$) was compared to the standard deviation of each person in the polychotomous group ($n = 39$) with the expectation that the former value would be greater than the latter value (viz., dichotomous standard deviation $>$ polychotomous standard deviation). Examination of all possible pairs of individuals from the two groups revealed that 1064 of the 1404 comparisons (75.78%) matched expectation; in other words, most of the participants who completed the EBI using the dichotomous scaling format revealed greater variability in their emotional balance ratios across the fourteen days when compared to individuals who used the polychotomous format. A randomization test indicated this high percent difference was not plausibly the result of physical chance (c -value $< .001$).

Psychological Well-Being

For all participants scores for the Satisfaction with Life Scale (SWLS; $M = 24.07$, $Mdn = 25.00$, $s = 7.59$) and Flourishing Scale (FS; $M = 45.29$, $Mdn = 46.00$, $s = 7.48$) were skewed toward the low ends of their respective possible scale ranges. Scores from these two measures of psychological well-being were expected to be monotonically and positively associated with the EBI ratios. Avoiding assumptions of continuous quantitative measurement and distributional normality, Spearman rank-order correlations between the well-being scores and balance ratios were computed for each of the fourteen time points and reported in Table 4. As can be seen, the life satisfaction and flourishing scales were generally more highly correlated with balance ratios for those participants who completed the polychotomous version of the EBI ($Mdn_{SWLS} r = .419$; $Mdn_{FS} r = .545$) compared to those who completed the dichotomous version ($Mdn_{SWLS} r = .274$; $Mdn_{FS} r = .106$). The fourteen balance ratios were then aggregated into medians within each participant and correlated with the measures of life satisfaction and psychological flourishing. Figure 3 shows the four resulting scatterplots.

With regard to the polychotomous version of the EBI, the Spearman correlations were moderate in magnitude for the SWLS ($r = .45$) and FS ($r = .70$) variables. By comparison, the correlations for the dichotomous version of the EBI were notably lower ($r = .33$ for life satisfaction; $r = .20$ for flourishing). Only the scatterplot comprised of the EBI ratios and flourishing scale scores demonstrated a compelling monotonic relationship. Lastly, given the differences in variability in balance ratios noted above between the dichotomous and polychotomous groups, the individual standard deviations computed across the fourteen time

points were correlated with the life satisfaction and flourishing scale scores. The Spearman correlation values for these four analyses were low, not exceeding .16 in absolute value.

DISCUSSION

The current study sought to investigate if dichotomizing the EBI scaling format would produce better psychometric outcomes over the polychotomous EBI format. We also aimed to provide additional evidence concerning the EBI's criterion validity. Polychotomous scales, such as Likert scales, have become a popular psychometric scoring paradigm used in research [5], as previous evidence suggests that, on average, Likert scales have better reliability and validity estimates compared to dichotomous scales [42, 53]. However, other studies have failed to confirm this finding, showing little to no evidence of the distinction between these two scaling formats [2, 9, 19, 34, 36]. Generally, our findings suggest somewhat marginal evidence to support any substantial distributional differences between the scaling formats since both scales had highly similar mean and median values. Nonetheless, the polychotomous scale had higher correlation coefficients with the life satisfaction and flourishing scales, suggesting that the polychotomous EBI led to improved psychometric validity compared to the dichotomous format.

Overall, the distributional pattern of the data between the dichotomous and polychotomous scaling formats indicated that the EBI ratios for the dichotomous group clustered at the tail ends of the distribution. In contrast, the EBI ratios for the polychotomous group fell towards the middle of the distribution. The binary nature of the dichotomous scale illustrates the extremity of these EBI ratios found within the dichotomous group, as Weijters et al. [61] found that increasing the number of item response options led to a decrease in an extreme response style. These slight differences that appeared in the distributional pattern were also demonstrated by the differences in variability expressed by the standard deviations. Researchers have suggested that decreasing the number of response options available will reduce the variability of the scale and increasing the number of response options leads to an increase in the reliability of a scale [33, 53]. Our results from a simple non-parametric test support the notion that reducing the number of response options impacts the variability of the scale, as indicated by the higher standard deviations found within the dichotomous group. However, the fluctuations observed among the standard deviations for both scaling formats may likely be attributed to the study's design. Due to the inherent nature of experience sampling methodology, which assesses the subjective nature of one's experiences, this allows researchers to measure the variability of an experience, as researchers have used respondents' standard deviation as a measure of intraindividual affect variability [18, 39]. Thus, we cannot conclude that the polychotomous scale led to greater reliability than the dichotomous scale.

Regarding the EBI's criterion validity, the results from Spearman's correlation coefficients reveal a weak monotonic relationship between the EBI ratios and life satisfaction and the EBI ratios and psychological flourishing. Albeit the small monotonic association between the EBI ratios and life satisfaction, our findings corroborate previous evidence suggesting a positive association between SOM ratios and life satisfaction [63]. The weak monotonic association between the EBI ratios and the psychological well-being measures is plausibly due to the weaker correlation coefficients observed among those in the dichotomous group. Thus, the polychotomous EBI's correlation coefficients were greater in magnitude than the dichotomous

ones, suggesting that the polychotomous scale led to increased validity estimates over the dichotomous scale.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

There are two potential limitations pertaining to the results of our study. One limitation concerns the external validity of our data as we utilized a college sample, so our results warrant caution because they may not be representative of the entire population [25]. The generalizability of the SOM ratios may be impacted depending upon the sample utilized. For example, Jones and colleagues [29] found within their college sample that individuals reported more extreme positive and deep optimal SOM ratios, and there was little evidence to support any monotonic increase between the SOM ranges. On the other hand, Schwartz and colleagues [49] utilized a clinical sample and indicated more variation within their patients' SOM ratios and observed a monotonic increase from the extreme negative (.375) to normal range (.719) before and after treatment. Despite these generalizability issues, previous research using the EBI has primarily utilized clinical samples. Thus, we sought to provide further evidence for the EBI's external validity by using a non-clinical sample. Future research implementing the EBI should aim to draw from a non-clinical sample better representative of the general population. A second limitation of the current study concerns the study's design. In order to prevent participant fatigue and the potential for increased dropout rates, we implemented a cross-sectional assessment of life satisfaction and psychological flourishing at the end of the week. This decision to include a one-time assessment of the psychological well-being measures could have led to the observed weak monotonic association between the EBI ratios and the psychological well-being measures. Regardless, more research is needed to determine associations between the EBI and other psychological well-being measures and whether the EBI ratios are theoretically supposed to increase linearly. Furthermore, to our knowledge, the EBI has not been used in any factor analysis studies to investigate the subscales and items of the measure. It would likely be beneficial for future research to investigate whether the EBI's three positive and negative subscales would load onto positive and negative affect factors.

CONCLUSION

Our findings confirm that the EBI is a unique alternative to traditional measures of affect that allows researchers and clinicians precise quantification of one's emotional temperature. We extend previous research that has implemented the EBI by demonstrating that the measure has sound psychometric properties, and we have provided additional evidence for the measure's validity. Further, our results contribute to the body of knowledge concerning scaling formats by highlighting that the assumption for Likert-scales superiority may not be as clear as some contend. Although the dichotomous EBI format was observed to have lower validity estimates and higher standard deviations than the polychotomous EBI format, we conclude that the dichotomous format may be a useful alternative depending on a study's design and purpose.

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TABLES**Table 1: Revised States of Mind Categories and Levels of Psychological Functioning**

SOM Category	Range
Extreme Negative	.000 - .437
Conflicted	.438 - .563
Subnormal/Coping	.564 - .672
Normal	.673 - .766
Optimal	.767 - .844
Deep Optimal	.845 - .900
Extreme Positive	.901 - 1.00

Table 2: Frequency of Missing Observations

Time Point Observations	Total Observations	No. of Missing Observations	Frequency % Missing Observations	EBI Ratio	Total No. of Observations	No. of Missing Observations	Frequency % of Missing Observations
Timepoint 1	69	10	3.79%	EBI Ratio 1	65	14	4.65%
Timepoint 2	71	8	3.03%	EBI Ratio 2	71	8	2.66%
Timepoint 3	63	16	6.06%	EBI Ratio 3	60	19	6.31%
Timepoint 4	71	8	3.03%	EBI Ratio 4	68	11	3.65%
Timepoint 5	66	13	4.92%	EBI Ratio 5	64	15	4.98%
Timepoint 6	65	14	5.30%	EBI Ratio	62	17	5.65%
Timepoint 7	54	25	9.47%	6	52	27	8.97%
Timepoint 8	63	16	6.06%	EBI	62	17	5.65%
Timepoint 9	56	23	8.71%	EBI	51	28	9.30%
Timepoint 10	57	22	8.33%	Ratio	56	23	7.64%
Timepoint 11	52	27	10.23%	7	48	31	10.30%
Timepoint 12	53	26	9.85%	EBI	50	29	9.64%
Timepoint 13	49	30	11.36%	Ratio	46	33	10.96%
Timepoint 14	53	26	9.85%	8	50	29	9.64%
Total	842	264	99.99%	EBI Ratio 10 EBI Ratio 11 EBI Ratio 12 EBI Ratio 13 EBI Ratio 14 Total	805	301	100.00%

Note. The frequency of the missing data for the sample (n = 79) was estimated to be 34%

Table 3: Descriptive Statistics for the EBI Ratios

EBI Ratios	Dichotomous				Polychotomous			
	<i>n</i>	<i>M</i>	<i>Mdn</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>Mdn</i>	<i>SD</i>
Ratio 1	33	0.65	0.75	0.30	32	0.65	0.68	0.24
Ratio 2	34	0.69	0.72	0.25	37	0.68	0.69	0.21
Ratio 3	25	0.72	0.85	0.33	35	0.69	0.75	0.25
Ratio 4	31	0.66	0.75	0.32	37	0.71	0.69	0.21
Ratio 5	32	0.62	0.67	0.34	32	0.66	0.65	0.23
Ratio 6	32	0.70	0.80	0.26	30	0.69	0.69	0.21
Ratio 7	25	0.65	0.67	0.30	27	0.68	0.68	0.20
Ratio 8	29	0.70	0.78	0.30	33	0.72	0.72	0.21
Ratio 9	26	0.73	0.84	0.30	25	0.64	0.71	0.23
Ratio 10	29	0.68	0.86	0.35	27	0.63	0.69	0.30
Ratio 11	25	0.71	0.79	0.32	23	0.71	0.77	0.24
Ratio 12	25	0.73	0.87	0.32	25	0.74	0.81	0.21
Ratio 13	25	0.59	0.67	0.39	21	0.66	0.68	0.29
Ratio 14	23	0.63	0.67	0.37	27	0.65	0.64	0.25

Table 4: Spearman's Rank Correlation Coefficients Between the EBI Ratios and Well-Being Measures

EBI Ratios	Dichotomous		Polychotomous	
	SWLS (ρ)	FS (ρ)	SWLS (ρ)	FS (ρ)
Ratio 1	0.21	0.08	0.46	0.62
Ratio 2	0.52	0.26	0.28	0.49
Ratio 3	0.21	0.07	0.54	0.52
Ratio 4	-0.08	-0.18	0.42	0.54
Ratio 5	0.35	0.24	0.15	0.35
Ratio 6	0.33	0.08	0.37	0.55
Ratio 7	0.34	0.40	0.42	0.57
Ratio 8	0.35	0.35	0.29	0.49
Ratio 9	0.21	0.31	-0.07	0.11
Ratio 10	0.41	0.37	0.55	0.63
Ratio 11	-0.18	0.02	0.51	0.65
Ratio 12	0.15	0.03	0.25	0.45
Ratio 13	0.29	0.13	0.56	0.62
Ratio 14	0.26	0.07	0.51	0.72

FIGURES

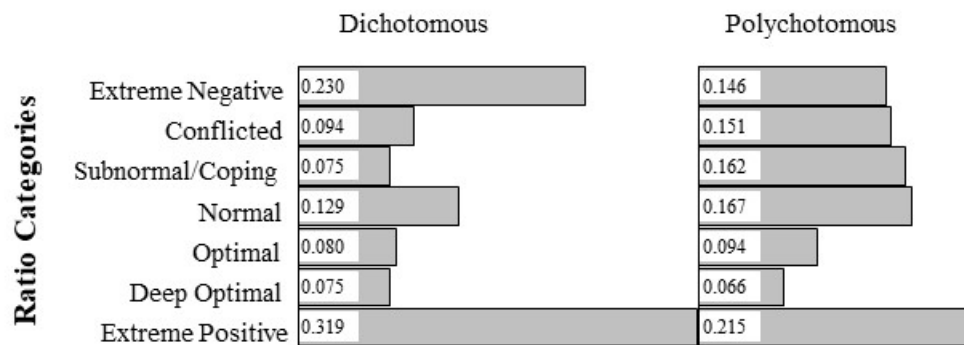


Figure 1. Ratio proportions for dichotomous and Likert scale formats

Note. Values represent proportions for the dichotomous or polychotomous EBI ratios classified into the seven categories of functioning.

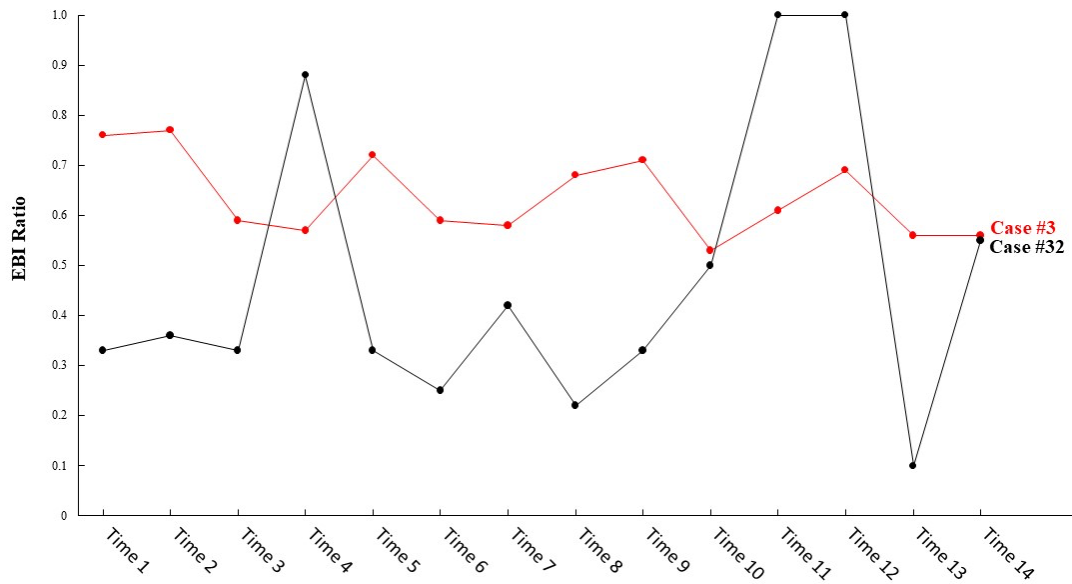


Figure 2. EBI ratios for two participants with contrasting variability
Note. Two respondents' EBI ratios across one week are graphically depicted. The red line represents the polychotomous EBI ratios (Case #3) and the black line represents the dichotomous EBI ratios (Case #32).

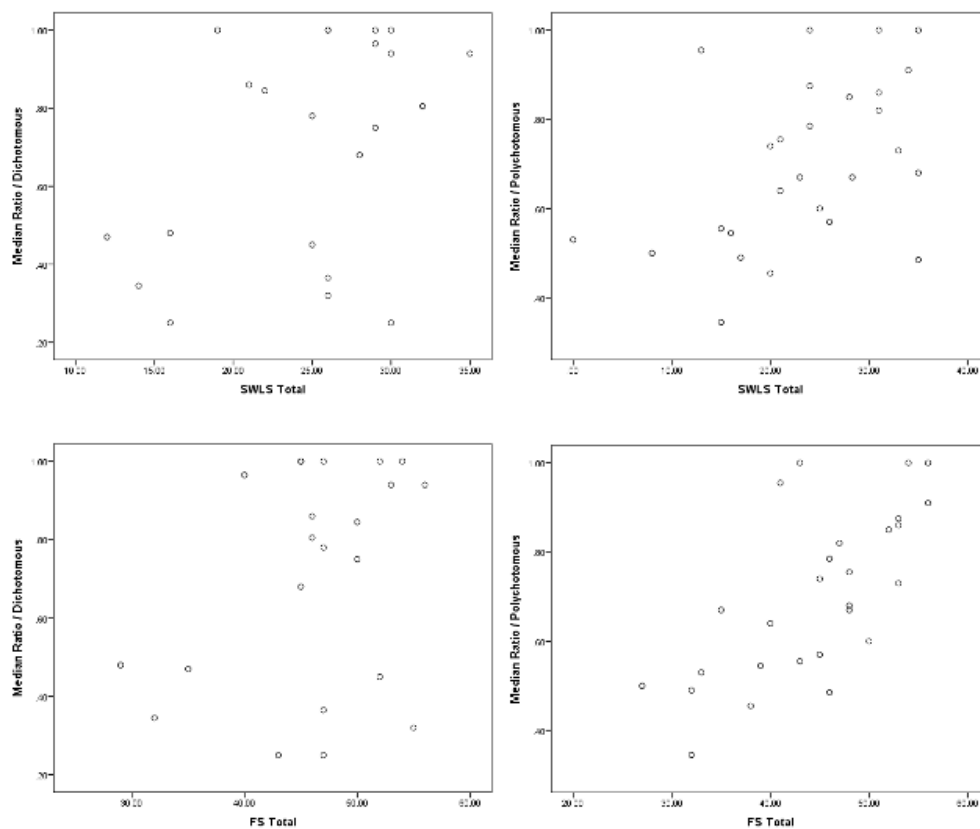


Figure 3. Scatterplots comparing median EBI ratios with life satisfaction (SWLS) and psychological flourishing (FS) for dichotomous and polychotomous rating scales

APPENDIX

Polychotomous Emotional Balance Inventory

Directions: Please consider how frequently you have experienced each of the listed feelings to follow. For each feeling, indicate the frequency of the feeling using the following options: never, rarely, sometimes, frequently, or almost always. Depending upon the answers you provide, you may be asked additional questions.

Item Stem – How frequently have you experience d feeling _____ within the past three to four hours?	Emotions presented in the item stem, _____						
Response choices:	Proud	Anxious	Interested	Grateful	Ashamed	Loving	Irritable
o Never o Rarely o Sometimes o Frequently o Almost Always	Hopeful	Aroused	Devoted	Nervous	Hostile	Happy	Enraged
	Afraid	Dread	Frustrated	Romantic	Exuberant	Friendly	Regretful
	Panicky	Lively	Annoyed	Tense	Inspired	Engaged	Amused
	Guilty	Enthusiastic	Terrified	Despair	Joyful	Hateful	Affectionate
	Sad	Passionate	Ecstatic	Depressed	Vigorous	Angry	Tormented

Note. The presented polychotomous emotional balance inventory above were adapted to meet the experience sampling methodology design.

Dichotomous Emotional Balance Inventory

Directions: Please consider whether or not you have experienced each of the listed feelings to follow. For each feeling, click either yes or no, indicating that you either experienced the feeling or not. Depending upon the answers you provide, you may be asked additional questions.

Item Stem – Feelings/emotions presented in the item stem, _____

Have you
experience
d feeling

within the
past three
to four
hours?

Response	Proud	Anxious	Interested	Grateful	Ashamed	Loving	Irritable
choices:	Hopeful	Aroused	Devoted	Nervous	Hostile	Happy	Enraged
o Yes o No	Afraid	Dread	Frustrated	Romantic	Exuberant	Friendly	Regretful
	Panicky	Lively	Annoyed	Tense	Inspired	Engaged	Amused
	Guilty	Enthusiastic	Terrified	Despair	Joyful	Hateful	Affectionate
	Sad	Passionate	Ecstatic	Depressed	Vigorous	Angry	Tormented
